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Research Article

An Overview of Missed Nursing Care and Its Predictors in Saudi Arabia: A Cross-Sectional Study

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Background. Nursing care is holistic, and missing any aspect of care can be critical to patients' health. However, due to the complex and intense nature of the nursing practice, nurses have to unintentionally prioritize some activities, forcing them to omit some aspects of nursing care. *Aim*. To explore the dimensions of missed nursing care and its predictors within the Saudi Arabian healthcare system. *Methods*. Quantitative, cross-sectional study used the MISSCARE survey by utilizing nonprobability convenience sampling to collect the data of 604 staff nurses working in inpatient wards in Jazan, Saudi Arabia. *Results*. The overall mean of missed nursing care is ($m = 1.37$, $\text{SD} = 0.45$). Missed nursing care activities were mostly failure to attend interdisciplinary care conferences ($m = 1.66$, $\text{SD} = 0.96$) and patient ambulation thrice a day ($m = 1.63$, $\text{SD} = 0.97$). Missed nursing care was mainly caused by human resource shortage ($m = 3.53$, $\text{SD} = 0.88$). Missed nursing care is predicted by the turnover intention ($B = 2.380$, $t = 3.829$, $p < 001$) and job satisfaction ($B = -0.864$, $t = -4.788$, $p < 001$). *Conclusion*. Although missed nursing care is evident in Saudi Arabia, it is significantly lower than the international rates, and it is mainly caused by labor resource shortage which directly influences nurses' job satisfaction and intention to leave. Optimizing the recruitment process, resource allocation and effective nurses' retention programs are proposed solutions that may be beneficial to mitigate missed nursing care.

1. Introduction

Ensuring optimum care and safe practice is the core objective of all healthcare organizations. The World Health Organization (WHO) defines patient safety as the prevention or mitigation of errors and harms to patients associated with the provision of health care (2017). The Institution of Medicine encourages surveillance and reporting of errors in healthcare, with several initiatives, to measure and mitigate errors [1]. These errors are classified into two major types: errors of the commission as a result of the wrong action taken and errors of omission as a result of actions not taken or missed [2].

Nurses play a crucial role in preserving patient safety [3], considering that they constitute the largest portion of healthcare providers [4]. They also play an active role in detecting and preventing errors [5]. Furthermore, the holistic merit of nursing practice demands direct interaction and intervention with patients. This complex and intense nature of nursing practice make nurses prone to committing unintentional errors [6], and as a result of time constraint and insufficient manpower and resources, they often have to consciously prioritize some activities over others [7].

Missed nursing care is an omission error wherein some aspects of required nursing care are partially or totally delayed or unfulfilled [8]. It occurs in all cultures and countries [9] and is an important indicator of nursing care quality and patient safety [10]. This phenomenon has several names that are used interchangeably. Among them are missed nursing care [11], implicitly rationed care [12, 13] and nursing care left undone [14, 15]. Nevertheless, all of them denote the omission or delay of parts of nursing care [16].

A pioneer qualitative study [11] interviewed nurses to determine the frequency and reasons behind missed nursing care and reported the following nine major elements of nursing care that are usually missed: ambulation, position change, feeding, patient teaching, discharge planning, emotional support, hygiene, intake, and output documentation. According to Kalisch et al. [9], missed nursing care is an omission error in which its antecedents include labor resources, material resources, and communication/teamwork, with serious consequences and threats to patient safety.

However, factors associated with missed nursing care still remain poorly explored. Ausserhofer et al. [14] reported that the frequency of missed nursing care is clearly associated with both the nursing work environment and the nurse-to-patient ratio. Working under pressure with time and resource restrictions leads nurses to commit errors of omission and neglect of care [17]. Kalisch [11] enumerated different reasons behind missed nursing care; among them are staffing inadequacy, time restriction, poor delegation, and insufficient material resources. In 2021, Al-Fauri, Obaidat, and AbuAlRub explored the types and reasons for missed nursing care among Jordanian nurses and inferred that inadequate manpower is the most frequent cause of missed nursing care and that a low nursing staffing ratio is associated with high missed nursing care. Furthermore, Alsubhi et al. [18] conducted an extensive review to identify factors associated with missed nursing care and nurses' voluntarily turnover; they found that missed nursing care is highly prevalent in many countries and is linked to negative patient outcomes, poor nursing satisfaction, and a high tendency for turnover.

Moreover, missed nursing care has detrimental consequences for both patients and healthcare organizations, and it is associated with poor nursing care, job dissatisfaction, absenteeism [7], poor retention, and staff morale [19]. Most importantly, it has a negative effect on patient safety [20, 21]. It leads to increased length of hospital stay, undesirable complications (e.g., bed sores, falls, and hospital-acquired infection) [22], ineffective pain management, malnourishment, and high mortality [23].

In Saudi Arabia, few studies explored missed nursing care and mainly focused on its relationship with the practice environment and safety. To the best of our knowledge missed nursing care and its predictors in Saudi Arabia have not yet been investigated. Hence, this study aimed to explore the most common types and reasons behind missed nursing care and its predictors in a unique multinational nursing workforce in Saudi Arabia.

2. Methods

2.1. Design. This cross-sectional, observational, quantitative study explored the most common types and reasons for missed nursing care and its predictors.

2.2. Settings. The study was conducted among nurses working in inpatient wards in the Jazan area (2 tertiary and 8 general hospitals) with 1565 bed capacity and 1566 nurses working as staff nurses in inpatient wards in total.

2.3. Participants and Sampling. Data were collected from participating nurses between June 1, 2021, and September 30, 2021. As COVID-19 pandemic precautions demand physical distancing, the study used an online data collection method. The study questionnaire was created using Google Forms, and the link was shared with the regional nursing administration in Jazan and consecutively forwarded to Directors of Nursing in the proposed hospitals, and they distributed to their nurses. Convenience sampling was utilized. Inclusion criteria for participation required nurses to be working in inpatient wards and provide direct nursing care. Meanwhile, nurses working in the outpatient department, administration, and those who are not involved in providing direct nursing care were excluded. Yamane's sample size formula: $n = N(1+\mathrm{N}^{*}\mathrm{e}^{2})$ [24], used to determine the appropriate sample size with 95% confidence level, 5% margin of error and study population of 1566, n= (319). Out of 1566 projected participants, only 604 participants completed the survey.

2.4. Study Questionnaire. The study employed the MISSCARE survey, which was developed by Kalisch and Williams in 2009. It consists of two main sections: the first section measures missed nursing care, which has 24 items. The participants were asked to indicate how often the nursing care is missed for each item, using a 5-point Likert scale ranging from never missed = 1 to always missed = 5 The second section of the MISSCARE survey which consists of 17 items aims to explore the reasons that drive nurses to MISSCARE. The survey requires participants to rate the reason for missed nursing care as significant, moderate, minor, or not a reason for missed nursing care. Participants' demographic characteristics, including age, gender, level of education, work experience, overtime, and working shifts were also included. The survey designates 3 items to measure nurses' job satisfaction which are the level of nurse satisfaction in the current position, the level of nurse satisfaction with being a nurse, and nurse satisfaction with the level of teamwork in the unit. In addition, nurses' intention to leave is measured by 1 item that asks participating nurses to report their intention to leave their current work within 6 months, within one year, or no intention to leave. In the present study, the study questionnaire was tested by 15 nurses in a pilot study to confirm the reliability and applicability, and Cronbach's α was 0.93 and 0.95 for the first and second sections, respectively, of the MISSCARE survey.

2.5. Ethical Considerations. Prior to data collection, permission to use the MISSCARE survey was granted by the original author. The electronic survey began with informed consent, all participants needed to read and chose to agree option to start filling out the questionnaire. The data collection method did not pose any health risk, and the participants' privacy was carefully preserved. Ultimately, to further enhance anonymity, the participants and their responses were coded so that their data could not be readily used for nonresearch purposes.

2.6. Statistical Analysis. All statistical data were analyzed using SPSS version 25.0. The data collected from the MISSCARE survey were analyzed using descriptive statistics, including mean and standard deviation (SD). Internal consistency of the study tool and the association of missed nursing care with job satisfaction and intention to leave were evaluated by correlational analysis including Pearson correlation coefficient and Spearman's rho correlation coefficient. Linear regression was used to test if variables can predict missed nursing care.

3. Results

Out of 1566 projected participants, the study recruited only 604 participants (response rate = 39%), 89.1% were female, 69.9% aged 25–34 years, and 51.3% had a bachelor's degree in nursing. In addition, 30.1% of the participants had been working for a period extended between 5 and 10 years. Meanwhile, 47% had been working overtime for 1–2 hours in the last 3 months, and 80.1% had no plans of leaving their current work (Table 1).

7.3% of participants reported that "attending interdisciplinary care conferences whenever held" was the most frequently missed element of nursing care (mean (m) = 1.66). Another element that was also frequently missed by 6.6% of participants was "facilitating ambulation thrice per day or as ordered" with $m = 1.63$). Conversely, "bedside glucose monitoring as ordered" recorded the least missed care activities as 90.7% of participants never missed ($m = 1.12$ (Table 2).

Table 3 summarizes the common reasons behind missed nursing care. The most frequently reported was "inadequate number of staff" ($m = 3.53$). This reason was reported to be significant. Other significant reasons were "inadequate number of assistive and/or clerical personnel (nursing assistants, technicians, and unit secretaries)" ($m = 3.36$), "unexpected rise in patient volume and/or acuity on the unit" ($m = 3.29$), and "heavy admission and discharge activity" ($m = 3.15$).

Correlation analysis was rendered between the study's main variables and missed nursing care. Missed nursing care had a significantly positive relationship with nurses' intention to leave ($r = 0.199$, $p < 0.001$) and a significantly negative relationship with nurses' job satisfaction ($r = -0.297$, $p < 0.001$) (Table 4).

Variables of age, gender, qualification, level of experience, adequate staffing, overtime, turnover intention, and level of satisfaction were tested if they predict missed nursing care among participants using multiple regression. Results show that 21% of the variance in missed nursing care can be accounted for by the seven predictors collectively F (10,593)= (16.319), $p < 001$. The results shows that the turnover intention ($B = 2.380$, $t = 3.829$, $p < 001$) and the level of satisfaction ($B = -0.864$, $t = -4.788$, $p < 001$) positively predict missed nursing care (see Table 5).

4. Discussion

Missed nursing care is a multifaceted phenomenon that has a direct impact on patients' health outcomes. This study aimed to determine the most common types and reasons behind missed nursing care and its predictors. The overall mean of missed nursing care in Saudi Arabia, as shown in this study (1.37), is significantly lower than those in the US (1.71) [25], South Korea (1.40) [26], and Australia (2.02) [27] as well as among middle eastern countries, such as Jordan (2.78) [28] and Egypt (2.26) [29].

The most frequently missed nursing care activities were failure to attend interdisciplinary care conferences, patient ambulation for three times a day, and turning and positioning every 2 hours, consistent with the results of several studies, including Gravlin and Bittner [30], Kalisch et al. [31], Papastavrou et al. [32], and Tubbs-Cooley et al. [33]. Nurses may perceive that these tasks are not a priority and that missing them will not cause serious impacts on patients' health. The most frequently missed task by nurses was attending interdisciplinary conferences, which can be attributed to work overload and lack of time to participate in such meetings [34]. In addition, nurses may probably have an unclear perception toward their role in the process of shared clinical decision and their contribution to the therapeutic process as a whole. Meanwhile, missing basic tasks including patient ambulation for three times and turning and positioning every 2 hours are often associated with the lack of supportive services and personnel such as aid nurses. These physical tasks require a certain level of strength and teamwork cooperation. Possibly, nurses missed these tasks because of their overdependence on family involvement in basic care. In Saudi Arabia, the healthcare system allows admitted patients to be accompanied by a family member to provide psychological support and ease the patients' hospitalization experience. Nurses may delegate under supervision some simple nursing tasks to patient attendants and request to assist in providing care, including ambulation, turning, and positioning.

The least common missed nursing care activities were bedside glucose monitoring and vital signs assessment. This result is consistent with several studies [10, 29, 31]. Nurses may perceive that such tasks are crucial and serious indicators of any deterioration in the general condition of patients and that they have a direct impact on patients' health outcomes. Nurses may also prioritize these tasks because it requires less time and effort to perform and needs precise documentation of results.

Furthermore, the most significant reasons for missed nursing care were inadequate number of staff, inadequate number of assistive personnel, patient volume/acuity, and heavy admission/discharge activity. Human resource shortage in hospitals is often regarded as one of the main factors of failure to provide comprehensive and quality care by nurses and nursing assistants. The gap between nursing workforce supply and demand reflects some

Table 1: Sample statistics.

Characteristics	Frequency	Percentage
Gender		
Male	66	10.9
Female	538	89.1
Age (years)		
<25	24	4.0
25–34	422	69.9
35–44	128	21.2
45–54	30	5.0
Highest educational attainment		
RN diploma	220	36.4
AND	50	8.3
BSN	310	51.3
MSN or higher	24	4.0
Nursing experience		
≤6 months	14	2.3
>6 months–2 years	102	16.9
>2 years–5 years	132	21.9
>5 years–10 years	182	30.1
>10 years–15 years	114	18.9
>15 years	60	9.9
Overtime duration for the last 3 months		
None	202	33.4
1–12 hours	284	47.0
>12 hours	118	19.5
Plans to leave the current position		
No plans to leave	484	80.1
In the next 6 months	30	5.0
In the following year	90	14.9
How satisfied are you in your current position?		
Very satisfied (*n* (%))	52 (8.6%)	
Satisfied (*n* (%))	84 (13.9%)	
Neutral (*n* (%))	140 (23.2%)	
Dissatisfied (*n* (%))	232 (38.4%)	
Very dissatisfied (*n* (%))	48 (15.9%)	
Independent of your current job, how satisfied are you with being a nurse or a nurse assistant?		
Very satisfied (*n* (%))	12 (2%)	
Satisfied (*n* (%))	42 (7%)	
Neutral (*n* (%))	74 (12.3%)	
Dissatisfied (*n* (%))	208 (34.4%)	
Very dissatisfied (*n* (%))	268 (44.4%)	
How satisfied are you with the level of teamwork on this unit?		
Very satisfied (*n* (%))	12 (2%)	
Satisfied (*n* (%))	58 (9.6%)	
Neutral (*n* (%))	104 (17.2%)	
Dissatisfied (*n* (%))	250 (41.4%)	
Very dissatisfied (*n* (%))	180 (29.8%)	

serious local conditions. According to Aboshaiqah [35]; the limited number of nursing schools in Saudi Arabia, low wages, long working hours, and the negative social perception of nursing are the reasons why many nurses give up their nursing careers and why the country is experiencing an exacerbation of nurse shortage. These results suggest that the system of care in hospital units, where admissions and discharges and acuity fluctuations are the regular ebb and flow of the unit work, is not responsive to workload volume.

Although the Saudi Ministry of Health and Saudi Central Board for Accreditation of Healthcare Institutions laid out safe staffing "nurse to patient ratios" standards in its facilities, the national nursing shortage hinders achieving these standards that led nurses to an excessive workload which is considered as a significant reason for missed nursing care. Therefore, nurses prioritize their patients according to their acuity level, and critical patients usually receive the most attention compared with those who are less critical [36]. Tubbs–Cooley et al. [37]

Table 2: Types of missed nursing care.

Items	Never missed	Rarely missed	Occasionally missed	Frequently missed	Always missed	Mean	SD
Attending interdisciplinary care conferences whenever held	369 61.1%	114 18.9%	77 12.7%	44 7.3%	0 0%	1.66	0.96
Facilitating ambulation three times per day or as ordered	398 65.9%	74 12.3%	92 15.2%	40 6.6%	0 0%	1.63	0.97
Turning and positioning every 2 hours	185 61.3%	122 20.2%	76 12.6%	36 6%	0 0%	1.63	0.92
Feeding the patients when the food is still warm	418 69.2%	82 13.6%	66 10.9%	38 6.3%	0 0%	1.54	0.92
Teaching the patients about illness, tests, and diagnostic studies	423 70.1%	96 15.9%	69 11.4%	16 2.6%	0 0%	1.46	0.80
Providing mouth care	430 71.2%	104 17.2%	42 7%	28 4.6%	0 0%	1.45	0.82
Offering emotional support to patients and/or family	219 72.5%	94 15.6%	56 9.3%	16 2.6%	0 0%	1.42	0.77
Assisting with toileting needs within 5 minutes of request	436 72.2%	106 17.5%	46 7.6%	16 2.6%	0 0%	1.41	0.74
Bathing or providing skin care	454 75.2%	94 15.6%	32 5.3%	24 4%	0 0%	1.38	0.76
Responding to call light within 5 minutes	468 77.5%	84 13.9%	40 6.6%	12 2%	0 0%	1.33	0.69
Setting up meals for patients who feed themselves	481 79.7%	72 11.9%	34 5.6%	18 3%	0 0%	1.32	0.71
Discharge planning and teaching	478 79.1%	72 11.9%	40 6.6%	14 2.3%	0 0%	1.32	0.70
Fully documenting all necessary data	482 79.8%	84 13.9%	24 4%	14 2.3%	0 0%	1.29	0.65
Responding to PRN medication requests within 15 minutes	496 82.1%	66 10.9%	22 3.6%	20 3.3%	0 0%	1.28	0.69
Conducting focused reassessments according to patients' condition	484 80.1%	80 13.2%	24 4.6%	12 2%	0 0%	1.28	0.65
Providing skin/wound care	244 80.8%	39 12.9%	12 4%	7 2.3%	0 0%	1.28	0.65
Monitoring intake/output	490 81.1%	74 12.3%	28 4.6%	12 2%	0 0%	1.27	0.64
Administering medications within 30 minutes before or after the scheduled time	492 81.5%	140 11.6%	68 5.6%	16 1.3%	0 0%	1.27	0.62
Assessing the effectiveness of medications	304 83.4%	66 10.9%	26 4.3%	8 1.3%	0 0%	1.24	0.59
Performing patient assessments each shift	510 84.4%	68 11.3%	12 2%	14 2.3%	0 0%	1.22	0.59
Handwashing	528 87.4%	50 8.3%	18 3%	8 1.3%	0 0%	1.18	0.54
Assessing vital signs as ordered	544 90.1%	40 6.6%	16 2.6%	4 0.7%	0 0%	1.14	0.46
Bedside glucose monitoring as ordered	548 90.7%	40 6.6%	14 2.3%	2 0.3%	0 0%	1.12	0.42

IV, intravenous; PRN, as necessary; SD, standard deviation.

revealed a direct relationship between missed nursing care and nursing workload. Meanwhile, Ball et al. [38] argued that for every rise in the number of patients, the workload of each nurse rises; consequently, the probability of missed nursing care will increase to 10%.

The study also found that approximately 20% of the participants had plans to leave their current position. Such a rate is lower than those in Jordan (32%) [28], Egypt (24.8%) [29], and Italy (35.5%) [39]. Furthermore, the current study revealed that missed nursing care had a significantly positive

Table 3: Reasons for missed nursing care.

Items	NOT a reason for missed care	Minor reason	Moderate reason	Significant reason	Mean	SD
Inadequate number of staff	44 7.2%	28 4.8%	98 16.2%	433 71.8%	3.53	0.88
Inadequate number of assistive and/or clerical personnel (nursing assistants, technicians, and unit secretaries)	44 7.3%	64 10.6%	128 21.2%	368 60.9%	3.36	0.94
Unexpected rise in patient volume and/or acuity on the unit	70 11.6%	36 6%	144 23.8%	354 58.6%	3.29	1.01
Heavy admission and discharge activity	74 12.3%	74 12.3%	144 23.8%	312 51.7%	3.15	1.05
Supplies/equipment not functioning properly when needed	74 12.3%	89 14.7%	135 22.4%	306 50.7%	3.12	1.06
Unbalanced patient assignments	88 14.6%	62 10.3%	148 24.5%	306 50.7%	3.11	1.09
Urgent patient situations (e.g., a worsening condition)	74 12.3%	80 13.2%	154 25.5%	296 49%	3.11	1.05
Supplies/equipment not available when needed	78 12.9%	92 15.2%	142 23.5%	292 45.3%	3.07	1.07
Lack of backup support from team members	92 15.2%	88 14.6%	162 26.8%	262 43.4%	2.98	1.09
Other departments did not provide the care needed (e.g., physical therapy did not ambulate)	88 14.6%	106 17.5%	160 26.5%	250 41.4%	2.95	1.08
Tension or communication breakdowns with other ancillary/support departments	100 16.6%	84 13.9%	176 29.1%	244 40.4%	2.93	1.10
Tension or communication breakdowns with the medical staff	96 15.9%	91 15.1%	192 28.5%	245 40.5%	2.93	1.09
Medications were not available when needed	94 15.6%	124 20.5%	126 20.9%	230 43%	2.91	1.12
Tension or communication breakdowns within the nursing team	115 19.1%	100 16.6%	146 24.2%	243 40.1%	2.85	1.15
Caregiver off unit or unavailable	122 20.2%	112 18.5%	136 22.5%	234 38.7%	2.80	1.16
Inadequate handoff from the previous shift or sending unit	119 19.5%	123 20.4%	156 25.8%	206 34.1%	2.75	1.13
Nursing assistant did not communicate that care was not provided	133 21.9%	112 18.5%	155 25.7%	204 33.8%	2.72	1.15

Table 4: Correlations between missed nursing care, job satisfaction, and intention to leave.

Variables	1	2	3	4	5	6
1. Satisfaction with the current position	1.000					
2. Satisfaction with being a nurse	0.387**	1.000				
3. Satisfaction with the level of teamwork in the unit	0.494**	0.414**	1.000			
4. Total satisfaction score	0.818**	0.747**	0.798**	1.000		
5. Intention to leave	−0.212**	−0.368**	−0.266**	−0.353**	1.000	
6. Total missed nursing care	−0.199**	−0.278**	−0.231**	0.247**	−0.199**	1.000

** $p < 0.01$.

correlation with their intention to leave their jobs. Missed nursing care is linked to work overload, considering that nurses cannot monitor all patients assigned to them and compel themselves to ration their care [40, 41]. The workload is a main factor that causes missed nursing care [22]. These circumstances usually lead to poor nursing satisfaction, which is also associated with a higher rate of intention to leave [21].

In addition, a significantly negative correlation was noted between missed nursing care and job satisfaction. These variables are strongly related throughout the nursing literature. This finding is supported by a previous study, which recruited 7079 nurses from different countries, including Australia, the US, Turkey, and Iceland and reported that a higher rate of missed nursing care was linked to a lower level of job satisfaction [42]. The level of nursing job

Table 5: Multiple linear regression predicting missed nursing care.

Model summary						
Model	R		R square	Adjusted R square	Std. error of the estimate	
	0.46		0.21	0.20	0.976	
Model		Unstandardized coefficients		Standardized coefficients	t	Sig.
		B	Std. error	Beta		
	(Constant)	59.35	4.21		14.07	0.001
	Age	0.457	0.831	0.026	0.550	0.580
	Gender	−8.592	1.321	−0.245	−6.505	0.060
	Qualification	−0.132	0.468	−0.012	−0.281	0.779
	Level of experience	−0.010	0.427	−0.001	−0.023	0.981
	Adequate staff	−0.762	0.350	−0.087	−2.178	0.030
	Working overtime	−0.038	0.567	−0.002	−.067	0.946
	Turnover intention	2.380	0.622	0.158	3.829	0.001
	Level of satisfaction	−0.864	0.180	−0.198	−4.788	0.001
Model		Sum of squares	Df	Mean square	F	Sig.
	Regression	15.55	10	155.52	16.319	0.001
	Residual	56.51	593	95.30		
	Total	72.06	603			

satisfaction is an important indicator not only to nurses' physical and psychological health but also to the quality of the healthcare system [43–45]. According to several studies, nursing job satisfaction is directly related to the amount of missed nursing care, considering that staff nurses who reported less missed nursing care often claimed to have a higher level of job satisfaction [23, 31, 46, 47]. Indeed, various reasons can hinder nurses from providing optimum and comprehensive care, leave them frustrated, and eventually, feel dissatisfied with their job. The results of the current study suggest that the level of nurses' job satisfaction and the reasons behind missed nursing care in Jazan hospitals should be explored in depth to mitigate missed nursing care activities and to improve the quality of nursing care provided to patients.

However, the current study has several limitations. It utilized a cross-sectional correlational design, which does not support causation between missed nursing care and staff satisfaction or turnover intentions. The study used an online questionnaire as pandemic precautions recommend which often led to a low response rate. Furthermore, the sample size is relatively small, and it was rendered exclusively in Jazan Region, thereby limiting the generalizability of the study finding among nursing professionals across Saudi Arabia.

5. Conclusions

Missed nursing care is evident across all countries, including Saudi Arabia. Nonetheless, the rate of missed nursing care in Saudi Arabia is significantly lower than those in other international and even middle eastern countries. Failure to attend interdisciplinary care conferences, ambulation, and turning and positioning were the most frequently missed nursing care activities. The main reason behind missed nursing care was human resource shortage. Moreover, poor job satisfaction and high intention to leave were directly associated with an increased rate of missed nursing care. Nursing care is holistic and healthcare organizations need to pay more attention to missed nursing care rates and their underlying causes. Optimizing the recruitment process, resource allocation and effective nurses' retention programs are proposed solutions that may be beneficial to mitigate missed nursing care.

Data Availability

The datasets used for this study are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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Research Article

Factors Associated with Nursing Student Satisfaction with Their Clinical Learning Environment at Wolkite University in Southwest Ethiopia

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Background. The clinical learning environment has been defined as "an interactive network of strengths within the clinical environment that influence the clinical learning outcomes of students. Understanding students' level of satisfaction with their clinical learning environment is crucial to ensuring the required teaching and learning process. Therefore, this study was designed to assess the level of satisfaction with the CLE among nursing students at the Wolkite University of Ethiopia. *Methods.* A cross-sectional study was conducted at Wolkite University. This study was carried out in March 2022 on 208 student nurses selected by purposive and convenient sampling techniques. This study used the English version of the Clinical Learning Environment and Supervision + Nurse Teacher (CLES + T) evaluation scale. The collected data were cleaned, coded, and entered into Epi data 3.1, and then, statistical analyses were performed using SPSS version 26. Bivariate and multivariable logistic regression models were used to identify factors associated with the satisfaction level of nursing students towards CLE. Adjusted odds ratios (AORs) with 95% confidence intervals (CIs) were calculated, and p values < 0.05 were considered to indicate statistical significance. *Results.* More than half of the study participants were females, and nearly half (50.5%) of the participants were in year three of the nursing program. The study found that 39.9% (95%CI: 32.2%, 46.6%) of students were satisfied with their CLE. Factors that had a significant association with the satisfaction level of nursing students towards CLE were gender (female students) (AOR = 16.053 (6.397, 40.286)), year of study (4th year) (AOR = 6.296 (2.679, 14.796)), and the type of the hospital in which their last clinical placement was held (at a primary hospital) (AOR = 2.961 (1.122, 7.815)). *Conclusion.* Effective nursing education programs need to be developed to increase satisfaction with clinical practice and to promote positive emotional regulation in nursing students. Nurse practitioners and managers should be aware of their important role in the professional development of students and their satisfaction with clinical placements.

1. Background

Nursing education should include instruction and practice in a clinical learning setting. A clinical learning environment (CLE) is an environment where clinical skills are acquired by direct or indirect supervision by preceptors and nurse teachers that are both facilitators and responsible for the student's learning in clinical settings. In nursing, the CLE is an essential part of developing skills and integrating theoretical knowledge, clinical practice, and professionalism [1–4].

CLE is a crucial component of the learning process in nursing education. Learning in the clinical practice environment is an essential and core component of nursing education because nursing is a skill-based profession. CLE plays a crucial role in enabling students to develop their professional skills and competencies as they pursue becoming registered nurses [5–7]. To prepare nursing students for the rigors of professional practice, learning in the practice setting is crucial. Clinical practice involves training in a safe and secure environment, without the pressure of real-world performance, for practicing skills; it constitutes a bridge between academic learning and the clinical setting in which students integrate theory and practice and develop a reflective stance [8–11].

Clinical education facilitates the integration and translation of nursing students' theoretical knowledge from academia to practice, thereby enabling learning through learning in a realistic clinical setting [12]. For nurses to effectively perform the myriads of tasks, it depends on their capacity to apply theory to practice. An effective learning process in the clinical setting is essential to combine cognitive, psychomotor, and appropriate attitudes in such a way to benefit both the learning needs of the student and the nursing care needs of the client [2, 13–15].

Student satisfaction with clinical experience and the overall simulated learning environment was a good indicator of the quality of nursing education. Student satisfaction is an important element of the study of the effectiveness of a clinical-based learning environment. Student satisfaction is crucial for meaningful and engaged learning because it encourages active, purposeful engagement in clinical learning experiences [16–18].

The CLE is complicated and dynamic. Many variables, including the kind of supervisor, the standard of student feedback, the setting, and the participants, can affect the CLE. Studies have revealed that challenges faced by nursing students during their CLE have an impact on their general health and interfere with their learning process [19, 20].

Numerous variables, including social, psychological, environmental, and academic factors, can have an impact on a nursing student's satisfaction with their clinical experience and their subsequent involvement in the process [21, 22]. The preference for the practice center, the mean student grade, the distance to the practice center, the number of students assigned to the clinical educator, the type of service, the type of center, and the type of management were the factors influencing satisfaction with their CLE [1, 18, 23].

Many researchers explored the different factors that contributed to the successful development of competencies over the course of clinical placement. The followings are the main learning domains affecting student nurses, ward atmosphere (WA), the leadership of the ward manager (WM), and a supervisory relationship with a nurse teacher (NT) [1, 3, 15, 17, 24–28].

Although nursing students' satisfaction with their CLE is necessary, studies conducted in different parts of the world found that an unconstructive CLE can hinder the attainment of learning targets and delay the gaining of skills, attrition, and dissatisfaction among nursing students. Research conducted in many countries indicates that negative experiences with CLE hinder the achievement of learning outcomes, exacerbating an international nursing shortage [20, 29–31].

Even though a careful understanding of students' satisfaction with their CLE is essential for securing the required teaching and learning process, there is a scarcity of research related to nursing students towards CLE satisfaction in Ethiopia. The research findings will contribute to the limited body of knowledge regarding the topic. The need to improve clinical nursing education is an important aspect of the training of nurses. Therefore, this study forwarded ways of clinical teaching improvement and will enhance the way department heads and nurse educators assume their primary role of improving nursing students during their clinical practice. In addition to nursing education, the results of the study will also be helpful for nursing practice, administration, and further research. Thus, this study was designed to assess the level of satisfaction with the CLE among nursing students at Wolkite University in Ethiopia.

2. Methods

2.1. Study Setting. This study was conducted at Wolkite University, SNNP, Ethiopia. Wolkite University is one of the 3^{rd} generation federal universities in Ethiopia. Wolkite University (WKU) is currently located at SNNPR, Gurage Zone, 170 km south-west of Addis Ababa on the way to Jimma. Currently, the university offers undergraduate, postgraduate, and Ph.D. programs.

2.2. Study Design and Period. A cross-sectional study using a quantitative research design was conducted on March 10–15 2022.

2.3. Population and Eligibility Criteria. All third and fourth-year students were included to participate in the study. The reason behind including those students is that they have already started their clinical attachments with different courses. The inclusion criteria in this research were the students studying in the third and fourth years in the nursing department, consent to participate in the study, and filling out the questionnaire. The exclusion criteria included unwillingness to participate in the study or absence due to educational leave at the time of the study. The data were collected from all the studied populations.

2.4. Sampling Technique. Purposive and convenient sampling techniques were implemented. It is purposive as only third and fourth-year students have been selected to take part in the study. It was convenient because students of those year levels who were available and interested in participating were selected.

2.5. Variables of the Study

2.5.1. Dependent Variable. Satisfaction of nursing students with CLE is a dependent variable in this study.

2.5.2. Independent Variable

(i) *Demographic variables are as follows*: gender, year of study, type of the nursing ward of the last clinical placement, type of the hospital in which clinical placement was held, and number of meetings with nurse teachers during the latest clinical placement.

2.6. Operational Definition. **Satisfaction with CLE:** The Clinical Learning Environment, Supervision, and Teacher (CLES + *T*) scale was used to operationalize satisfaction with

CLE. In this case, it was operationalized as follows: students are satisfied if they get more than the mean value of the total satisfaction score and vice versa.

2.7. The Data Collection Tool and Procedure. Self-administered questionnaires were used. In this study, the CLES + T scale was used. In addition to that, questionnaire on demographic data including the gender, year of study, type of nursing ward of last clinical placement, type of the hospital in which clinical placement was held, and frequency of meeting with nurse teachers during the latest clinical placement was used. We used the English version of the CLES + T assessment scale. This scale of psychometric tests includes a total of 34 elements in five subdimensions [24]. The subdimensions are as follows: pedagogical atmosphere of the ward (nine items), leadership style of the ward manager (four items), premises of nursing of the ward (four items), supervisory relationships (eight items), and the nurse teacher's role in clinical practice (nine items). A Likert scale of 1 to 5 points was used to grade the questions. The scores were as follows: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree. Each student's questionnaire's total mean score was determined by adding up the mean scores of every question. Each student's scores on the questions that make up each of the five subdimensions were also calculated. Higher ratings represent greater agreement with the statements. By averaging the students' overall satisfaction scores, the degree of their contentment with their clinical learning environment was ascertained. The data were collected by two MSc midwifery teachers and one supervisor.

2.8. Statistical Analysis. The collected data were cleaned, coded, and entered into Epi data 3.1, and then, statistical analyses were performed using SPSS version 26. Students' demographic features are displayed as frequencies and percentages. The variables from the bivariate analysis that had a p value of less than 0.25 were added to multivariable logistic regression models to help control confounding variables. To explain the relative impact of independent variables on satisfaction with the clinical learning environment, multivariable logistic regression analysis with a backward stepwise approach of variable selection was utilized. The strength of the link between numerous independent variables and outcome variables was assessed using the adjusted odds ratio after confounding variables were taken into account. The Hosmer– Lemeshow assumption test was used to evaluate the model's goodness of fitness and found that it was properly fitted. Multivariable logistic regression finally reached statistical significance at a p value of < 0.05.

2.9. Data Quality Management. Before actual data collection, a pretest was conducted on 5% [10] of the sample of randomly selected nursing students at a nearby university by data collectors. The reliability of the data collection tool was measured (Cronbach's alpha of the overall items was 0.92), data collection time was estimated, and some modifications such as logical order and rewriting items difficult to understand were made as well. At the end of each day of data collection, the principal investigator and supervisor reviewed the questionnaire to ensure its consistency and completeness.

3. Results

Regarding the sample's demographics data, 47.6% were males and 52.4% were females, with ages ranging from 18 to 34 years, with a mean of 21.08 years and a standard deviation of 2.23 years. Nearly half of the participants were in year three of the nursing program (50.5%). The majority of participants (44.7%) attended the medical ward in their last clinical placement. Of the participants, 55.7% attended a specialized care center for the last clinical learning site and 38.9% met a nurse teacher frequently during the latest clinical placement (Table 1).

3.1. Satisfaction Level of Nursing Students towards CLE. The minimum and maximum scores were 34 and 170, respectively. The mean score for total satisfaction towards CLE among nursing students after adding all items was 3.07 (SD = 0.59). The total score of the respondents who have high satisfaction was 39.9%(95%CI: 32.2%, 46.6%) ($n = 83$), and the total score of those having low satisfaction was 60.1% ($n = 125$). Table 2 shows the level of satisfaction towards CLE among nursing students at Wolkite University. There were five dimensions of satisfaction towards CLE, and the pedagogical atmosphere (50.0%) was the highest, whereas the role of the nurse teacher (34.6%) was the lowest (Table 2).

4. Associated Factors with the Satisfaction Level of Nursing Students towards CLE

Both bivariate and multivariable logistic regression analyses were carried out to identify factors associated with the satisfaction level of nursing students towards CLE. Accordingly, in bivariate analyses, gender, age, year of study, type of the hospital in which their last clinical placement was held, and frequency of their meeting with the nurse teacher during their latest clinical placement were significantly associated with a satisfaction level of nursing students towards CLE at p value < 0.25.

All independent variables with $p < 0.25$ in the bivariate logistic regression analysis were entered into the multivariable logistic regression analysis to identify the final factors associated with the satisfaction level of nursing students towards CLE. Backward logistic regression was used for selecting variables in the final model. In the multivariable logistic regression analysis, gender, year of study, and type of the hospital in which their last clinical placement was held were factors associated with the satisfaction level of nursing students towards CLE.

Female students were about 16.053 (AOR = 16.053 (6.397, 40.286)) more likely to be satisfied with CLE than male students. Those students who were in the fourth year of

Table 1: Distribution of the study participants across demographics ($n = 208$).

Variables	Category	Frequency	Percentage
Gender	Male	99	47.6
	Female	109	52.4
Year of study	3rd year	105	50.5
	4th year	103	49.5
Type of the nursing ward of the last clinical placement	Surgical	42	202
	Gynecology	22	10.6
	Medical	93	44.7
	Pediatrics	31	14.9
	Psychiatric	20	9.6
Type of the hospital in which clinical placement was held	Primary hospital	43	20.7
	General hospital	50	24.0
	Specialized care center	115	55.3
How many times did you meet NT during the latest clinical placement	Never	11	5.3
	1–2 times	69	33.2
	3 times	81	38.9
	Often	47	22.6

n: sample size, NT: nurse teachers.

Table 2: Level of satisfaction towards CLE among study participants.

Domains	Not satisfied		Satisfied	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Content of the supervisory relationship	133	63.9	75	36.1
Role of the nurse teacher	136	65.4	72	34.6
Pedagogical atmosphere	104	50.0	104	50.0
Nursing care of the ward	135	64.9	73	35.1
Leadership style of the ward manager	124	59.6	84	40.4

their study were about 6.296 times (AOR = 6.296 (2.679, 14.796)) more likely to be satisfied with CLE than students in the third year. Additionally, students who attended their last clinical placement in a primary hospital were about 2.961 times (AOR = 2.961 (1.122, 7.815)) more likely to be satisfied with CLE than students who were attending their last clinical placement at a specialized care center (Table 3).

5. Discussion

Our study aimed to assess satisfaction levels towards CLE and its associated factors among selected nursing students at Wolkite University. Accordingly, the magnitude of students' satisfaction with CLE was 39.9% (95%CI: 32.2%, 46.6%). The finding in this study is similar to that reported by a study conducted in Rwanda, in which (40%) of the participants were satisfied [28]. On the other hand, the magnitude of students satisfied with CLE in this study was lower than that in studies conducted in Nepal (88%) [3], at King Saud University [4], the three universities in Cyprus [17], in the Universiti Kebangsaan Malaysia [25], and in India (54.86%) [27]. These discrepancies may be due to differences in the time of research conducted and the difference in the study settings. Furthermore, the discrepancy between the numbers of the sample size used can also affect the difference in the satisfaction level.

The present study' findings showed that the most satisfactory area for student nurses was the pedagogical atmosphere (50%) in their clinical learning environment and that they were least satisfied with the role of the nurse teacher (34.6) and nursing care of the ward (35.1) in their clinical learning environment. Contrary to this, the most satisfactory area for student nurses was the leadership style (1.44) of their mentors in their clinical learning environment, and they were least satisfied with the student-nurse relationship (1.41) and content context balance (1.41) in their clinical learning environment [27]. Furthermore, a study conducted in Ghana demonstrated that the most satisfactory area for student nurses was the leadership style of the ward manager (3.63) [1]. The differences in mean scores in dimensions of the CLES + T were found in different studies that we reviewed. This might be due to different studies considering nursing students in different year levels.

The gender of students was associated with the satisfaction level of nursing students towards CLE. The finding of the present study was supported by a qualitative study that was conducted on nursing students' challenges in a CLE at the school of nursing and midwifery at Addis Ababa University. The result showed that lack of interest is different among gender (male vs. female) as male feel more undermined to study nursing [19]. This might be because the majority of participants were females. On the contrary, Karim et al. [25] found that there was no significant relationship between gender and the level of satisfaction.

In addition, the year of study was strongly associated with the satisfaction level of nursing students towards CLE. The finding of the present study was supported by a study that was conducted on the perception of the CLE among

Table 3: Multivariable logistic regression results showing factors associated with the satisfaction level of nursing students towards CLE, Southern Ethiopia, 2021 ($n = 208$).

Characteristics	Satisfaction towards CLE		COR (95%CI)	AOR (95%CI)
	Satisfied (%)	Not satisfied (%)		
Gender				
Male	14 (6.7%)	85 (40.9%)	1	1
Female	69 (33.2%)	40 (19.2%)	**10.473 (5.271, 20.808)**	**16.053 (6.397, 40.286)**
Year of study				
3rd year	33 (15.9%)	72 (34.6%)	1	1
4th year	50 (24.0%)	53 (25.2%)	**2.058 (1.170, 3.621)**	**6.296 (2.679, 14.796)**
Type of the hospital				
Primary hospital	32 (15.5%)	11 (5.3%)	**7.883 (3.544, 17.531)**	**2.961 (1.122, 7.815)**
General hospital	20 (9.6%)	30 (14.4)	1.806 (.897, 3.637)	1.04 (.46, 2.354)
Specialized care center	31 (14.9%)	84 (40.4)	1	1

Significant at $p < 0.05$; COR: result from bivariate and AOR: multivariable logistic regression. The bold values show significant associations between dependent and independent factors.

nursing students in Nepal. The result showed that the satisfaction of students towards CLE is more as their year of academic study increases [3]. This finding is also confirmed by a different study performed previously [11, 17, 22]. The reason behind this may be due that their satisfaction increased as students progressed through the program that the higher-year students expressed higher confidence in clinical knowledge and skills. On the contrary, a study conducted in Ghana found that the mean CLES + T score was not associated with the year of study even though third-year students had higher scores than fourth-year students [1].

Our findings highlight that the satisfaction with a CLE of nursing students is associated with the type of hospital in which their last clinical placement was held. In this case, students who attended their last clinical placement in a primary hospital were more satisfied with their CLE. This is also supported by another study [10]. The possible justification may be due to the attitudes of the nursing staff and the strong support of students by the staff in primary hospitals being high compared to in specialized care centers. On the other hand, the relationship between the last clinical placement in the previous semester and the level of satisfaction was not significant in another study [25].

6. Conclusion

In conclusion, efficient nursing education programs must be created to improve clinical practice satisfaction and support good emotional regulation in nursing students. Nursing teachers and managers should focus on how to increase the satisfaction level of students. The importance of their contributions to student's professional growth and satisfaction with clinical placements should be understood by nurse educators and department leaders. Gender, year of study, and type of the hospital in which their last clinical placement was held were factors associated with the satisfaction level of nursing students towards CLE. Improving the positive perception of male students towards CLE and improving nursing students' satisfaction starting from the time they started clinical practice will be expected from all responsible bodies. Furthermore, making a close relationship between the nursing department which provides theory and hospitals in which students attend their clinical practice will be recommended to increase the satisfaction level of nursing students towards CLE.

Abbreviations

CLE:	Clinical learning environment
CI:	Confidence interval
COR:	Crude odds ratio
AOR:	Adjusted odds ratio.

Data Availability

Data sets used in this study are available from the corresponding author upon reasonable request.

Ethical Approval

This study was approved by the Institutional Review Board (IRB) of the College of Health Science and Medicine, Wolkite University, with IRB number RCSUILC/112/2021. All methods were used in compliance with the rules and regulations of the institution.

Consent

The study's goals and objectives were described to the study participants. The study subjects provided their informed consent. Before filling out the questionnaire, they were requested to participate voluntarily and advised that they could leave at any time, for any reason.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Authors' Contributions

ABT was responsible for the research idea and proposal development, supervised the data collection process, conducted the analysis, and wrote the manuscript. TGG was involved in proposal development and data analysis and wrote the manuscript. The authors reviewed and approved the final manuscript.

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Research Article

Factors Influencing Turnover Intention among Nurses and Midwives in Ghana

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Background. Nurse turnover intention, defined as a measure of nurses' desire to leave their positions, is a global public health issue with a grave impact on the healthcare workforce. However, literature on it is limited in sub-Saharan Africa, an at-risk region. This study aimed to determine the predictors of turnover intention among nursing staff at a tertiary hospital in Kumasi, Ghana. *Methods*. This was an institution-basedcross-sectional study conducted among 226 randomly selected nurses and midwives working at a tertiary healthcare center in Kumasi, Ghana. Data were collected by using a structured questionnaire. Significant predictors of turnover intention were analyzed by using multivariate logistic regression analysis. Adjusted odds ratio (AOR) with a 95% confidence interval (CI) and p value <0.05 was used. *Results*. The prevalence of turnover intention among study participants was 87.2% (197/226). About two-thirds (61.5%, 139/226) of the participants were exposed to a high level of workplace hazards. Management support (AOR = 3.09, 95% CI = 1.09–8.75), salary (AOR = 0.07, 95% CI = 0.01–0.46), inadequate number of staff on duty per shift (AOR = 3.36, 95% CI = 1.08–10.47) and participants' rank (AOR = 6.81, 95% CI = 1.18–39.16) were significantly associated with turnover intention. *Conclusion*. Overall, the turnover intention was high. Hence, there is a need for policymakers, health administrators, and nurse managers to implement strategies such as increasing staff strength, providing adequate support, incentives, and other forms of motivation for nurses and midwives to help reduce the rate of turnover intention.

1. Introduction

Globally, the increasing demand for healthcare workers, particularly amidst the outbreak of the 2019 coronavirus disease (COVID-19), calls for the need to retain the healthcare workforce. Nurses and midwives form a significant proportion of the hospital workforce. The World Health Organization (WHO) estimates that nurses and midwives constitute approximately 50% of healthcare workers [1]. Nurses and midwives have an important role to play in the achievement of the Agenda 2030 of the Sustainable Development Goal Three (SDG3) of "good health and wellbeing for all" [2]. To be able to achieve SDG3 by 2030, the WHO projects that about 9 million additional nurses and midwives are needed [1].

About half of the global shortage of healthcare workers is attributable to nurses and midwives [1]. This has been heightened by the COVID-19 pandemic with its associated high workload, frequency of nurse absenteeism, increased levels of burnout, and turnover intention [3–6]. Mosallam et al. defined turnover intention as "the final cognitive step leading to actual turnover and that it is the main factor impacting turnover" [7]. Studies have shown that nurses' and midwives' turnover intention range from 20.0 to 67.8% globally [8–11]. In a multinational study, factors such as inadequate staff and job satisfaction were identified to contribute significantly to turnover intention among nurses and midwives [12]. Similarly, in Italy, Sasso et al. reported that poor patient safety and emotional exhaustion were significantly associated with turnover intention among nurses [13]. In sub-Saharan Africa, a pooled prevalence of 50.7% of turnover intention has been reported in a systematic review and meta-analysis [9]. In Ethiopia, a study found that about 64.9% of nurses had turnover intention [14]. Lack of satisfaction with performance appraisal systems, low monthly income, high workload, and young age have been identified as significant predictors of turnover intention among nurses and midwives in sub-Saharan Africa [11, 15, 16].

In Ghana, up to 69.0% of nurses and midwives have been reported to have turnover intention in the future [17–20]. It has been suggested that such turnover intention could be reduced if organizational and nurse managers would adopt a transformational leadership style to inspire positive change [19]. Burnout and workplace violence have also been reported to have a significant effect on turnover intention among nurses [17, 20]. For instance, Opoku et al. found in their study that nurses that experienced high burnout at the workplace had about five times increased odds of turnover intention [20].

This study sought to determine the prevalence and key predictors of turnover intention among nurses and midwives working at a tertiary hospital in Kumasi, Ghana. This study also assessed the exposure levels of workplace hazards and their effect on turnover intention among this group of healthcare workers. One key thing is that studies conducted in Ghana about the subject failed to address the effect of exposure levels of workplace hazards (physical, chemical, mechanical, and psychological hazards) on turnover intention among nurses and midwives. This study, therefore, addresses this gap in the effect of exposure levels of workplace hazards on turnover intention among nurses and midwives in Ghana. The outcome of this study will provide essential data for policymakers in formulating interventions that will aim at retaining nurses and midwives on the job and also reducing exposure to workplace hazards. The ability to retain nurses and midwives in the job in Ghana will also aid in improving the quality of patient care and strengthening the healthcare system of the country.

2. Methods

2.1. Study Design, Setting, and Population. This cross-sectional study was conducted among nurses and midwives working at a tertiary healthcare facility in Kumasi, Ghana, from September 2021 to December 2021. The study site has over 4000 healthcare professionals with diverse expertise. Among the healthcare professionals working in the facility are 2289 registered nurses and midwives. The study population was all registered and certified nurses and midwives working at the hospital. These were staff that performed nursing care at the hospital. The eligibility criteria for the study were all registered nurses and midwives that had practiced for at least 12 months at the facility. All nurses and midwives that were on study, annual and sick leave at the time of the data collection were excluded from the study.

2.2. Sample Size Estimation and Sampling. The sample size was calculated using a baseline study conducted in Nigeria [15], which showed that 85.5% (P) of healthcare workers in Nigeria had turnover intention. Based on a 95.0% confidence interval (Z) and a 5% allowable margin of error (E), the sample size was calculated from the following equation: [21]

$$\text{Sample size} = \frac{Z^2\,(P)(1-P)}{E^2}. \qquad (1)$$

With a nonresponse rate of 20%, a total of two hundred and twenty-nine (229) participants were recruited for the study.

The study participants were selected by using a simple random sampling technique. They were nurses and midwives working in a tertiary healthcare center in Kumasi, Ghana. First, balloting was carried out to select six out of thirteen clinical departments at the hospital. The number of nurses and midwives selected from each department was determined using probability proportional to size. This was performed by dividing the number of nurses in each department by the number of nurses in all the departments and multiplying by the estimated sample size. The selection of study participants was conducted by using the lottery method. Unique identifiers were assigned to all the names of nurses and midwives in each department. The unique identifiers were put in a bowl and drawn one after the other until the estimated sample size for each department was obtained.

2.3. Data Collection Tools and Procedure. Data collection was conducted by using a structured pretested questionnaire using a pen-to-paper approach. A pretest was carried out on 20 nurses and midwives working in a different facility in Kumasi which was not part of the source population for the study. After the pretest, appropriate revisions were made to the data collection instrument. The questionnaire was made up of four major parts; demographic characteristics (age, sex, educational level, among others), workplace environment (management support, leadership style, years of practice, among others), exposure to occupational hazards (excessive workload, slips, falls, extreme temperature, among others), and turnover intention.

The turnover intention was estimated by asking participants if they intended to quit the job in the future with a "yes" or "no" response. The turnover intention was defined as having the intention to quit the job in the future. The level of exposure to workplace hazards was assessed by asking the study participants about seventeen (17) workplace hazards that healthcare workers are potentially exposed to at the workplace. The exposure to a particular hazard was scored '1'. The overall score for the total number of workplace hazards exposed was computed and expressed as a percentage. Study participants that were exposed to at least 70.0% of the hazards were categorized as having a potentially high level of exposure, while those that had less than 70.0% were categorized as having relatively low levels of exposure. The cutoff of the exposure level was determined at the discretion of the authors.

2.4. Data Management and Analysis. The data were exported to Stata version 16 for quality checks and analysis. Descriptive statistics such as frequencies, percentages, and means were presented using tables. Chi-square or Fischer's exact test was used to determine the relationship between demographic characteristics, workplace environment, occupational hazards, and turnover intention. Significant predictors of turnover intention were analyzed by using multivariate logistic regression analysis. Adjusted odds ratio (AOR) with a 95% confidence interval (CI) and p value <0.05 were used to identify significant predictors of turnover intention.

2.5. Ethical Considerations. This study was granted ethical approval by the Komfo Anokye Teaching Hospital Institutional Review Board (KATH-IRB) with reference number KATHIRB/AP/040/20 on the 16th of September, 2021. All recruited study participants provided informed consent. Their privacy and confidentiality were ensured.

3. Results

3.1. Demographic Characteristics and Workplace Environment of Study Participants. Out of a total of 229 participants that were recruited, 226 of them returned the questionnaire filled (response rate = 98.7%). About 45.1% (102/226) of the participants were between the ages of 30 to 39 years. The mean age of study participants was 32.9 (±7.2) years, with a range of 22 to 59 years. About two-thirds (65.0%, 147/226) of the participants were married. A little over half (52.7%, 119/226) of the participants had a diploma as their highest level of education (Table 1).

Approximately 53.1% (120/226) of the participants had practiced for 1 to 5 years. About 37.2% (84/226) of the participants were staff nurses/midwives. About 31.9% (73/226) of the participants indicated they received adequate management support, while about 32.3% (73/226) of the participants indicated they liked the leadership style in the ward (Table 1).

3.2. Turnover Intention and Exposure to Workplace Hazards among Study Participants. Out of a total of 226 participants, about 87.2% (197/226) of participants had turnover intention. About two-thirds (61.5%, 139/226) of the participants were exposed to a high level of workplace hazards. The study participants indicated they were exposed to the following hazards at the workplace: slips, trips, and falls (81.9%), infections from patients (90.3%), excessive workload (73.9%), standing for prolonged periods (72.6%), poor work posture (73.5%), and manual lifting of patients (86.3%) (Table 2).

3.3. Predictors of Turnover Intention among Study Participants. After adjusting for all the significant variables in the multivariate analysis, participants' rank, salary, management support, and the number of staff on duty per shift were identified as significant predictors of turnover intention among study participants (Table 3).

The odds of senior staff nurse/midwife having turnover intention was more (AOR = 6.81, 95% CI = 1.18–39.16) compared to staff nurse/midwife. Similarly, participants that were taking monthly salary between Gh¢3000–4000 ($369–$492) had about 93% (AOR = 0.07, 95% CI = 0.01–0.46) reduced odds of having turnover intention compared to those that were on monthly salary between Gh¢ 1000–2000 ($123–$246).

Study participants that indicated that management support was inadequate were about three (3) times more (AOR = 3.09, 95% CI = 1.09–8.75) likely to have turnover intention compared to those that indicated management support was adequate. Study participants that indicated that the number of staff per shift was inadequate were about 3 times more (AOR = 3.36, 95% CI = 1.08–10.47) likely to have turnover intention compared to those that indicated the number of staff per shift was adequate.

4. Discussion

Turnover intention is a major public health challenge, especially in low-resource settings. This study was conducted to determine the key predictors of turnover intention among nurses and midwives working in a tertiary hospital in Kumasi, Ghana. The study also examined the exposure of nurses to workplace hazards. The prevalence of turnover intention was estimated at 87.2%, with low salary levels being the commonest reason for turnover intention. The significant predictors of turnover intention in the present study were management support, salary, inadequate number of staff per shift, and participants' rank. About 61.5% of the study participants were exposed to high levels of workplace hazards.

The prevalence of turnover intention (87.2%) in the present study was about twice higher than the prevalence rate (45.2%) previously reported in Ghana [19]. The prevalence rate in this present study is comparable to studies conducted in Saudi Arabia (94.0%) and Japan (74.1%) [22, 23]. However, our 87.2% prevalence of turnover intention differs from the 20.7% reported in the Philippines [24] and 24.8% in Egypt [16].

Table 1: Demographic characteristics and workplace environment of study participants.

Variables	Total *n* (%)	Intention to quit *n* (%)	No intention to quit *n* (%)	*p* values
Age group (years)				0.448[a]
20–29	86 (38.1)	72 (83.7)	14 (16.3)	
30–39	102 (45.1)	90 (88.2)	12 (11.8)	
40+	38 (16.8)	35 (92.1)	3 (7.9)	
Mean age (±SD)	32.9 (±7.2)			
Age range	22–59			
Sex				0.051
Male	66 (29.2)	62 (93.9)	4 (6.1)	
Female	160 (70.8)	135 (84.4)	25 (15.6)	
Relationship status				0.606[a]
Single	76 (33.6)	64 (84.2)	12 (15.8)	
Married	147 (65.0)	130 (88.4)	17 (11.6)	
Cohabiting	3 (1.3)	3 (100.0)	0 (0.0)	
Level of education				0.109
Diploma	119 (52.7)	107 (89.9)	12 (10.1)	
First degree	89 (39.4)	77 (86.5)	12 (13.5)	
Postgraduate	18 (8.0)	13 (72.2)	5 (27.8)	
Years of practice				0.056[a]
1–5	120 (53.1)	103 (85.8)	17 (14.2)	
6–10	51 (22.6)	49 (96.1)	2 (3.9)	
11–15	35 (15.5)	27 (77.1)	8 (22.9)	
16+	20 (8.9)	18 (90.0)	2 (10.0)	
Rank				0.003[a]
Staff nurse/Midwife	84 (37.2)	73 (86.9)	11 (13.1)	
Senior staff nurse/Midwife	69 (30.5)	67 (97.1)	2 (2.9)	
Nursing/Midwifery officer	43 (19.0)	33 (76.7)	10 (23.3)	
Senior nursing/Midwifery officer	9 (4.0)	6 (66.7)	3 (33.3)	
Principal nursing/Midwifery officer	21 (9.3)	18 (85.7)	3 (14.3)	
Salary (Gh¢)				0.033
1000–2000	87 (38.5)	77 (88.5)	10 (11.5)	
2000–3000	105 (46.5)	95 (90.5)	10 (9.5)	
3000–4000	34 (15.0)	25 (73.5)	9 (26.5)	
Management support				<0.001
Adequate	72 (31.9)	53 (73.6)	19 (26.4)	
Inadequate	154 (68.1)	144 (93.5)	10 (6.5)	
Leadership style at the ward				<0.001
Like	73 (32.3)	52 (71.2)	21 (28.8)	
Dislike	153 (67.7)	145 (94.8)	8 (5.2)	
Effect of work on the matrimonial home				0.001
Yes	97 (42.9)	93 (95.9)	4 (4.1)	
No	129 (57.1)	104 (80.6)	25 (19.4)	
Number of staff on duty per a shift				<0.001
Adequate	53 (23.5)	37 (69.8)	16 (30.2)	
Inadequate	173 (76.6)	160 (92.5)	13 (7.5)	

NB: postgraduate includes masters, GHC 8.13: USD 1.00 per exchange rate in Ghana during the study period, SD : standard deviation, [a]analyzed by using Fisher's exact test.

The study participants were found to have been exposed to workplace hazards such as slips, trips and falls, cuts, wounds, needle pricks, and injuries from sharp objects, infections from patients, excessive workload, standing for prolonged periods, poor work posture, and manual lifting of patients. The exposure of nurses and midwives to cuts, wounds, needle pricks, and injuries from sharps is not surprising due to their frequent use of sharp objects, such as needles, for injections and other sharp objects at the workplace [25]. This finding is comparable to a study in Saudi Arabia that reported that among healthcare workers, nurses (56.5%) were the most affected by sharp object injuries at the workplace [26]. A higher prevalence of needle stick injuries has also been reported among Iranian nurses in the workplace [27]. This puts them at higher risk of cuts, wounds, needle pricks, and injuries from sharps. Again, these sharps may have been exposed to infected body fluid and blood, which could serve as a medium of transmission of

Table 2: Turnover intention and exposure to workplace hazards among study participants.

Variable	Frequency, $N = 226$	Percentage, %
Turnover intention		
Yes	197	87.2
No	29	12.8
Reasons for turnover intention *		
To seek greener pastures abroad	147	74.6
Salary is too small	190	96.4
Planned career change	62	31.5
Too much abuse	55	27.9
Poor condition of service	179	90.9
My physical health	42	21.3
Lack of respect from doctors	76	38.6
Lack of respect from supervisors	79	40.1
Level of exposure to workplace hazard		
Low	87	38.5
High	139	61.5
Exposure to workplace hazards *		
Slips, trips, and falls	185	81.9
Cuts, wounds, needle pricks, and injuries from sharp objectives	211	93.4
Radiation	45	19.9
Extreme temperature (cold/heat)	53	23.5
Electric shock	61	27.0
Infection from patients	204	90.3
Irritation from disinfectants	125	55.3
Direct contact with a contaminated specimen	98	43.4
Heat	64	28.3
Anaesthetic gas/agents	91	40.3
Excessive workload	167	73.9
Poor interpersonal relationship	99	43.8
Standing for prolonged periods	164	72.6
Chemical inhalation	60	26.5
Poor work posture	166	73.5
Manual lifting of patients	195	86.3
Assault (verbal abuse)	69	30.5

*Multiple responses.

infectious diseases. The majority of the nurses and midwives in this study indicated exposure to infections from patients as one of the common workplace hazards. This could be explained by the study being conducted amidst the COVID-19 pandemic where the infection rate was high. The high exposure to infections from patients in this study underpins an initial report that, as of June 2020, more than 600 nurses had lost their lives due to COVID-19 infections in the world [28]. The 81.9% of the study participants that indicated exposure to slips, trips, and falls is also very disturbing, looking at their effects on sustaining injuries at the workplace [29]. In the univariate analysis, participants who were exposed to high levels of workplace hazards had about three times increased risk of turnover intention compared to those that were exposed to low levels of workplace hazards. However, this was insignificant after adjusting for other covariates. We recommend that hospital architecture and structures should aim at minimizing injury risk.

The present study identified nurses' salaries and management support as significant predictors of turnover intention. This is in line with other studies that reported lack of management support could influence turnover intention among nurses and midwives [30–32]. In a previous study, nurses and midwives with high salaries were also more likely to remain in the profession compared to colleagues with lower salaries [33, 34]. Participants in the present study that indicated that they received inadequate support from management were more likely to have turnover intention compared to those who received adequate support from management. This highlights the importance of management support at the workplace and how it influences nurses' and midwives' turnover intention. When nurses and midwives receive all the needed support, such as the provision of personal protective equipment and medical care policy for the nurse and family, they may feel motivated. Our findings also have implications for policymakers and employers to ensure that salary levels and other forms of remuneration of nursing staff in sub-Saharan Africa are comparable with the global market.

We observed that an inadequate number of nurses on duty predicted turnover intention among study participants. Participants that had inadequate number of staff per shift were more likely to have turnover intention compared to those that had adequate number of staff per shift. In Australia and California in the United States, mandatory nurse-

Table 3: Multivariate logistic regression analysis of the factors associated with turnover intention among study participants.

Variables	*Univariate* Crude OR (95% CI)	*p* value	*Multivariate* Adjusted OR (95% CI)	*p* value
Rank				
Staff nurse/midwife	1.00		1.00	
Senior staff nurse/midwife	5.05 (1.08–23.61)	0.040	6.81 (1.18–39.16)	0.032
Nursing/midwifery officer	0.50 (0.19–1.29)	0.149	0.63 (0.17–2.38)	0.494
Senior nursing/midwifery officer	0.30 (0.07–1.38)	0.123	1.25 (0.17–9.42)	0.829
Principal nursing/midwifery officer	0.90 (0.23–3.58)	0.886	11.79 (1.20–115.98)	0.034
Salary (Gh¢)				
1000–2000	1.00		1.00	
2000–3000	1.23 (0.49–3.12)	0.657	1.04 (0.29–3.67)	0.955
3000–4000	0.36 (0.13–0.99)	0.047	0.07 (0.01–0.46)	0.005
Management support				
Adequate	1.00		1.00	
Inadequate	5.16 (2.26–11.81)	<0.001	3.09 (1.09–8.75)	0.033
Leadership style at the ward				
Like	1.00		1.00	
Dislike	7.32 (3.06–17.54)	<0.001	3.17 (0.93–10.80)	0.065
Effect of work on the matrimonial home				
Yes	1.00		1.00	
No	0.18 (0.06–0.53)	0.002	0.40 (0.10–1.52)	0.179
Number of staff on duty per shift				
Adequate	1.00		1.00	
Inadequate	5.32 (2.36–12.02)	<0.001	3.36 (1.08–10.47)	0.037
Level of exposure				
Low	1.00		1.00	
High	3.60 (1.59–8.18)	0.002	1.68 (0.62–4.56)	0.304

NB: all significant variables were adjusted for in the multivariate analysis, OR : odds ratio, and CI : confidence interval.

to-patient ratios per shift are as follows: 1 : 4 on morning shifts, 1 : 5 on afternoon shifts, and 1 : 8 on night shifts. For the type of ward, the nurse-to-patient ratios are 1 : 5 for the general medical-surgical ward, 1 : 4 for the emergency ward, and 1 : 2 for the critical care unit [35, 36]. There are no such recommendations in Ghana and across Africa. Inadequate number of staff per shift means that the burden of workload will be increased. This may also increase the stress levels of the number of staff on duty. High stress among nurses has been reported to influence turnover intention among nursing professionals [37]. There is, therefore, the need to ensure that the number of nurses on duty per shift is adequate to reduce the burden of workload as well as enhance patient and staff safety [38].

We also observed that participants' rank was significantly associated with turnover intention among nurses and midwives. Principal nurses/midwives and senior staff nurses/midwives were more likely to have turnover intention compared to staff nurses/midwives. The findings in the present study are comparable to an earlier study that found a significant effect on nurses' rank on turnover intention [39]. In Ghana, staff nurses/midwives are younger and of lower rank compared to senior staff nurses/midwives and principal nurses/midwives who have attained that status through long service. The leadership positions at the workplace are given to those of higher rank. Taking up a leadership position could increase the workload and stress levels at the workplace, which equally affects turnover intention [38].

The outcome of the present study will help hospital administrators, nurse managers, and policymakers to set up strategies that will reduce the levels of exposure to workplace hazards. Again, the high turnover intention among nurses and midwives in the present study deepened the significance of providing incentives and adequate support to nurses and midwives and ensuring that there is adequate number of staff on duty, considering their influence on turnover intention.

5. Strengths and Limitations of the Study

The present study provides useful data in understanding the dynamics of turnover intention among nurses and midwives in Ghana and expanding on existing interventions to improve their working conditions in the country. This study provides data on the effect of the levels of exposure to workplace hazards on turnover intention, which had not been previously reported among nurses and midwives in Ghana. Another strength of this study is the high response rate which enhances the quality of the study data and the representativeness of the study population.

Despite the significant findings in this study, a few limitations were identified. First, the exclusion of nurses and midwives on study, annual and sick leaves from the study could affect the burden of turnover intention. Second, this was not a multicenter study, hence, limiting the power of generalization of the study findings. Third, it is worth noting the wide confidence intervals of some of the results. We recommend that caution should be taken in interpreting the results with wide confidence intervals.

6. Conclusion

Turnover intention is rife among this cohort of nurses and midwives. The most significant predictors of turnover intention were management support, salary, inadequate number of staff per shift, and participants' rank. Again, study participants were exposed to a high level of workplace hazards. There is a need to set up strategies such as increasing the staff strength and ensuring equitable distribution of nurses and midwives in all the departments, providing the needed resources such as personal protective equipment and incentives for nurses. Amidst a high shortage of healthcare staff, we recommend a concerted effort and institution of policies to mitigate turnover intention.

Data Availability

The datasets used for the analysis of this study are available upon reasonable request from the corresponding author.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Acknowledgments

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Research Article

Complementary Feeding Practices and Household Food Insecurity Status of Children Aged 6–23 Months in Shashemene City West Arsi Zone, Oromia, Ethiopia

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Introduction. Appropriate infant feeding practices are critical to a child's growth, health, and development during the first 1000 days of life. One in every six children worldwide receives a minimum acceptable diet. According to the EDHS 2016, the status of the minimum acceptable diet was 7 percent among children aged 6–23 months in Ethiopia. The study sought to ascertain the relationship between complementary feeding (CF) indicators and household food insecurity in children aged 6–23 months. *Methods*. A systematic sampling method was used to conduct a cross-sectional study of 536 mother-child pairs aged 6–23 months. The 24-hour dietary recall was used to collect data on CF practices using face-to-face interviews with socioeconomic and food security questionnaires. The relationship between complementary feeding indicators and household food insecurity was investigated using logistic regression analysis. The relationship between independent variables and complementary feeding indicators was determined using multivariate logistic regression. *Results*. Overall, a total of 67.9% of children received timely introduction of CF and Minimum Meal Frequency (MMF), Minimum Dietary Diversity (MDD), and Minimum Acceptable Diet were met by 61.7%, 42.5%, and 41.7%, respectively. Result of multivariate logistic regression showed there is significant association between household food security with MMF, MDD, and MAD [AOR: 2.02, 95% CI: (1.25–3.24); AOR: 1.55, 95% CI: (1.02–2.36); and AOR: 1.62, 9595% CI: (1.06–2.47)], respectively, while there was no association with introduction of CF [AOR = 0.87, 95% CI: (0.55–1.39)]. *Conclusion*. This study revealed that the rates of MMF, MDD, and MAD remained low in this study setting. Household socioeconomic status (wealth index, food security status, household income) and child age were found to be among the factors statistically significantly associated with complementary feeding practices indicators.

1. Introduction

The first 1000 days of a child's life are crucial for promoting health and development as well as preventing stunting. Inadequate quantities and quality of complementary foods, as well as poor feeding practices and increased infection rates during this period, may be risk factors for stunting in children [1]. Appropriate infant feeding practices are critical for a child's growth, health, and development during the first two years of life [2]. CF refers to a gradual dietary transition involving the introduction of solid and semisolid foods to the infant's diet when breast milk alone is no longer sufficient to meet an infant's nutritional needs [3].

WHO recommends that all children be exclusively breastfed for the first six months of their lives and then receive complementary foods that are nutritionally safe and adequate until they are two years old or older [4]. Malnutrition has been linked to poor breastfeeding and complementary feeding practices of mothers, as well as a high rate of infectious diseases, in the first two years of life [5]. Complementary feeding practices that are insufficient in terms of quality, quantity, and frequency of meals have a negative impact on children's health and growth in the first two years of life [6, 7]. Globally, one in six children receives a minimum acceptable diet [8]. The study found that less than one-fourth of the children aged 6–23 months in developing countries had good consumption quality [8]. WHO shows the effect of feeding practices on the nutritional status of children; about 32% of children under 5 were stunted and 10% were wasted due to poor BF and CF [9].

Household food insecurity is another important cause of malnutrition that has an effect on vulnerable groups in societies, especially the poor women of reproductive age and children under the age of five as they are at high risk [10]. The 2018 Global Nutrition Report revealed the fact that diets of infant and young children are suboptimal everywhere in all wealth groups from 75.6% in the lowest to 56.7% highest quintile; besides this, 74.6% of children of 6–23 months of age do not have sufficient diet diversity for a healthy diet worldwide [11]. Like most developing countries, improper feeding practices remain a challenging problem in Ethiopia. In Ethiopia, only 7% of children aged 6–23 months met the minimum acceptable diet [12]. This is an alarming gap; still all children have the need and right to sufficient food to support life; there is limited evidence that shows an association between CF indicators with household food security status in Shashemene city, Oromia, Ethiopia. Thus, this study is designed to assess the association between CF practices and household food security status of children aged 6–23 months in the study setting (Figure 1).

1.1. Operational Definitions. Timely introduction of complementary feeding: the proportion of children aged 6–23 months who were introduced to solid and semisolid foods at 6 months of age [13, 14].

Minimum dietary diversity (MDD) is the proportion of children of 6–23 months of age who receive foods from 4 or more food groups with the food groups consisting of (I) grains, roots, and tubers; (II) legumes and nuts; (III) dairy products; (IV) flesh foods; (V) eggs; (VI) vitamin A-rich fruits and vegetables; and (vii) other fruits and vegetables during the previous day of study [13, 14].

Minimum meal frequency (MMF) is the proportion of breastfed and nonbreastfed children of 6–23 months of age, who receive solid, semisolid, or soft foods (but also including milk feeds for nonbreastfed children) the minimum number of times or more during the previous day [13, 14].

The minimum is defined as 2 times for breastfed infants of 6–8 months, 3 times for breastfed children of 9–23 months, and 4 times for nonbreastfed children of 6–23 months [13, 14].

A minimum acceptable diet (MAD) is the proportion of children of 6–23 months of age who receive both MMF and MDD during the previous day of study [13, 14].

2. Methods and Materials

2.1. Study Settings and Period. The research was carried out in Shashemene City from February to March 2020. Shashemene is the most densely populated city in the region, with a diverse ethnic population. It is 250 kilometers from Finfinnee, the capital of Oromia, Ethiopia. Shashemene city is located in the subtropical climatic zone: Shashemene's population is estimated to be 272193 people: in 2019, males accounted for 50.4 percent of the population, while females accounted for 49.6 percent. According to the Shashemene health office report, children aged 6–23 months made up 4.8 percent of the population, or 13065 people.

2.2. Study Design and Population. A community-based cross-sectional study was conducted in Shashemene city, Oromia, Ethiopia, from Feb to March in 2020. All mothers who had children aged 6–23 months residing in Shashemene city by 2020 considered as source population whereas mothers of children aged 6–23 months living in selected households during the study period and resided in the study area for more than 6 months were taken as the study population.

2.3. Inclusion and Exclusion Criteria. All mother-child pairs aged 6–23 months living in Shashemene city were taken as source population, whereas mother-child pairs aged 6–23 months living in the selected household during the study period as well as resided in the study area for ≥6 months presented during the study period were included as study population while those resided in the study area for <6 months were excluded from the study subjects.

2.4. Independent and Dependent Variables. The outcome variable was the CF indicators (timely introduction of CF, MMF, MDD, and MAD). The independent variables were maternal, child, and household characteristics. Briefly, the description of the variables was as follows: sociodemographic characteristics: age, sex, family size, monthly income, partner's education level, and household food security were measured with the Household Hunger Scale (HHS), household wealth index, food insecurity, occupation, residence, knowledge, and attitude of mothers, Obstetric history: pregnancy history, ANC, PNC, delivery mode and place of delivery, birth space, and number of parity) were the independent variables.

As per the WHO definitions already given in the introduction, children receiving the recommended feeding were coded 1 and all other children were coded 0. These are the food groups used in constructing the MDD and MAD, with data on feeding obtained through 24-hour recalls by mothers: grains, roots, and tubers; legumes and nuts; dairy products (milk, yogurt, and cheese); flesh foods (meat, fish, poultry, and liver/organ meats); eggs; vitamin-A-rich fruits and vegetables; and other fruits and vegetables [14]. Household food security was measured with the Household Hunger Scale (HHS) that has 9 items along with 9-frequency (9I 9 F) Household Food Insecurity Access Scale (HFIAS) [15].

2.5. Sample Size Determination. The sample size was determined by a single population proportion formula taking the proportion of appropriate complementary feeding practice 11.4% from the previous study [16]. The following assumptions were used: margin of error = 4%, $Z\alpha = 1.96$, and design effect = 2.243; a total of 536 samples mothers were

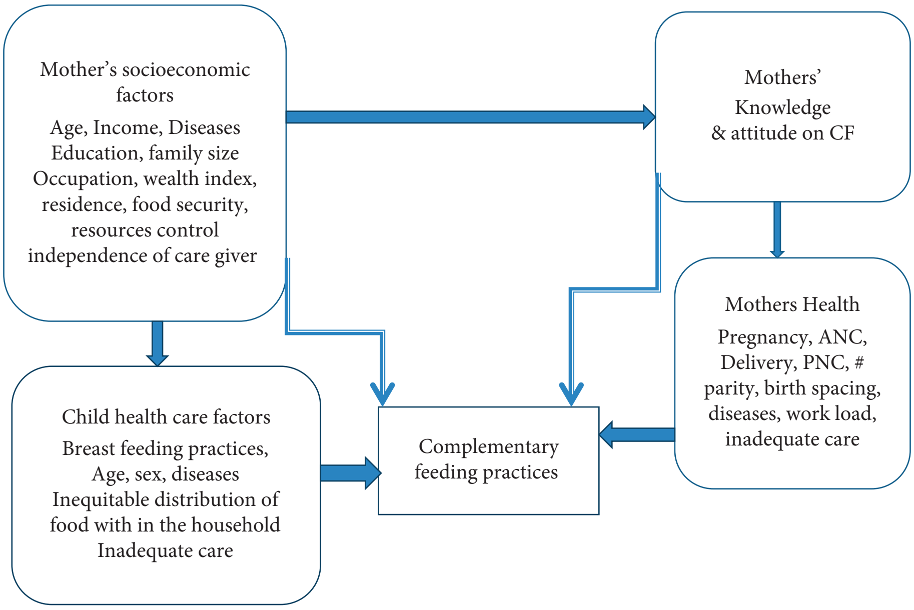

Figure 1: Conceptual framework of complementary feeding practice from the different literature review, 2020. CFP: complementary feeding practices, PNC: postnatal care, and ANC: antenatal care.

obtained with consideration of 10% contingency to nonresponders.

$$n = \frac{\left(z\alpha/2^{2}\,(1-p)\right)}{d^{2}} \gg \frac{(1.96)^{2} * 0.114\,(1-0.114)}{(0.04)^{2}} \tag{1}$$

$$= 243, 243 * 2 + 48 = 536.$$

2.6. Sampling Procedure. The study subjects were chosen using a two-stage sampling technique. A simple random sampling method was used to select four subcities at random from a total of eight subcities. The total population in the four selected subcities, Buchanan, Arada, Alelu, and Awasho, was 36877, 34529, 31734, and 36370 (139510), with 6696 children aged 6–23 months. The calculated sample (536) was divided equally among the four subcities, resulting in 134 mothers with children aged 6–23 months. To obtain individual sample units or subjects at the household level, all target groups of the subcity were obtained from the health post prior to calculating *K*th and then determining *K*.

The random start was determined by lottery, and every *K*th mother with eligible children was chosen from four subcities using systematic random sampling; thus, a child was chosen in each subcity, and his or her mother was interviewed accordingly. One eligible child with a mother at the time of the survey was chosen from each household; if more than two eligible children were found, the younger was chosen, and the process was repeated until the next *K*th in the same direction. If the mother was not present on the day of data collection, she was replaced by the next mother from the same subcity after one visit. It was summarized below (Figure 2).

2.7. Data Collection Instruments. Data were collected by using face-to-face interviews during a home-to-home visit from mothers who had children aged 6–23 months using a structured questionnaire. The questionnaire comprised background information on individual characteristics: mothers' age, education, employment status, obstetrics, maternal health practice, children's, age, CF feeding practices, BF, and household characteristics: wealth index, income, and food security/insecurity issues.

2.8. Data Collection Methods. Data was collected by using face-to-face interviews during a home-to-home visit from mothers who had children aged 6–23 months using a structured questionnaire. For data collection, first of all, we were collected information about dietary diversity (MDD) meal frequency and MAD of children by using the 24-dietary recall. Socioeconomic and demographic characteristics of children were collected. The four main complementary feeding indicators (timely introduction of CF, MMF, MDD, and MAD), and food security items were included in the questionnaire via 24-hour dietary recalls of food and liquid consumption during the prior day of the survey [13].

Six diploma holder data collectors and two BSc holder supervisors were recruited. For data quality control, the questionnaire was first developed in English and translated to the local language, Afaan Oromo, and then backtranslated to English by two people, who have good command in both languages for consistency. The training was given to data collectors and supervisors for 2 days and the questionnaire was pretested in 5% of mothers, in the study area, which is not included in the actual study to assess the content and approach of the questionnaire and the necessary correction was made. All questionnaires were checked on daily bases

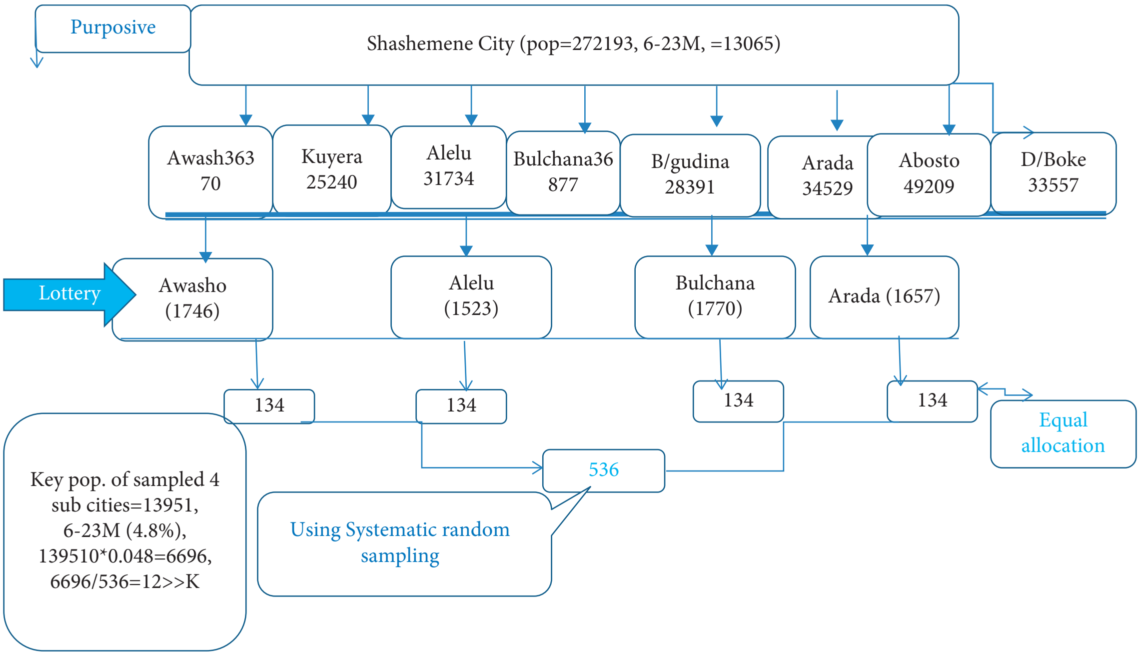

Figure 2: Diagrammatic presentation of the sampling scheme of the study participants among 6–23-month-old children in Shashemene city, Ethiopia, 2020. Pop: population, K: the interval.

for completeness while data was thoroughly checked and cleaned before analysis.

2.9. Data Processing and Analysis. Data were coded, entered, and analyzed using SPSS version 25. Descriptive statistics such as frequencies, proportions, means, and standard deviation are used to describe data. Bivariate analysis was made to describe the relation of each independent variable with the dependent variable. Finally, independent variables associated during bivariate analysis with P-value ≤ 0.25 were entered into multivariable logistic regression analysis used to determine the strength of association between independent and dependent variables. OR along with 95%, CI was reported, and the statistical significance was declared at the p-value <0.05. Multivariate logistic regression model was used to control confounders.

CF indicators were compared with household food security: Wealth index was computed as a measure of household wealth using principal component analysis (PCA). Fifteen variables related to ownership of selected household assets, size of quantity of durable equipment, materials used for housing construction, and ownership, improved water, and sanitation facilities were considered. Finally, the generated principal component was divided into 5 equal quintiles (lowest, second, middle, fourth, and highest) while household food security was measured with the Household Hunger Scale (HHS) which has 9 items along with 9-frequency (9I 9 F) Household Food Insecurity Access Scale (HFIAS) [15].

The response categories are never (0 times), rarely (1-2 times), or sometimes (3–10 times), and often (more than 10 times). Therefore, the HHS was used in this study to define two groups: households reporting (a) little to no hunger in the past month because of insufficient food or because of lack of resources to get food and thereby classified as food secure households and (b) moderate-to severe hunger in the past month because of insufficient food or because of lack of resources to get food, and thereby classified as food-insecure households.

3. Results

3.1. Sociodemographic Characteristics of Study Subjects. In this study from 536 sampled mothers, 520 mother-child pairs participated in the study giving the response rate of 97.01%. The mean age of mothers was 26.83 SD (±4.41) years. More than half of the study subjects were between the ages of 25 and 34 years. The most common source of drinking water in study areas is an improved drinking water which piped into the dwelling, a public tap or standpipe 505 (97.1%), the rest 15 (2.9%) from bottled water. Regarding educational status, about 22% of mothers had basic education only whereas 14.8% percent of the households has no work. Of the total study subjects, 481 (92.5%) were married, live at a different place and not married each 14 (2.7%), divorced 10 (1.9%), 1 (.2%) widowed, and 325 (62.5%) Muslim by religion. With regard to ethnic distribution, nearly 2/3, 333 (64%) of the respondents, belong to Oromo ethnic groups. Regarding household food security, out of 520 respondents 407 (78.3%) of children's mothers were under the household who met food security whereas 113 (21.7%) were reported to have had insecure food in the two-week period before the survey (Table 1).

The most common sources of information for the mothers of children aged 6–23 months were health care workers (HCWS) followed by radio (Figure 3). Most study

Table 1: Sociodemographic characteristic of mothers with children of 6–23 months, in Shashemene city, Oromia, Ethiopia, 2020 ($n = 520$).

Age of mothers/caretakers	Frequency	Percent
≤24 years	151	29.4
25–29 years	231	44.4
30–34 years	100	19.2
35+	38	7.3
Religion of mothers		
Orthodox	95	18.3
Protestant	81	15.5
Catholic	13	2.5
Others	6	1.2
Educational status of mothers		
Basic education	117	22.5
Primary school	236	45.4
Secondary school	113	21.7
Higher education	54	10.4
Educational status of fathers		
Basic education	71	13.7
Primary school	189	36.3
Secondary school	192	36.9
Higher education	68	13.1
Mothers'/caretakers' occupation		
Housewife	244	46.9
Daily labor	150	28.8
Government employee	64	12.3
Students	18	3.5
Merchant	44	8.5
Husband's occupation		
Government employee	149	28.7
Farmer	77	14.8
Merchant	217	41.7
Daily laborer	28	5.4
Others	49	9.4
Family income per month (ETB: Ethiopian birr)		
≤999 ETB	13	2.5
1000–1999 ETB	84	16.2
2000–2999 ETB	129	24.8
3000–3999 ETB	89	17.1
≥4000 ETB	205	39.4
Ethnicity		
Oromo	333	64
Amhara	89	17.2
Wolaita	47	9
Others	51	9.8
Family size		
1–3	101	19.4
4–6	327	62.9
≥7	92	17.7
Who decide on the properties of the household		
Husband	166	31.9
Wife	31	6
Jointly	323	62.1
Sources of information about commercially available CF		
HCWs	95	18.3
Family	163	31.3
Media	215	41.3
Relative	16	6.9
Others	11	2.1
Household wealth index		
Lowest	13	2.5
Second	61	11.7
Middle	203	39
Fourth	151	29

Highest CF: complementary feeding 92; HCWs: Health care workers 17.7.

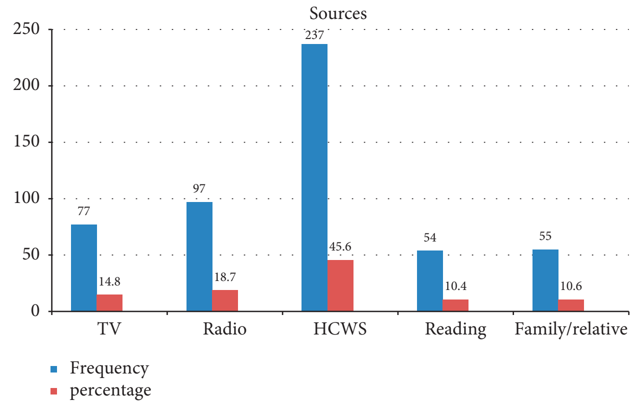

Figure 3: Sources of information about advantages of breast milk feeding in Shashemene city, Oromia, Ethiopia, 2020. TV: television, HCWS: health care workers.

participants 351 (67.5%) were multiparous and of 520 respondents the highest proportion of women 494 (95%) received ANC from a skilled attendant; of these, 41% of mothers have used four or more antenatal care services. Out of 520 respondents, only 288 (55.4%) of them were used postnatal care services. Four hundred fifty (86.5%) of the respondents' birth interval from previous birth were greater than 2 years; with regard to sex, results have shown 262 (50.4%) of the children were male while 258 (49.6%) of them were females.

Concerning delivery attendants, and place of delivery, 426 (81.9%) of mothers were delivered at health facility compared to 94 (18.1%) of home delivery, while 460 (88.5%), 35 (6.7%), and 25 (4.8%) of mothers delivered their children with the assistance of HCWs, TBAs, and others, respectively. Relating to postnatal care, a large proportion of maternal and neonatal deaths occur during the 48 hours after delivery, and these first two days following delivery are critical for monitoring complications. The level of postnatal care coverage is extremely low in this study setting. The great majority of women 231 (44.4%) with a live birth in the preceding survey did not receive a postnatal checkup while among women who received a postnatal checkup, 128 (24.6%) within 0–2 days, 127 (24.4%) within 3–6 days of delivery, and 34 (6.5%) received a postnatal checkup within 7 days and above.

Out of 520 respondents' children aged 6–23 months, 292 (56.2%), 239 (46%), and 329 (63.3) of them experienced symptoms of acute respiratory infection (ARI), diarrhea, and fever, respectively, in the two weeks preceding the survey (Table 2).

Almost all mothers 519 (99.8%) BF their children after delivery indicate that very young children are mostly fed breast milk, as recommended by WHO. Most of them 482 (92.7%) feed breast milk based on child demand. The median duration and the mean duration of any BF in Ethiopia are 25 months. In this study, result indicates mothers' BF status; the median duration of BF was 14 months (i.e., 243/520 (46.7%) lower than the EDHS, 2011) (Figure 4).

Table 2: Maternal obstetric related characteristics of mothers of children of 6–23 months, Shashemene city, Oromia, Ethiopia, 2020.

Parity	Frequency	Percent
Prim parous (1)	92	17.7
Multiparous (2–4)	351	67.5
Grand multipara (5+)	77	14.8
Mode of delivery		
Normal	468	90
Cesarean section	49	9.4
Others	3	0.6
No antenatal care (ANC) attendance		
No ANC session	26	5
≤3	279	53.7
≥4	215	41.3
Birth spacing		
<2	338	65
2–4	160	30.8
>4	22	4.2
No. of children in the family		
1–3	384	73.8
4–6	120	23.1
>6	16	3.1
Birth order		
1st	101	19.4
2nd	141	27.1
3rd	152	29.2
4th	59	11.3
5th & above	67	12.9
Age of the child		
6–8 months	93	17.9
9–11 months	70	13.5
12–17 months	209	40.2
18–23 months	148	28.5

Mothers' breastfeeding status.

3.2. Food and Fluid Provided for the Children.

Milk (417 (80.2 percent) was the most commonly provided food or fluid for children, followed by potatoes (324 (62.3 percent), porridge/gruel 235 (45.2 percent), and bread, vegetables, and fruits 181 (34.8 percent). The most preferred food for the children was homemade, accounting for 398 (76.5 percent), while commercially available food was preferred by the remaining 122 (23.5 percent). In terms of CF practices and frequency during illness, 187 (36%) mothers decreased food quantity and frequency, 147 (28.3%) withheld food quantity and frequency, 123 (23.7%) mothers maintained the same quantity and frequency, and only 63 (12%) mothers increased food quantity and frequency. Due to cultural practices, approximately 124 (23.8%) of mothers did not provide cabbage and meat to their children between the ages of 6 and 23 months. Concerning food preparation, out of 520 mothers, 452 (86.9%) prepare separately for a child while 68 (13.1%) prepared with adult food.

Grains, roots, and tubers were the most commonly taken food items followed by dairy products, among all age categories children in the previous 24 hr preceding the survey. Legumes and nuts, eggs, and vitamin A-rich fruit and vegetables were consumed higher among children aged 18–23 months compared to the other groups in 24 hr preceding survey. Eggs were

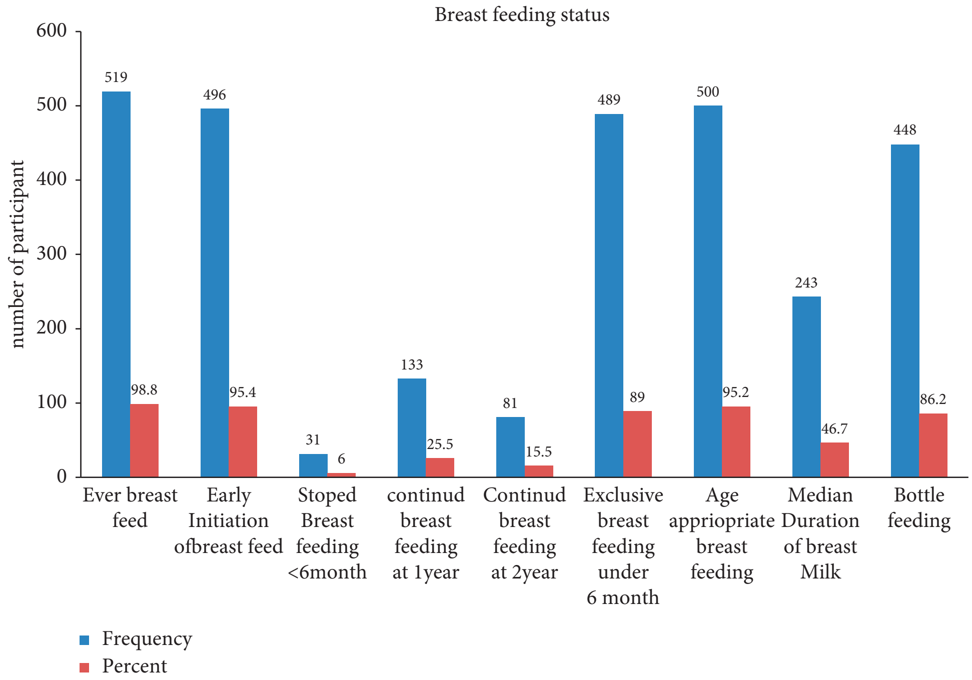

Figure 4: Mothers' breastfeeding status indicators of 6–23-month children in Shashemene Oromia, Ethiopia, 2020. BF: breastfeeding. EBF: exclusive breast feeding.

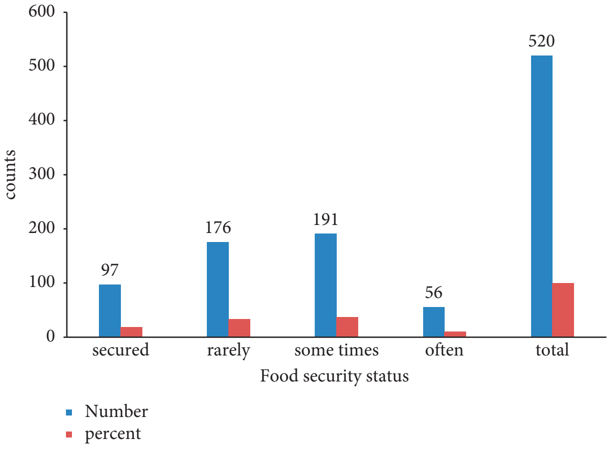

Figure 5: Household food security status among mothers of 6–23 months of age in Shashemene city, Oromia, Ethiopia, 2020. *Note.* Figure 5 indicates household food security status among mothers of 6–23-month children in Shashemene city.

Table 3: Types of food groups given during the previous day according to the age of the child among children aged 6–23 months, Shashemene, 2020 ($n = 520$).

	Age of children in months											
Food groups	6–11 months (163)				12–17 months (209)				18–23 months (148)			
	Yes	*N* (%)	No	No (%)	Yes	*N* (%)	No	*N* (%)	Yes	*N* (%)	No	*N* (%)
Grains, roots, and tubers	135	**82.8**	28	17.2	187	**89.5**	22	10.5	131	**88.5**	17	11.5
Legumes and nuts	65	**39.5**	98	60.1	94	**45**	115	55	84	**56.8**	64	43.2
Dairy products	107	**65.6**	56	34.4	139	**66.5**	70	33.5	91	**61.5**	57	38.5
Egg	71	**43.6**	92	56.4	110	**52.6**	99	47.4	90	**60.8**	58	39.2
Flesh foods	20	**12.3**	143	87.7	39	**18.7**	170	81.3	39	**26.4**	109	73.6
Vit. A-rich foods	90	**55.2**	73	44.8	116	**55.6**	93	44.5	108	**73**	40	27
Other fruits and vegetables	77	**47.2**	86	52.8	75	**35.9**	134	64.1	73	**49.3**	75	50.7

Vit. A: Vitamin A.

the least consumed in 6–11-month age group; however, there was less consumption of flesh food across all age categories in contrary to other food groups (Table 3).

3.3. Complementary Feeding Status' Indicators. CF was assessed on five hundred twenty mothers-child pairs enrolled in the study. Of these, three hundred fifty-three (67.9%) of the mothers had been introduced for CF at 6 months' age of the children as per suggested while 31 (6%) before 6 months and the rest late after 6 months. Introduction of solid, semisolid, or soft foods by age 6–8 months was 86/93, (92.5%) but vary across age from 112/209 (53.6%) of 12–17 m, −53/70 (75.7%) of 9–11 m, 12–15 m (68.9%), and 18–23 m (68.9%). Overall, 321 (61.7%) mothers fed their children meeting MMF as recommended. Less than half 41.7% of children in all age groups met the criteria for MAD. The lowest proportion who met MAD was (31.2%) in the age group of 6–9 months. However, overall, less than half (42.5%) and 156 (30%) of children aged between 6 and 23 months met the requirements for MDD and ACFP, respectively. Chi-square illustrations of CF indicators and food insecurity are shown in Table 4.

93 (89.2%) mothers fed their child one or two times among breastfed child 6–8 months' age whereas 313 (73.3%) for breastfed child 9–23 months of age fed three or more times.

3.4. Bivariate and Multivariable Analyses. Tables 5 and 6 showed bivariate and multivariate associations of household food security with complementary feeding indicators, with Table 5 illustrating factors associated with CF among mothers with children aged 6–23 months. To account for potential confounders, multivariable logistic regression was used. Age, education, occupation, household income, child age, sex, wealth index, food security status, and household monthly food expenditure were the variables.

In this study, there was no association between maternal occupation, maternal education, age 25–29 years, child sex, and CF indicators. Of the total entered variables, the finding revealed socioeconomic status (wealth index, household food security, household income, and child age) are factors statistically significantly associated with the CF indicator, while the rest of the variables were not associated after controlling for potential confounders though associated in bivariate analyses.

Table 5 revealed that there is no association between food security (secure vs. total insecurity) and the introduction of complementary feeding practices at six months ($P = 0.45$), but there are associations between food security and MMF (0.002), MDD ($P = 0.03$), and MAD ($P = 0.02$). There is a relationship between food security and insecurity and their sub groups (food insecure without hunger ($P = 0.23$), food insecure with moderate hunger ($P = 0.46$), and food insecure with severe hunger ($P = 0.08$)) among MMF CF indicators. Aside from that, the table revealed no link between household food insecurity without hunger and MAD ($P = 0.21$) or the timely introduction of CF ($P = 0.67$).

However, there is an association between household food insecurity without hunger with MDD ($P = 0.006$), timely introduction of CF ($p \le 0.001$) with moderate hunger, and food insecure with severe hunger ($P = 0.02$). However, there was an association between household food security with moderate hunger and MDD ($P = 0.003$) and MAD ($P = 0.01$) as well as food insecure with severe hunger and MDD ($P = 0.001$), MAD ($P = 0.002$), and ACFP ($p \le 0.001$). Household socioeconomic status (wealth index) was found to be statistically significantly associated with complementary feeding practices. Those mothers who are in highest percentile were about 7, 3.7, and 3.8 times more likely to practice MMF, MDD, and MAD compared to the others counterparts (those who were in lowest percentile through fourth) [(AOR = 6.54, 95% CI: (1.84–20.3)]∗∗, [AOR = 3.7, 95% CI: (1.03–13.36)] ∗, and [AOR = 3.8,95% CI: (1.05–13.73)] ∗, respectively. After controlling for potential confounders, our results reveal that mothers who belonged to the household whose food security met were 2 times higher to practice MMF compared to the other counterparts [(AOR = 2.02, 95% CI: (1.25–3.24∗∗)], $P = 0.04$). Others with children in age categories 18–23 months showing a significant association in practicing CF indicators compared with the other groups of children (i.e., MMF [AOR = 5.6, 95% CI: (2.35–13.51) ∗∗∗, MDD [AOR = 2.31, 95% CI (1.3–4.08), MAD [AOR = 2.18, 95% CI (1.24–3.87), and introduction of CF [AOR = 5.89, 95% CI: (2.49–13.93)]∗∗∗) (Tables 5 and 6).

4. Discussion

A study was conducted on the association of CF practices and household food security status among mother-child pairs of 6–23 months, which had a response rate of 97.01%. Overall, the result revealed that the magnitude of ACFP was 30%. This is higher than that of the studies done on Damot Sore 11%, Arsi Nagele, 9.5%, and Ghana's 14.3% [16–18], but lower than that of Sri Lankans 68%, Bangladeshi 40%, and Nepali 32% [19, 20]. This is possibly due to differences in the study setting, socioeconomic status, or indicators used to measure appropriate complementary feeding or sociocultural variances among different populations at different times.

In a recent study, the lowest proportion of children who had been fed with ACFP was in the age group of 6–11 months compared with the counter group. This implies the need to give due attention at a younger age. In this study, the proportion of children who had been introduced to solid, semisolid, or soft foods among those aged 6–23 months was 67.9%, while that of 6–8 months was 86/93, or 92.5%.

This is higher than the 74.2% reported by Damot Sore, 72.5% by Arsi Nagele, 72.6% by Ghana, and 70–71.5% reported by Nepali and Bangladeshi studies [16–20]. This figure corresponds to the WHO recommendation that more than 80% of 6–8-month-old children begin complementary feeding at 6 months [13, 14]. Nevertheless, in the current finding, the time of introduction of complementary feeding is better than other similar studies conducted elsewhere [17, 18, 21].

Table 4: Chi-square association of CF indicators with food security status among mothers of 6–23-month children in Shashemene city, Oromia, Ethiopia, 2020 ($N = 520$).

Variables	MMF		MDD		MAD		ACFP		Introduction of CF	
	Met, *N* (%)	Pv	Met, *N* (%)	Pv	Met, *N* (%)	Pv	Met, *N* (%)	Pv	Yes, *N* (%)	Pv
Food secure	71(73.2)	1	47(48.5)	1	47(48.5)	1	40(41.2)	1	66(68)	1
FI without hunger	113(64.2)	0.23	71(40.3)	0.006	69(39.2)	0.21	53(30.1)	0.56	128(72.7)	0.67
FI with moderate hunger	102(53.4)	0.46	69(36.1)	0.003	68(35.6)	≤0.010	35(18.3)	≤0.001	130(68.1)	≤0.001
FI with severe hunger	41(73.2)	0.08	34(60.7)	≤0.001	33(58.9)	0.002	28(50)	≤0.001	29(51.8)	0.02

FI: food insecurity, Pv: *p*-value, CF: complementary feeding, MMF: minimum meal frequency, MDD: minimum dietary diversity, MAD: minimum acceptable diet, ACFP: appropriate complementary feeding, and *N*: count (%).

Table 5: Bivariate association of food security status with CF indicators of children aged 6–23 months old in Shashemene city, Oromia, Ethiopia, 2020.

Background characteristics	MMF			MDD			MAD			Introduction of CF		
	COR (95% CI)		Pv	COR (95% CI)		Pv	COR (95% CI)		Pv	COR (95% CI)		Pv
Characteristics of children												
Sex												
M	0.91	0.64–1.30	0.62	0.82	0.57–1.16	0.26	0.87	0.61–1.24	0.44	1.06	0.74–1.54	0.73
F	1			1			1			1		
Child age (in months)												
6–8	1			1			1			1		
9–11	0.93	0.50–1.8	0.93	2.08	1.09–3.96	0.02	1.85	0.97–3.53	0.059	3.94	1.53–10.13	0.004
12–17	0.52	0.31–0.88	0.01	1.31	0.78–2.21	0.31	1.31	0.78–2.21	0.30	10.64	−4.70–24.08	≤0.001
18–23	1.24	0.70–2.18	0.45	2.59	1.50–4.47	0.001	2.45	1.43–4.24	0.001	5.54	2.37–12.90	≤0.001
Characteristics of mothers												
Mothers' age (years)												
≤24	0.80	0.45–1.41	0.45	0.38	0.22–.66	0.001	0.40	0.24–0.70	0.001	0.18	0.07–0.42	≤0.001
25–29	0.78	0.42–1.48	0.43	0.80	0.45–1.42	0.45	0.75	0.42–1.34	0.33	0.71	0.37–1.35	0.30
30–34	0.42	0.27–0.67	≤0.001	0.50	0.33–.77	0.002	0.53	0.34–0.81	0.004	1.92	1.23–2.98	0.004
35+	1			1			1			1		
Mothers' education												
No formal education	1			1			1			1		
Primary school	0.97	0.61–1.54	0.92	1.23	0.78–1.94	0.35	1.21	0.77–1.92	0.39	1.30	0.80–2.10	28
2 yr and above	0.98	0.60–1.61	0.94	1.11	0.68–1.80	0.66	1.15	0.71–1.87	0.56	1.07	0.64–1.80	0.78
Mother's employment												
Homemakers	1			1			1			1		
Unskilled worker	0.67	0.46–0.98	0.04	1.16	0.80–1.68	0.43	1.12	0.76–1.62	0.56	1.57	1.05–2.33	0.02
Skilled workers	0.70	0.39–1.23	0.21	1.51	0.87–2.63	0.14	1.54	0.89–2.68	0.12	1.29	0.71–2.33	0.40
Household characteristics												
Households monthly expenditure on food												
≤3999	1			1			1			1		
≥4000	1.70	1.17–2.47	0.005	2.20	1.54–3.15	≤0.001	2.17	1.52–3.12	≤0.001	0.93	0.64–1.36	72
Households food security status												
Secure	2.07	1.29–3.31	0.002	1.57	1.04–2.40	0.03	1.64	1.08–2.50	0.02	0.84	0.53–1.32	0.45
Insecure	1			1			1			1		
Wealth quintile												
Lowest	1			1			1			1		
Second	1.05	0.32–3.51	0.93	0.49	0.13–1.90	0.30	0.49	0.12–1.90	0.31	0.55	0.17–1.86	0.34
Middle	1.76	0.57–5.41	0.32	1.32	0.39–4.43	0.65	1.29	0.38–4.34	0.68	0.38	0.12–1.19	0.09
Fourth	1.77	0.56–5.52	0.32	2.05	0.61–6.94	0.24	1.89	0.56–6.41	0.30	0.41	0.13–1.29	0.12
Highest	7.09	2.05–24.45	0.002	4.02	1.15–14.07	0.02	4.02	1.15–14.08	0.02	0.30	0.09–.99	0.04

The proportion of children aged 6–23 months who met the MMF criteria was 61.7%. It is comparable to the findings of Arsi Nagele (67.3%) and the Bale Zone Ethiopians (68.4%) [17, 22]. However, it is lower than studies conducted in Sri Lanka (88.3%), Bangladesh (81%), Nepal (82%), coastal South India (77.5%), Derashe, southern Ethiopia (95%), and Amibara district, north east Ethiopia (69.2%) [19, 20, 23–25]. This disparity might be due to the sociocultural, educational, and working conditions of caregivers.

With regard to minimum dietary diversity (MDD), the current study also revealed that the proportion of children who met MDD was 42.5%; this reflects the fact that only these mothers fed their young children with four or more food groups from seven food sets (i.e., grains, roots, and

Table 6: Multivariate association of food security status with CF indicators of children aged 6–23 months in Shashemene city, Oromia, Ethiopia, 2020.

Background characteristics	MMF			MDD			MAD			Introduction of CF		
	AOR	(95% CI)	Pv	AOR	(95% CI)	Pv	AOR	(95% CI)	Pv	AOR	(95% CI)	Pv
Characteristics of children												
Sex												
M	0.91	0.64–1.30	0.61	0.81	0.57–1.16	0.26	0.87	0.61–1.23	0.44	1.05	0.73–1.54	0.78
F	1			1			1					
Child age (months)												
6–8	1			1			1			1		
9–11	3.89	1.46–10.37	0.007	2.21	1.12–4.37	0.02	1.94	0.98–3.85	0.05	4.11	1.57–10.73	0.004
12–17	11.34	4.87–26.39	≤0.001	1.43	0.82–2.48	0.19	1.42	0.83–2.46	0.20	11.18	4.88–25.61	≤0.001
18–23	5.64	2.35–13.51	≤0.001	2.31	1.3–4.08	004	2.18	1.24–3.87	0.007	5.89	2.49–13.93	≤0.001
Characteristics of mothers												
Age (yrs)												
≤24	0.60	0.29–1.43	0.28	0.91	0.43–1.91	0.81	0.86	0.41–1.81	0.69	5.63	1.89–16.76	0.002
25–29	0.68	0.28–1.32	0.21	0.92	0.45–1.87	0.82	0.90	0.44–1.84	0.78	4.45	1.56–12.68	0.005
30–34	1.07	0.39–2.14	0.84	1.52	0.70–3.29	0.28	1.47	0.68–3.18	0.32	2.46	0.80–7.53	0.11
35+	1			1			1			1		
Mothers' education												
No formal education	1			1			1			1		
Primary school	1.02	0.62–1.66	0.93	1.17	0.73–1.8	0.49	1.05	0.63–1.77	0.82	1.3	0.80–2.21	0.72
2 yr and above	0.91	0.53–1.54	0.72	0.92	0.55–1.53	0.73	1.24	0.80–1.91	0.32	1.0	0.62–1.88	0.78
Mother's employment												
Homemakers	1			1			1			1		
Unskilled worker	1.65	0.91–3.01	0.09	0.84	0.47–1.50	0.57	0.82	0.46–1.48	0.52	0.88	0.47–1.66	0.70
Skilled workers	1.23	0.67–2.4	0.49	1.04	0.57–1.87	0.21	0.96	0.53–1.72	0.89	1.13	0.60–2.13	0.69
Household characteristics												
Household's monthly expenditure on food												
≤3999	1			1			1			1		
≥4000	1.72	1.16–2.53	0.006	2.29	1.58–3.33	≤0.001	2.25	1.55–3.25	≤0.001	0.91	0.61–1.37	0.67
Households food security status												
Secure	2.02	1.25–3.24	0.004	1.55	1.02–2.36	0.04	1.62	1.06–2.47	0.02	0.87	0.55–1.39	0.58
Insecure	1			1			1			1		
Wealth quintile												
Lowest	1			1			1			1		
Second	1.00	0.29–3.42	0.99	0.45	0.12–1.79	0.26	0.46	0.12–1.82	0.27	0.64	0.18–2.21	0.48
Middle	1.68	0.53–5.31	0.37	1.23	0.36–4.20	0.74	1.22	0.35–4.18	0.75	0.44	0.14–1.39	0.16
Fourth	1.71	0.53–5.48	0.36	1.89	0.55–6.56	0.31	1.78	0.51–6.16	0.36	0.46	0.14–1.48	0.19
Highest	6.54	1.84–23.3	0.04	3.70	1.03–13.36	0.46	3.80	1.05–13.73	0.04	0.37	0.10–1.25	0.11

tubers; legumes and nuts; dairy products; flesh foods; vitamin A-rich food; eggs; and other fruits and vegetables) which is almost similar with that of Bangladesh 42%, but higher than the figures stated from studies done in Arsi Nagle 18.8%, Damot sore 16%, India 15%, and Nepal 34%; however, it is lower than that of Sir Lanka 71% [16, 17, 19, 20, 26]. While in Eastern and South Africa it was one in ten infant and young children [27].

The high variation from Damot Sore and Arsi Nagele could be due to the fact that the current study was done in the city where there was better information and maternal health care access, which led to a difference in awareness of the mothers and educational status variations, whereas the previous studies were done in rural areas where mothers were less advantageous compared to their urban counterparts. The low consumption of protein-rich foods can be due to a number of factors, including lack of nutritional awareness and a shortage of access due to economic constraints [28]. The percent study revealed the varieties of foods given to younger children are lower and MDD only tends to increase with growing age (Table 3); that is, the lowest proportion who met MDD was found in the age group of 6–11 months. Similar patterns have also been observed in Ethiopia and other developing countries [17, 29–31].

This might be because mothers may assume that younger infants do not need diversified food or that their guts may not be able to digest animal-source foods. Besides this, the most commonly restricted foods are meat and cabbage, which is why mothers believe that children cannot swallow them. Moreover, flesh food is the least consumed food across all ages, while eggs are the least consumed in the age group 6–11 months. Subsequently, CF might be initiated with monotonous staples. This is in line with a study from northern Ethiopia, which found that flesh foods and eggs were introduced in children's diets in the middle of the second year of age [31]. The study observed that household economic status as measured by wealth index and food security level was a significant predictor of MDD. Obviously, the lower economic status restricts the availability and variety of food in the household.

The minimum acceptable diet incorporates MMF and MDD, which was 41.7%. This is comparable with findings from Bangladesh of 40% and Ghana of 46% where MAD is adopted [18–20]. But this is higher than that of Ethiopia's national level of 7%, and Abiy Adi, north Ethiopia's 11.9%, India's 9%, and Nepal's 32%. But it was lower than the finding from Sri Lanka at 68% [12, 19, 20, 31]. The percent study revealed better conditions in practicing CF indicators than studies done in Damot sore, Arsi Nagele, Abiy Addi ciy, north Ethiopia, and India [16, 17, 31]. Surely, this is the result of health services provided like health education to people in the community. However, 64.5% of infants of 6–8 months of age received the introduction of CF at 6 months of age in 2017, while global rates of MMF, MDD, and MAD were low, at 50.3%, 28.2, and 15.9%, respectively [32].

The lower level of the result could be attributed to socioeconomic, cultural, and policy differences between the study areas as well as time. Thus, the low prevalence of this indicator suggests that the majority of children were either not fed as frequently as the recommended 2–4 times daily or were not offered food from four or more of the recommended food groups in their diet. This may have resulted in inappropriate CF practices which led to malnutrition. High MAD in this study was observed as compared to the national figure of 7% as of EDHS 2016. This might be because EDHs were a nationally representative survey with a wide range of child feeding styles in different parts of the regions of Ethiopia, with a diversified sociocultural context. Besides this, the DHS covers both rural and urban areas, which reduces the figure.

The higher figure observed in our study may be due to the current expansion of HEWs in the study area that focused on ANC, PNC, and child care education, which in turn increases maternal exposure to healthcare workers, thus increasing their practices. Moreover, this is a pocket study that is localized into Ciy where there is better access and availability to information, education, healthcare services, and other social services across time variation. Overall, the proportion of children who met ACFP was 30%. This was higher than that of the studies done on Damot sore, 11.4%, Arsi Nagele, 9.5%, and Abiy Addi Ciy, north Ethiopia, where ACFP was 10.5% [16, 17, 31]. This could be due to differences in the study setting; for example, the previous study was conducted in rural areas of the country where access to maternal health care services and media is limited.

4.1. Factors Associated with Complementary Feeding Indicators. The current study revealed that household socioeconomic status (wealth index and food security status, household income) and child age are factors significantly associated with ACFP while the rest of the variables were not associated or lost association after controlling for potential confounders though associated in bivariate analyses. One more important determinant factor associated with CF indicators was household economic status as measured by wealth index and food security level. The household wealth index was found to be statistically significantly associated with CF practices. Those mothers who are in the highest percentile were about 6 times, 3.7 times, and 3.8 times, more likely to practice MMF, MDD, and MAD than those who were in the lowest percentile [(AOR = 6.54, 95% CI: (1.84–23.3)∗∗, (AOR = 3.7, 95% CI: (1.03–13.36)∗∗, and (AOR = 3.8, 95% CI: (1.05–13.73)]∗∗**,** respectively, but no association with the introduction of CF (0.37, 95% CI: (0.10–1.25), $P = 0.11$). So, this illustrates that economically higher people are more likely to practice CF indicators than their counterparts. In fact, a higher household wealth index is positively associated with higher dietary diversity. Families in the high percentile are more likely to be able to afford and offer a variety of foods to their children more frequently. The positive association between a household with the highest wealth percentile and an increased diet diversity has been consistently reported in previous studies done in Sri Lanka, Pakistan, India, Bangladesh, and Nepal [19, 20], which was consistent with our findings.

The 2018 Global Nutrition Report also revealed that the diets of infants and young children are suboptimal everywhere in all wealth groups, from 75.6% in the lowest to 56.7% in the highest quintile [11]. The fact that household wealth is a predictor of MDD underlines the important role of household assets in determining optimal CF practices [19, 20], which is in line with our findings. This study contradicted the findings of Damot Sore and Arsi Nagele, as well as Ethiopia, Nepal, and Sri Lanka, in which maternal education was found to be a predictor of ACFP [16, 17, 19, 20, 31]. The possible explanations can be the difference in societal norms and cultures, with a geographic difference regarding female education.

Child age is also found to be a predictor variable as older children (18–23 months) are about five times more likely to feed CF indicators compared with younger children (6–11 months). Similarly, studies conducted in five Asian countries and Tanzania, Arsi Nagele, and the northern part of Ethiopia reported child age as a predictor variable [17, 19, 20, 27, 32]. This might give an opportunity for the health planners to give due attention to younger children's feeding.

Global nutrition report indicated 74.6% of children 6–23 months of age do not have sufficient diet diversity for a healthy diet worldwide; hence, inappropriate CF after 6 months of age is one major cause of malnutrition; in turn, malnutrition is the leading cause of the global burden of the disease, so attention should be given to young child nutrition education intervention to meet SDG Agenda refers to ending "all forms of malnutrition" [11].

The most important issue regarding feeding during illness was that only 63 (12.3%) of the mothers increased food quantity and frequency. Despite cultural and social food restrictions, commonly on cabbage and meat, which need due attention. Interestingly, there are encouraging practices detected in this study: almost all mothers (519) breastfeed their children after delivery, 496/520 (95.5%) initiate breast feeding earlier, and most of them (482) breast milk based on child demand, whereas 489 (94%) feed EBF versus 58% national Figure of 2016 EDHS. It is recommended that a child continues to breastfeed until the age of two. However, in Ethiopia, the percentage of children who are currently breastfeeding decreases from 91% among children aged 12–17 months to 76% among children aged 18–23 months as of EDHS 2016. That is a bit comparable to this finding.

Homemade food was the most commonly preferred food for the children among 398 (76.5%), while the remaining 122 (23.3%) did not. The most common reasons for early initiation of CF were mothers' negative attitude towards the quantity of breast milk, not staying with the child, and lack of knowledge about breast milk. Nearly 488 (86.2%) mothers used bottle feeding, whereas during illness, only 63 (12%) mothers increased food quantity and frequency, while the rest 88% did not. Despite cultural and social food restrictions on cabbage and meat, which account for 124 (23%), 452 (86.9%) prepared food separately, while 68 (13.1%) were prepared with adult food.

Overall, a low level of ACFP, MDD, and MAD was observed in this study, particularly among children of 11 months of age. Therefore, it needs mitigation to improve CF.

5. Limitations

The limitation of our study was it does not demonstrate a cause-and-effect relationship and it may not provide a complete picture of the areas or zones. Hence, our study was conducted among the residents of a single city, which was not representative of the region. Thus, generalizing the result may distort the results to other setting, so caution is needed. Furthermore, the figure could have been overestimated or underestimated due to recall and social desirability biases introduced by the time of initiation, diversity, and frequency of food. The 24-hour dietary diversity recall may only show the most recent feeding and necessitates multiple measurements.

6. Conclusion and Recommendation

As a result, the overall CF indicators were low, negatively impacting the health of infants and young children. This demonstrates the significance of taking immediate action to promote CF indicators. Despite the timely introduction of CF, the proportion of mothers whose children met MMF, MDD, and MAD criteria remained a public health challenge in the study area. Child age and household socioeconomic status (food security, wealth index, and income) were among the factors found to be significantly associated with CF indicators.

6.1. Recommendation. It was stated in previous studies that two-thirds of child's death was attributed to inappropriate CF practices, in this study CF indicators remaining low. So, to scale up successful interventions to levels that would make an impact, Health Bureau, NGOs, and other development sectors should give special attention to:

(i) Educational/counseling intervention on nutrition for mothers and/or caregivers is essential for improving infant and young child feeding practices, particularly for mothers with younger children about, time, variety, quantity, and frequency of food

(ii) Promoting socioeconomic status of the community, particularly for poor mothers with households with the lowest wealth index/food insecure via multiple discipline/intersect oral collaboration engagement to improve ACFP

(iii) To come up with the real figure, large-scale longitudinal study will be proposed for the researcher

Abbreviations

ACFP:	Appropriate complementary feeding practice
ANC:	Antenatal care
AOR:	Adjusted odds ratio
C/S:	Caesarian section
CF:	Complementary feeding
CI:	Confidence interval
COR:	Crude odds ratio
CSA:	Central statistical agencies
EDHS:	Ethiopian Demographic and Health Survey
EBF:	Exclusive breast feeding
BF:	Breast feeding
FI:	Food insecurity
HCWs:	Health care workers
IYCF:	Infant and young child feeding
MAD:	Minimum acceptable diet
MDD:	Minimum dietary diversity
MMF:	Minimum meal frequency
OR:	Odds ratio
NGOs:	Nongovernmental organizations
PPS:	Probability proportionate to size
PNC:	Postnatal care
SDGs:	Sustainable development goals
SPSS:	Statistical Package for the Social Sciences software
TBAs:	Traditional birth attendants
UNICEF:	United Nation International Children's Emergency Funds
WHO:	World Health Organization.

Data Availability

Data used to support the study are available from the corresponding author upon request.

Ethical Approval

The proposal was approved by the research and Ethics Committee of the Madda Walabu University; then permission was obtained from relevant authorities.

Consent

An informed consent form was made available to the study participants. The consent was in line with the ethical principle of “autonomy” statements that give participants the right to stop participation in the study. Finally, information regarding the importance of appropriate CF practice and nutritional advice was given to respondents by interviewers.

Conflicts of Interest

The authors declare that they have no potential conflicts of interest.

Authors’ Contributions

JA and KK were involved in proposal writing, designed the study, and participated in coordination, supervision, and the overall implementation of the project, analyzed the data, and finalized the manuscript. KH conceived the study and participated in all stages of the study and revision of the manuscript. All authors read and approved the final manuscript.

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Research Article

Fatigue and Sleep Disturbance among Breast Cancer Patients during Treatment in Saudi Arabia

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Background. Fatigue and sleep disturbances are highly prevalent side effects encountered during treatment by patients with breast cancer, and they affect women's quality of life. Most studies investigating sleep and exhaustion in cancer patients provide evidence that supports a strong connection between different sleep parameters and fatigue associated with cancer. *Objective*. This study was to assess the level of fatigue and sleep disturbance in breast cancer patients during treatment in Saudi Arabia. *Method*. A descriptive cross-sectional study design was conducted on breast cancer patients undergoing treatment in Saudi Arabia. The data were collected through convenience sampling of patients. The study involved self-administered questionnaires comprising three categories: demographic data, perceived Pittsburgh Sleep Quality Index (PSQI), and Functional Assessment of Chronic Illness Therapy–Fatigue (FACIT-F). A total of 101 participants took part in this study. The significant statistical test was determined at a 95% confidence interval and at $p < 0.05$. *Results*. Half of the study participants were aged between 30 and 50 years. Significant differences were found in fatigue and sleep disturbance among BC patients during treatment in Saudi Arabia. A high prevalence of fatigue was found at 21.8%, and 5% of participants experienced sleep disturbance. *Conclusions*. Breast cancer patients in Saudi Arabia have a low overall global quality of life. The patients experience poor sleep quality and fatigue, which suggests that during treatment, patients need to be assessed routinely for these symptoms to prevent or reduce fatigue and sleep disturbance. Sleep disturbance might be correlated with fatigue.

1. Introduction

Worldwide, the most prevalent type of cancer is breast cancer (BC), leading to increased mortality among women [1]. It is estimated that more than one million females have diagnosed annually with BC [2]. There were 627,000 female deaths from BC in 2018, which comprised nearly 15% of all female cancer-related deaths [2]. The predominance of BC in Saudi Arabia's female population is 25.9%, and the mortality rate is 18.2% [3]. The second most common malignancy in Saudi females is BC, with a prevalence of 21.8% [4]. A cancer mortality survey among SA females has shown that BC is the 9th most common cause of death [4].

In SA, BC rates are expected to rise following several generations as the community increases and ages [4]. This disease ranks first among SA's female malignancies, accounting for nearly 22% of cases newly diagnosed with cancer [3]. In most nations, the rate of incidence of BC is also rising [3]. The mortality rate for BC was 5 times greater than that for patients with stage I tumor (credible interval) and 3.7 times greater than that for patients with stage II tumor in patients whose cancers were graded as stage IV [4].

In Western countries, the median onset age for BC patients is 65 years. However, in Saudi women, the median age for BC onset is 48 years [3]. BC is therefore a major concern for the SA population [3]. Anders and colleagues found that around 7% of women in the USA are diagnosed with BC before the age of 40, and for these women, survival rates are worse than those diagnosed at older ages [4]. Among young Saudi women, early diagnosis is a significant problem [4]. One study has shown from a logistic regression model that low BC screening use is significantly correlated with a woman's age, educational status, family income, use of hormonal contraceptives, and a positive history of previous BC [5].

During cancer care trajectory, individuals with cancer frequently struggle with different complicated symptoms that can interfere with the QOL and daily activities [1]. BC patients are exposed to several psychological and physical symptoms, which affect the quality and amount of sleep and fatigue [6]. Fatigue and sleep disturbances are highly prevalent and are encountered during treatment by patients with BC [7].

This topic has been studied in many countries, but there has been no focus specifically on BC patients [6]. Due to there being insufficient information and details in relation to BC, the authors of this paper wanted to conduct this research [6]. The majority of research examining sleep and exhaustion in cancer patients provides evidence that supports a clear association between cancer-related fatigue (CRF) and different parameters of sleep [7].

The majority of research has been performed in respect of patients with different cancers undergoing radiotherapy, chemotherapy, hormonal therapy, and surgery, for which associations have also been reported between fatigue and sleep disorders [8]. The prevalence of sleep disruption was 40% [9].

However, the QOL associated with well-being is now recognized as a virtual endpoint for cancer patients [6]. It has been shown that measuring cancer patients' QOL could enhance care and function as a prognostic factor and medical parameter [6]. The aim of the study was to assess the level of fatigue and sleep disturbance in breast cancer patients during treatment in Saudi Arabia.

The high prevalence of symptoms in the patient with BC during treatment are fatigue and sleep disturbances [7]. Roscoe et al. found that sleep disturbances are a common issue for cancer patients and survivors due to their complicated CRF relationship [8]. Considering what we know about the possible correlation between CRF and sleep disruptions, therapies that target disordered sleep and daytime sleepiness may be promising CRF treatments [8]. Given recent evidence that sleep disruption is normal in cancer patients and that it can be both a cause of and a consequence of exhaustion, it stands to reason that treating one symptom while avoiding the other may have a positive effect on the other [8].

Another study found that changes in CRF over time were significantly associated with parallel changes in nausea intensity ($r = 0.41$; p0.0001) and disrupted sleep ($r = 0.20$; p0.0001), according to Pearson correlations [10]. A further study reported that sleep disruption was found to be common in 40% of the population. A total of 154 people had sleep disturbances [9] and were tired (49% *vs.* 23%, pb0.001) [9]. Only the exhaustion-adjusted odds ratio (AOR) (1.90, 95% (CI) 1.10–3.30, $p = 0.020$) was found to be independently correlated with sleep disruption in a multivariable analysis [9].

Imanian et al. found that Spearman correlation coefficient results indicated that fatigue and sleep quality have a major relationship (0.210) [11]. In addition, Whisenant et al. found that three fatigue grades were specified: mild decreasing (59% cycle 2, 64% cycle 3), low moderate decreasing (30% cycle 2, 25% cycle 3), and high moderate decreasing (11% both cycles) [12]. Two disturbed sleep grades were specified: mild decreasing (89% cycle 2, 81% cycle 3) and increasing (11% cycle 2, 19% cycle 3) [12]. Women in the high moderate decreasing fatigue grade were more likely to have received doxorubicin (p = 0.02) and spent more hours lying down (p = 0.02) [12].

Another study indicated that at T1, three groups were found (fatigued with sleep complaints, average, and minimal symptoms) and five groups were identified at T2 (severely fatigued with poor sleep, emotionally fatigued with average sleep, physically fatigued with average sleep, average, and minimal symptoms) [13]. The majority of people in a group with more severe symptoms at T1 were also in a group with more severe symptoms at T2 [13]. Group membership was strongly associated with sociodemographic/medical factors at T1 and T2 [13].

Based on the findings of Fakih et al., patients recorded poor sleep 36% of the time before chemotherapy and 58% of the time during chemotherapy [14]. Clinical insomnia was recorded by 36% of patients during chemotherapy, up from 11% before treatment [14]. This indicates a substantial symptomatic burden that is poorly documented and treated in routine clinical practice [14]. Additionally, both psychological and therapy-related factors were linked to fatigue trajectories, with psychological factors most highly linked to high fatigue at the start of and during treatment [15].

In general, higher mindfulness was linked to fewer symptoms, such as pain intensity, pain interference, fatigue, depression, anxiety, and sleep disruption [16]. The degree of association, however, varied by mindfulness facet [16]. Observing had the least frequent associations and the smallest effect sizes across symptoms, while nonreactivity, nonjudgment, and explaining had the most frequent associations and largest effect sizes [16].

2. Materials and Methods

2.1. Research Design. The work involved a descriptive cross-sectional quantitative study of BC patients of age 18 years and above who were undergoing treatment in SA.

2.2. Setting. Data were collected using convenience sampling of patients who received cancer treatment. The data were collected from 28 February to 29 April 2020 (for 2 months). Subjects were assessed for research eligibility and asked to complete a questionnaire to assess their fatigue and sleep disturbance symptoms. All patients received care including all treatment modalities (surgical, chemotherapy, radiation, and hormonal). Patients with BC at any stage and under active medical treatment were included.

2.3. Sampling and Sample Size. The data were obtained from BC patients ($n = 101$). The inclusion criteria were (1) a BC patient, (2) age of 18 years and above, (3) undergoing treatment (including chemotherapy, radiation, hormonal, or surgical), and (4) able to read Arabic. The exclusion criteria consisted of (1) a mental illness and (2) diagnosis with another type of cancer. The researchers introduced the study's aim, objectives, and significance of the study to the participants and the questionnaire took approximately 10–15 minutes to be completed. The sample size was calculated through *G* power analysis using a confidence interval of 95% and an alpha of .05. The estimated target sample size was 100 students.

2.4. Data Collection Method. In addition to demographic data, the data were collected using two instruments to collect data [17]. The tools are available in two languages (English and Arabic language) because the study participant is speaking the Arabic language, so the authors used the Arabic version of the tool. The first tool measures fatigue and is called the FACIT-F scale of fatigue [17]. This instrument has been checked for reliability and validity [17]. The method measures self-reported fatigue and its effect on the activities of daily life and was first introduced as a supplement to the Functional Evaluation of Cancer Therapy [17]. A subscale to the general questionnaire, the FACIT-G, comprises the FACIT-fatigue [18]. In both the general population and patients with cancer, psoriatic arthritis, rheumatoid arthritis, systemic lupus erythematosus, paroxysmal nocturnal hemoglobinuria, and Parkinson's disease, the FACIT-F scale has been validated [18]. It contains 13 questions and uses a Likert-type scale of five points ($0 =$ not at all; $1 = a$ little bit; $2 =$ somewhat; $3 =$ quite a bit; and $4 = a$ lot). All items contribute equal weight to the total ranking [18]. The scale range is between 0 and 52, with the worst possible score being 0 and the best possible score being 52, suggesting no fatigue [18]. Each negatively worded item response is documented for this reason [18]. The FACIT-F is an important tool that can serve as a basis for enhancing our understanding of cancer patients' exhaustion [18]. Validity and reliability: The FACIT-F scale (Cronbach's alpha = 0.96) was found to have high internal validity in a 2007 report [18]. It was also found to have high reliability of test retests (ICC = 0.95) [19]. The FACIT and Fatigue Intensity Scale association was −0.799 [20].

In addition, the second tool can test the sleep disorder in patients with BC (PSQI). It was developed to determine sleep efficiency [20]. The tool involves 11 self-rated questions that consist of seven component scores: subjective sleep quality (0–3), sleep latency (0–3), sleep length (0–3), normal sleep efficiency (0–3), sleep disturbances (0–3), use of sleep medication (0–3), and daytime dysfunction (0–3) [20]. To obtain a global ranking for quality of sleep (range 0 to 21), component scores are summed up (range 0 to 3); a score greater than five indicates poor quality of sleep [20]. In other words, the higher the score, the worse is the sleep quality.

The PSQI specifies the respondents' normal sleep and waking hours, the total amount of sleep hours, the time taken to fall asleep, and other Likert-type questions [21]. The 7 clinical components denoting difficulty of sleep are then analyzed using these items: subjective sleep quality, sleep delay, sleep length, normal sleep performance, sleep disturbances, sleep medication, and daytime dysfunction [21].

The scale helps researchers assess sleep disorder over a one-month cycle by calculating a basic, global score representing the intensity of sleep disruption, according to the developers of the PSQI [21]. A few validation studies have shown that a 2- or 3-factor model, rather than the original 1-factor form, could better reflect the PSQI [21].

To assess the reliability of the PSQI-I and to create internal consistency, further studies have been carried out [22]. Cronbach's alpha for the PSQI-I was 0.72, ranging from 0.69 to 0.72 for each object [22]. There were statistically important and beneficial associations between the PSQI-I overall score and the seven component scores for the PSQI-I [22]. The correlation degree was $r = 0.36–0.56$, $p < 0.05$ for each domain. In terms of validity, the overall PSQI-I score was closely related to the overall Indo BDI-II score ($r = 0.22$, $p < 0.05$). BDI-somatic II's affective and cognitive components showed a strong association with the overall PSQI-I score ($r = 0.17–0.19$, $p < 0.05$) [22]. Sleep quality, sleep disruptions, sleep medicine, and daytime dysfunction were significantly associated with the total Indo BDI-II score ($r = 0.11–0.25$, $p < 0.05$) among the seven components PSQI-I [22].

2.5. Variables. A self-report questionnaire was used to collect information, and participants were approached by the researcher through electronic online invitation. The questionnaire was distributed for use via the online Google forms tool. The questionnaire contained 24 items comprising PSQI and FACIT-F. Data were obtained anonymously as responses without a request for names to be registered. Before the respondent could begin the survey, a detailed study information sheet was provided in the e-mail. Furthermore, participants were told that the collected data would be used exclusively for study purposes.

2.6. Data Analysis. The data were analyzed using (SPSS software) (IBM, Inc. Chicago, IL, USA) version 26. Descriptive and inferential statistics were used in this study. The descriptive statistics included frequencies and percentages. The inferential statistics used one-way analysis of variance (ANOVA), A *p*-value of <0.05 was considered statistically significant.

2.7. Ethical Considerations. The Nursing Faculty's Ethics and Research Committee at King Abdul-Aziz University was consulted for ethical approval of this research. Enrolment in the study was voluntary, and the collection of data was anonymous, as the participants were not requested to include their names. The research details were included on the beginning page of the online survey tool. Participants could then read the details before beginning the survey and determine if they wanted to continue. Informed consent was implied by the completion and submission of the survey by the participants.

3. Results

3.1. Demographic Data. There were 101 participants in this study. Half of the study participants were aged between 30 and 50 years. Most people in the study sample were female (96%). Moreover, half of the study participants were married (54.5%). In addition, 36.6% of them were employed and most of the employed participants (50.5%) had an income of less than 5000 Saudi Riyal. Most of the study participants (74.3%) were Saudi (Table 1).

Table 1: Participants' demographic characteristics.

Variables		*N*	%
AGE	Less than 30 years	36	35.6
	From 30 to 50 years	51	50.5
	More than 50 years	13	12.9
Gender	Female	97	96
	Male	4	4
Marital status	Divorce	11	10.9
	Married	55	54.5
	Single	32	31.7
	Widow	3	3
Employment	Employee	37	36.6
	None	34	33.7
	Retired	3	3.0%
	Student	27	26.7%
Income	10,000–20,000	23	22.8%
	5000–10,000	26	25.7%
	Less than 5000	51	50.5%
	More than 20,000	1	1.0%

%: percentage. *N*: number of participants. Total study participants: 101.

3.2. Differences in Levels of Fatigue and Sleep Disturbance. In this study, we tested the differences in levels of fatigue and sleep disturbance among BC patients during treatment in Saudi Arabia related to demographic variables, which included age, gender, marital status, income, occupation, and nationality. The following paragraphs present the significant results in Table 2.

3.2.1. Age. There was found to be a significant difference in daytime dysfunction among BC patients during treatment in Saudi Arabia related to age variables, for which the p-value of the test was 0.027. The mean and standard deviation for daytime dysfunction in the under-30 age group were 1.42 and 0.55, respectively; from 30 to 50 years, the values were 1.02 and 0.79, respectively; and for the over-50 age group, the values were 1.38 and 0.77, respectively (Table 2).

3.2.2. Gender. Similarly, there was a significant difference in sleep disturbance among BC patients during treatment in Saudi Arabia related to gender variables, for which the p-value was less than 0.001. The mean and standard deviation for sleep disturbance and gender of females were 1.48 and 0.6, and for males, the values were 1.50 and 0.58 (Table 2).

3.2.3. Marital Status. There were significant differences in sleep latency among BC patients during treatment in Saudi Arabia related to marital status variables, for which the p-value of the test was 0.001. The mean and standard deviation for sleep latency and marital status of married participants were 1.93 and 0.92; for single participants, values were 1.66 and 0.70; and for divorced participants, values were 1.27 and 1.35. Significant differences were found in sleep duration among BC patients during treatment in Saudi Arabia related to marital status variables, for which the p-value of the test was 0.001. Therefore, the mean and standard deviation for sleep duration and marital status of married participants were 1.38 and 1.04; for single participants, values were 1.48 and 0.93; for divorced participants, values were 0.55 and 0.69; and for widows, values were 3.00 and 0.00. There was found to be a significant difference in daytime dysfunction among BC patients during treatment in Saudi Arabia related to marital status variables, for which the p-value of the test was 0.036, or less than 5%. The mean and standard deviation for daytime dysfunction and marital status of married participants were 1.02 and 0.71; for single participants, values were 1.47 and 0.67; and for divorced participants, values were 1.36 and 0.92 (Table 2).

3.2.4. Income. There were found to be significant differences in sleep latency among BC patients during treatment in Saudi Arabia related to income variables, for which the p-value of the test was 0.023. The mean and standard deviation for sleep latency and income group of less than 5000 Saudi Riyal were 1.84 and 0.81. Moreover, the mean and standard deviation for the group income range from 5000 to 10,000 were 1.85 and 0.97, while for the group of income range from 10,000 to 20,000 Saudi Riyal, values were 1.22 and 1.13 (Table 2). Additionally, there were significant differences in sleep efficiency among BC patients during treatment in Saudi Arabia related to income variables, for which the p-value of the test was 0.027. The mean and standard deviation for sleep efficiency and income group of less than 5000 were 0.84 and 1.15; for the income group range from 5000 to 10,000, values were 0.83 and 1.13; and for the income group range from 10,000 to 20,000, values were 0.64 and 1.05 (Table 2). Moreover, there was a significant difference in the use of sleep medication among BC patients during treatment in Saudi Arabia related to income variables, for which the p-value of the test was 0.034. The mean and standard deviation for sleep medication usage and income group of less than 5000 were 0.53 and 0.95; for the income group range from 5000 to 10,000, values were 0.69 and 1.05; and for the income group range from 10,000 to 20,000, values were 0.00 and 0.00 (Table 2).

3.2.5. Employment Status. The study showed a significant difference between occupation statuses among BC patients in sleep quality, sleep efficiency, sleep medication usage, daytime dysfunction, and global score of sleep. There was a

Table 2: Statistical difference among study participants' demographic variables in sleep quality level.

Demographic variables	Sleep quality level		N	Mean	Std. Deviation	Std. error	95% confidence interval for mean		Minimum	Maximum	F	Sig.
							Lower bound	Upper bound				
Age	Daytime dysfunction	<30 years	36	1.42	0.55	0.09	1.23	1.60	0.00	2.00	3.759	0.027
		30–50 years	51	1.02	0.79	0.11	0.80	1.24	0.00	3.00		
		>50 years	13	1.38	0.77	0.21	0.92	1.85	0.00	3.00		
Marital status	Sleep latency	Married	55	1.93	0.92	0.12	1.68	2.18	0.00	3.00	5.544	0.001
		Single	32	1.66	0.70	0.12	1.40	1.91	1.00	3.00		
		Divorce	11	1.27	1.35	0.41	0.37	2.18	0.00	3.00		
		Widow	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	Sleep duration	Married	53	1.38	1.04	0.14	1.09	1.66	0.00	3.00	5.715	0.001
		Single	31	1.48	0.93	0.17	1.14	1.82	0.00	3.00		
		Divorce	11	0.55	0.69	0.21	-+0.08	1.01	0.00	2.00		
		Widow	3	3.00	0.00	0.00	3.00	3.00	3.00	3.00		
	Daytime dysfunction	Married	55	1.02	0.71	0.10	0.83	1.21	0.00	3.00	2.968	0.036
		Single	32	1.47	0.67	0.12	1.23	1.71	0.00	3.00		
		Divorce	11	1.36	0.92	0.28	0.74	1.98	0.00	3.00		
		Widow	3	1.00	0.00	0.00	1.00	1.00	1.00	1.00		
Employment	Subjective sleep quality	None	34	1.44	0.96	0.16	1.11	1.78	0.00	3.00	6.287	0.003
		Employee	37	0.76	0.80	0.13	0.49	1.02	0.00	3.00		
		Student	27	1.44	1.05	0.20	1.03	1.86	0.00	3.00		
	Use of sleep medication	None	34	0.59	1.10	0.19	0.20	0.97	0.00	3.00	3.230	0.044
		Employee	37	0.16	0.55	0.09	-0.02	0.35	0.00	3.00		
		Student	27	0.67	0.92	0.18	0.30	1.03	0.00	3.00		
	Daytime dysfunction	None	34	1.18	0.87	0.15	0.87	1.48	0.00	3.00	7.297	0.001
		Employee	37	0.92	0.64	0.11	0.71	1.13	0.00	3.00		
		Student	27	1.59	0.50	0.10	1.39	1.79	1.00	2.00		
	Global PSQI score	None	34	9.03	3.66	0.63	7.75	10.30	4.00	17.00	5.435	0.006
		Employee	37	6.62	3.37	0.55	5.50	7.75	1.00	15.00		
		Student	27	8.70	2.74	0.53	7.62	9.79	4.00	14.00		
Income	Sleep latency	Less than 5000	51	1.84	0.81	0.11	1.62	2.07	1.00	3.00	3.320	0.023
		5000–10,000	26	1.85	0.97	0.19	1.46	2.24	0.00	3.00		
		10,000–20,000	23	1.22	1.13	0.23	0.73	1.70	0.00	3.00		
		More than 20,000	1	3.00					3.00	3.00		

Number (N)/standard deviation (Std.)/frequency (F)/significance probability (Sig.), analysis of variance (ANOVA), $\propto < 0.05$ two tailed.

significant difference in subjective sleep quality among BC patients during treatment in Saudi Arabia related to occupation variables, for which the p-value of the test was 0.003. The mean and standard deviation for subjective sleep quality and the unemployed group were 1.44 and 0.96; for employees, values were 0.76 and 0.80. The mean and standard deviation for students were 1.44 and 1.05. In addition, there was a significant difference in sleep efficiency among BC patients during treatment in Saudi Arabia related to occupation variables, for which the p-value of the test was 0.014. The mean and standard deviation for sleep efficiency and the unemployed group were 1.06 and 1.15, while the employed group's mean and standard deviation were 0.61 and 0.96. In addition, the mean and standard deviation for students were 0.59 and 1.18. Moreover, the study showed a significant difference in sleep medication usage among BC patients during treatment in Saudi Arabia related to occupation variables, for which the p-value of the test was 0.044. The mean and standard deviation for use of sleep medication and the unemployed group were 0.59 and 1.10; for the employed group, values were 0.16 and 0.55; and the mean and standard deviation for students were 0.67 and 0.92. Similarly, the study presented a significant difference in daytime dysfunction among BC patients during treatment in Saudi Arabia related to occupation variables, for which the p-value of the test was 0.001. The mean and standard deviation for daytime dysfunction and the unemployed group were 1.18 and 0.87; for the employed group, values were 0.92 and 0.64; and for the student group, the mean and standard deviation were 1.59 and 0.50. Finally, the study sample showed a significant difference in Global PSQI Score among BC patients during treatment in Saudi Arabia related to occupation variables, for which the p-value of the test was 0.006. The mean and standard deviation for the Global PSQI Score and unemployed group were 9.03 and 3.66; for the employed group, values were 6.62 and 3.37; and for students, values were 8.70 and 2.74 (Table 2).

3.2.6. Nationality. There was a significant difference in sleep duration among BC patients during treatment in Saudi Arabia related to nationality variables, for which the p-value of the test was 0.006. The mean and standard deviation for sleep duration for Saudis were 1.53 and 1.04, and for non-Saudis, values were 0.88 and 0.85 (Table 2).

3.2.7. Region of Living. The study showed there was no significant difference among cancer patients with regard to the region of living.

4. Sleep Disturbance among Breast Cancer Patients during Treatment

4.1. Fatigue. In total, 21.8% of the sample study have Extreme Fatigue, 43.6% of them have quite a lot of Fatigue, 20.8% of them have Some Fatigue, and 13.9% of them have Little Fatigue.

4.2. Subjective Sleep Quality. In total, 26.7% of the sample study is very good at Subjective sleep quality, 44.6% of them are good at Subjective sleep quality, 14.9% of them are bad at Subjective sleep quality, and 13.9% of them are very bad at Subjective sleep quality.

4.3. Sleep Latency. In total, 10.9% of the sample study is very good at Sleep latency, 31.7% of them are good at Sleep latency, 32.7% of them are bad at Sleep latency, and 24.8% of them are very bad at Sleep latency.

4.4. Sleep Duration. In total, 25.7% of the sample study is very good at Sleep duration, 23.8% of them are good at Sleep duration, 33.7% of them are bad at Sleep duration, and 13.9% of them are very bad at Sleep duration.

4.5. Sleep Efficiency. In total, 53.5% of the sample study is very good at Sleep efficiency, 17.8% of them are good at Sleep efficiency, 5.9% of them are bad at Sleep efficiency, and 13.9% of them are very bad at Sleep efficiency.

4.6. Sleep Disturbance. In total, 1% of the sample study is very good at Sleep disturbance, 54.5% of them are good at Sleep disturbance, 39.6% of them are bad at Sleep disturbance, and 5% of them are very bad at Sleep disturbance.

4.7. Use of Sleep Medication. In total, 74.3% of the sample study is very good at the use of sleep medication, 14.9% of them are good at using sleep medication, 3% of them are bad at using sleep medication, and 7.9% of them are very bad at using sleep medication.

4.8. Daytime Dysfunction. In total, 15.8% of the sample study is very good at Daytime dysfunction, 51.5% of them are good at Daytime dysfunction, 29.7% of them are bad at Daytime dysfunction, and 3% of them are very bad at Daytime dysfunction.

5. Discussion

To the best of our knowledge, our study is one of the first to focus on the level of fatigue and sleep disturbance in breast cancer patients during treatment in Saudi Arabia. With an increase in cancer incidence in recent years and its impact on physical, psychological, and social dimensions, it is considered a significant health problem. As these are considered to be common side effects among BC patients. Significant differences were found in fatigue and sleep disturbance among BC patients during SA treatment. Our findings show that a high prevalence of fatigue was 21.8%. The study finding is consistent with the studies conducted previously. A study showed that the majority of patients (57.4%) reported moderate fatigue, while 21.7% and 20.9% reported severe and mild fatigue, respectively [11]. However, the study result is lower than the results reported in Norway, Italy, Germany, and Canada [23, 24] and higher than the study results found in Texas, Poland, Jordan, and India [25, 26]. This disparity may be attributed to differences in socioeconomic status and health-care delivery systems.

In our data, the participants were 101. However, the study reported 21.8% extreme fatigue, 43.6% Quite a lot of fatigue, 20.8% some fatigue, and 13.9% no or little fatigue. The similarities in these first study findings show that 115 of women, had 21.7% a severe level of fatigue [11]. Although, that second study used secondary data analysis of 548 BC females and showed a high prevalence of 75% of clinically relevant CRF in BC patients following their initial chemotherapy [10]. Therefore, due to the difference in sample size, we cannot consider that the result is accurate for generalizability. However, compared to our study the differences. In the first study, the data were collected through three questionnaires [11]. Also, in the second study, they showed the effect level of nausea directed and undirected influenced [10].

In terms of sleep disturbance, 5% of participants reported severe sleep disturbance. The sleep of breast cancer patients in this sample was characterized by reduced total sleep time, with many attributing poor sleep to pain, nocturia, feeling too hot, and coughing or snoring loudly. Thus, little attention has been paid to the role that sleep disturbance may play in contributing to this symptom. This disparity may be attributed to differences in tools that have been used to collect the data as in the present study PSQI scale, but in the other study, the author used the BFI scale. In addition, the period to collect the data was three months, but the present research has limited time.

Another study used secondary data analysis of 548 BC females and showed a high prevalence of 75% of clinically relevant CRF in BC patients following their initial chemotherapy [10]. Seventy-five percent of patients had clinically significant post-treatment CRF [10]. Linear regression showed that pretreatment CRF, more significant nausea, disturbed sleep, and younger age were significant risk factors for post-treatment CRF [10]. Path modeling showed that nausea severity influenced post-treatment CRF both directly and indirectly by influencing disturbed sleep. Similarly, both nausea severity and disrupted sleep affected post-treatment

CRF directly and indirectly. According to Pearson correlations, changes in CRF were strongly associated with concurrent changes in nausea occurrence and disrupted sleep [10]. This study is similar to our demographic variables; age and marital state were significant predictors of CRF. Younger patients experienced greater CRF than did older patients. This finding is consistent with prior research, which showed that younger age was associated with higher levels of CRF in BC patients. This is most likely due to more aggressive treatments given to younger patients [10]. Moreover, there was a significant difference in gender between males and females because we studied 4 males and 97 females. Therefore, due to the difference in sample size, we cannot consider that the result is accurate for generalizability.

5.1. Limitations. This study had a few limitations. First, insufficient number of studies related to fatigue and sleep disturbance among breast cancer patients in Saudi Arabia. Second, the sample size is considered small which affects the generalizability of the findings. Another important limitation was not being able to collect the data face-to-face due to COVID-19 restrictions. In addition to these limitations, the time required to conduct this study was limited, which was the most significant factor for us in our study.

5.2. Recommendations. We recommend that future studies investigate the relationship between fatigue and sleep disturbances that will enhance the quality of life for women with breast cancer and engage a more significant number of participants by increasing the sample size of the study. However, we emphasize on collecting the data from hospital settings rather than community samples and using different data collection methods such as self-report questionnaires, medical chart reviews, and interviews such as face-to-face interviews that assure that participants to understand the survey questions well and prevent the different interpretations of our questions. Further, we suggest using different designs like a mixed-method and more advanced statistical analysis to enhance and improve the study result. Also, recommending further research could advance our scientific understanding of potential interrelationships between sleep disturbance and cancer-related fatigue and clinical interventions that help with fatigue and sleep disturbance. In addition, it increases the level of education about how to deal with fatigue and sleep disturbances in the cancer patient.

6. Conclusions

Breast cancer patients in Saudi Arabia had a low overall global quality of life. The patients experienced poor sleep quality and fatigue, which suggests that during treatment patients need to be assessed routinely for these symptoms to prevent or reduce fatigue and sleep disturbance. Sleep disturbance might be correlated with fatigue, and future research should investigate strategies addressing sleep disturbance and fatigue.

Both sleep and fatigue in patients with cancer provide evidence supporting a high correlation between cancer-related fatigue and various sleep parameters, including poor sleep quality, disrupted initiation and maintenance of sleep, nighttime awakening, restless sleep, and excessive daytime sleepiness.

Data Availability

The datasets used for this study are available from the corresponding author upon reasonable request.

Consent

Written informed consent has been obtained from the subjects involved in this study.

Conflicts of Interest

The authors declare no conflicts of interest.

Authors' Contributions

F.A., F.S., W.M., and A.T.conceptualized the study; A.A., and T.A. developed methodology; A.A., T.A., and B.A. did formal analysis; A.A., T.A., A.T., and B.A. wrote the original draft; F.A., F.S., W.M., and A.T reviewed and edited the manuscript. All authors have read and agreed to the published version of the manuscript.

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Research Article

Nursing Students' Perception of Clinical Teaching and Learning in Ghana: A Descriptive Qualitative Study

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Background. Clinical teaching and learning are critical in bridging the theory-practice gap in nursing education. This study aimed at exploring nursing students' perception of clinical teaching and learning in Ghana. In particular, this study sought to (1) describe the factors that promote clinical teaching, (2) examine students' perception of clinical teaching, (3) describe the impact of clinical learning on students, and (4) explore ways of improving clinical teaching and learning. *Methods*. A descriptive qualitative study was conducted with 16 final-year nursing students using telephone-based interviews. Individual in-depth interviews were conducted with a semistructured interview guide, and data were analysed by the qualitative thematic analysis. *Results*. The findings indicate that being taught new things, being supervised, and having autonomy were the most significant factors that promoted clinical learning. Participants also reported that clinical experience created learning opportunities that helped develop clinical competence. They described learning experiences in the clinical setting as good, albeit gaps in practice. Poor staff attitude, lack of equipment, poor student attitude, inadequate learning opportunities, and lack of clinical supervisors were perceived as challenges in the clinical environment. *Conclusions*. Efforts to consciously teach, supervise, and challenge students to have independence in the clinical area will promote clinical teaching and learning. Therefore, nursing educational institutions and all other stakeholders need to collaborate in eliminating the numerous challenges students encounter in the clinical environment.

1. Background

Clinical teaching and learning are integral components of nursing education. Most clinical teaching and learning activities occur in the clinical setting where theory is translated into practice [1, 2] in healthcare providing institutions [3, 4]. Although the clinical environment is a significant place to apply the theories learned in the classroom, there remains a gap in the magnitude of applying the theory to practice. The effective application of theory to practice depends on many factors, including creating learning opportunities for students and support by preceptors [5].

A conducive clinical environment is critical in enhancing the learning experiences of students. For instance, in an environment where simulation learning is limited or not available at all, learning occurs in the actual hospital environment [6]. However, most clinical training facilities in sub-Saharan Africa are constrained by logistics and equipment, which tends to affect students' learning experiences. Multiple factors have been reported to affect student learning in the clinical area. These include individual-level factors, the nature of the hospital environment, socioeconomic, and nurse educator factors [7]. A study conducted by Rajeswaran [8] in Botswana discovered that nursing students could not translate the theory into practice because they lacked adequate supervision in the clinical setting, which resulted in low performance in clinical practice.

Research has identified several factors that negatively impact the clinical performance of students. These included limited opportunities for students to practice in teaching hospitals, inadequate or nonavailability of nurse educators, clinical instructors and mentors, and too many students in the programme [9]. It has also been reported that clinical instructors' attitude, constructive criticism, and supportive clinical settings promote clinical learning. Nonetheless, negative criticism tends to affect students' clinical performance [1]. The clinical teaching and learning process can also be negatively affected by student-related factors such as inadequate knowledge and skills, poor attitude, unprofessional behaviour, and poor communication skills with patients and clinical instructors. Again, the inability of students to ask questions, overconfidence, not being motivated to learn or work, lack of confidence, and dishonesty have been cited in the literature [10].

Despite the scarcity of evidence on students' perception regarding clinical education in Ghana, other studies globally reported nursing students' education and professional socialising experiences, processes, and outcomes are influenced by the quality of clinical learning setting and their perception of it during clinical placements [11, 12]. It has been revealed that nursing students perceived the clinical setting as stressful and challenging attitude [13]. However, others perceived the clinical education experiences as rewarding and satisfying [14].

Generally, from the students' perspective, the clinical setting has been described as nonsupportive because of institutional inadequacies, a lack of relationship between students and clinical educators, and negative attitude and behaviours on the part of some nurse educators [15]. Students have highlighted inhibitors to clinical learning, including preceptors' inadequate engagement and feedback [16]. Moreover, preceptors were not available to engage with students. Students found that theory and practice were not connected and felt that they lacked opportunities to reflect together with their preceptors [17].

It is critical to note that clinical training in nursing occurs in a complex clinical learning setting, which is influenced by many factors [18]. This setting provides an advantage for student nurses to learn experimentally and to translate theoretical knowledge to a diversity of mental, psychological, and psychomotor skills, which are of importance for patient care [19]. Students' exposure and preparation to enter the clinical environment are significant factors influencing the quality of clinical education [20].

According to the Nursing and Midwifery Council (N&MC) of Ghana, the minimum practical hours expected on a Registered General Nursing Programme are 1632 hours in a minimum of 3 years. For the institutions that run 4-year Bachelor of Science in Nursing Programmes, most practical sessions begin in the second year when students are deemed to have acquired some professional knowledge and are adequately prepared at least for basic nursing procedures. Clinical rotation is designed to cover all specialty areas required by the N&MC, including medical/surgical nursing, obstetrics and gynaecological nursing, public health, mental health, paediatrics, and other selected specialties available in the specialist units.

Students are taught mainly by clinical faculty and preceptors in the clinical sites. Faculty from the schools also have specific days they visit the clinical sites to teach their students. The minimum qualification for faculty from the schools is Masters' degree. On the other hand, clinical faculty/preceptors are Masters or Bachelor of Science prepared nurses. The minimum qualification for professional nurses in Ghana is diploma. The assessment of students' clinical competencies is usually conducted at the end of each semester in the clinical sites or the schools' skill laboratories using standardised evaluation tools. These examinations are conducted by faculty from the schools and clinical faculty/preceptors and are most often graded according to the schools' grading systems.

In Ghana, improving clinical nursing education is a significant characteristic of clinical skill acquisition. Critical areas of consideration include improving a positive clinical environment, effective clinical supervision, adequate assessment of students, and clinical-academic collaborations [21]. This research is critical in improving clinical teaching and learning in the Cape Coast Metropolis of Ghana. Currently, there is a paucity of data regarding this topic in the study area. This study explored nursing students' perception of clinical teaching and learning, in particular to (1) describe the factors that promote clinical teaching, (2) examine students' perceptions of clinical teaching, (3) describe the impact of clinical learning on students, and (4) explore ways of improving clinical teaching and learning.

2. Methods

2.1. Design and Participants. The study employed a qualitative explorative, descriptive design. The population comprised final-year student nurses who had enrolled on a four-year Bachelor of Science in Nursing programme in a public university in Ghana. Purposive sampling was used to recruit participants who were 18 years or older and had at least three years of clinical teaching and were therefore information-rich per the study's objectives.

2.2. Study Setting. The setting for this study comprised clinical placement sites across the country. Students enrolled in a Bachelor of Science in Nursing programme are mandated to have practical experience within the semester and during the inter-semester break. These students are allowed to select sites for clinical placement based on their location and the type of health facility that can help them accomplish the objectives of the clinical practicum. These sites represent different levels of health facilities in Ghana, including teaching and district hospitals. Some of the facilities are owned by the government, while others are private facilities. Although the facilities provide health services, the level of sophistication and specialised services differs across facilities. Although most of the facilities provided both general and specialised services, few concentrated on the provision of mental health services. The teaching hospitals focused on providing both general and specialised services and served as referral points for the district hospitals and other facilities in the periphery.

2.3. Data Collection. A semi-structured telephone-based interview technique was used for inquiry. The interviews were conducted between June and July 2020 to obtain in-depth information about participants' perception regarding clinical teaching and learning. It is worth noting that at the initial stages of the pandemic in March 2020, all clinical activities in the placement sites were halted. Students went home and continued classes online. Nonetheless, some of the students continued to support the staff in their various hospitals due to the staff shortages. They returned to campus to complete the semester in September 2020 after some restrictions had been lifted. At the time of the interviews, students were not on campus, which impacted our ability to do face-to-face interviews.

Demographic information comprising sex and age was collected prior to each interview to give perspective on the data. The semi-structured interview covered the following index questions followed with several probes: (1) How do you perceive the clinical teaching and learning environment? (2) How will you describe the clinical teaching you received? (3) What professional skills and attitudes did you model or learn from the professionals you worked with?

A total of sixteen interviews were conducted during the study period, at which point data saturation had been confirmed. The interviews were conducted in English and audio-recorded after consent had been sought from the participants. Each interview lasted between 45 and 60 minutes.

2.4. Data Management and Analysis. The inductive thematic analysis was conducted guided by the six steps proposed by Braun and Clarke [22]. Audio recordings were saved on separate password-protected computers, and the data were transcribed verbatim and analysed by two members of the research team. Each independent researcher read and reread the printed transcripts and listened to the audio version concurrently for familiarisation with the data. Afterwards, relevant phrases or sentences were highlighted and short codes were assigned.

The highlighted data were then collated into groups to get a condensed overview of the main points recurring throughout the participants' narratives. Following coding, the themes were generated by identifying patterns among the codes and combining several codes. After that, independent researchers deliberated and agreed on the themes to ensure accurate representation of the participants' narratives. The emergent themes were then defined by explaining exactly what the themes mean in relation to the data set.

2.5. Trustworthiness. Rigor was maintained throughout the research process as recommended by Lincoln and Guba [23]. To establish credibility, member checking was carried out. Also, two members of the research team analysed the data independently to ensure congruence between data and themes. An audit trail was also maintained to achieve confirmability and dependability by detailing the research process, the participants, and research setting. Two members of the research team coded the transcript. The audio-recorded interviews and transcripts were kept safe to allow for transferability.

Table 1: Demographic characteristics of the participants.

No.	Gender	Age	Programme
1.	Male	21	BSc. Nursing
2.	Female	23	BSc. Nursing
3.	Female	23	BSc. Nursing
4.	Male	25	BSc. Nursing
5.	Female	23	BSc. Nursing
6.	Female	24	BSc. Nursing
7.	Female	24	BSc. Nursing
8.	Female	25	BSc. Nursing
9.	Male	25	BSc. Nursing
10.	Female	22	BSc. Nursing
11.	Male	25	BSc. Nursing
12.	Female	22	BSc. Nursing
13.	Male	24	BSc. Nursing
14.	Female	22	BSc. Nursing
15.	Female	24	BSc. Nursing
16.	Female	23	BSc. Nursing

3. Results

Sixteen final-year nursing students offering Bachelor of Science in Nursing in a public university were interviewed for the study. Table 1 shows the demographic characteristics of the participants. Eleven of the participants were females, and five were males and were aged between 21 and 25 years. Five main themes and several subthemes emerged from the data, as shown in Table 2. The five themes are factors that promote clinical learning, the impact of clinical experience on students, students' perception of clinical teaching, challenges in the clinical setting, and improving clinical teaching and learning.

3.1. Factors That Promoted Clinical Learning. This theme described the many and varied factors that promoted clinical learning among students. Most of the participants were excited about an opportunity to learn new things in the clinical setting and described their best clinical experience as the one in which they were taught new things. They had the autonomy to practice and were supervised to practice new things learned on the ward. These factors that promote clinical learning are explicated as follows:

3.1.1. Being Taught New Things. Most participants reported that being taught new things promoted clinical learning as indicated in the following quote:

> "*. . . They taught us the emergency drugs. So that made me yearn for more. So, I mean, my best experience so far was at the Hospital A where I had nurses teaching me day by day. Teaching me the instruments, anything they had to do*" (Participant 1).

Table 2: Themes and subthemes.

Main themes	Subthemes
(1) Factors that promote clinical learning	(a) Being taught new things (b) Being supervised (c) Having autonomy
(2) The impact of clinical experience on students	(a) Clinical learning opportunity (b) Developing clinical competence
(3) Students' perception of clinical teaching	(a) Clinical practice is good (b) Gaps in clinical practice (c) Inadequate clinical practice
(4) Challenges in the clinical setting	(a) Poor staff attitude (b) Lack of equipment (c) Poor student attitude (d) Lack of learning opportunities (e) Lack of supervisors
(5) Improving clinical teaching and learning	(a) Supervision (b) Training for staff (c) Separate practical and theory sessions (d) Strengthening clinical teaching

3.1.2. Being Supervised. Participants indicated that being supervised facilitated learning in the clinical area:

> "*. . .We were supposed to perform a procedure, I think I did not do it well, and then our clinical instructor, one of the sisters, actually approached me and then corrected me. I think that was the best because of the way she approached me and made me understand that we do not do this at this point and she did not shout at me, maybe that is why I feel it's the best, and she actually corrected me at her office not right in front of the patients*" (Participant 6).

3.1.3. Having the Autonomy to Practice. Most of the participants described having the autonomy to practice as a factor that promotes clinical learning:

> "*. . . I learned that you can do a lot of things for a patient, and then you get to have the opportunity to do things on your own. You are supervised, but then we have a certain autonomy. You get to know how things are done. [In] certain hospitals, you do not get to practice the skill itself but here you are given the opportunity to actually do. . .wound dressing. . . and all that*" (Participant 10).

3.2. The Impact of Clinical Experience on Students. Clinical practice plays an important role in helping shape students' clinical skills needed for professional nursing practice. The participants shared how the clinical practices impacted them. The subthemes are clinical learning opportunities and develop clinical competence.

3.2.1. Clinical Learning Opportunity. Most participants described it as a learning opportunity.

> "*We change hospitals almost every semester, so if you are at a certain hospital where you do not get to experience a lot of conditions, you get to experience it at another place*" (Participant 10).

> "*Even though sometimes we are handicapped with the basic tools and equipment that we are supposed to practice with, at least we are able to learn one or two before you leave the ward*" (Participant).

3.2.2. Developing Clinical Competence. Some participants shared how their opportunities in the clinical setting to practice have improved their clinical competence:

> "*I did oral suctioning. That was the first time I actually did suctioning. I had observed on several occasions, but I never had the opportunity to do it. That was the first time I prepared the patient, used the suctioning machine myself, and inserted it. I was supervised for three times and subsequent ones I did them myself*" (Participant 11).

> "*I have experienced so many clinical experiences, but the one I really appreciate is how to pass an IV line and serve medication. Initially, at the lower levels, I had been having difficulties, and thought I will not be able to, but with exposure, [I can] do it now. Initially, people normally help me and supervise but now I can do it*" (Participant 13).

3.3. Students' Perception of Clinical Teaching. Participants have had varied clinical teaching experiences and therefore perceived clinical teaching differently. While some described it as good, others taught there were gaps, and some said it was inadequate.

3.3.1. Clinical Practice Is Good. In sharing their clinical experience, some participants described their clinical practice as good. This was especially the case when participants had the opportunity to learn new things and linked theory to practice examples:

> "*. . . I think it's very good and the opportunity to go to hospital B too was very educative. I think it was very good even though some of us thought it was hectic, we were able to learn something*" (Participant 10).
>
> *"Everything is good, especially the time we went to hospital B that one was very good" (Participant 13).*
>
> "*. . . I will say that so far I have learned so many things and then although we are still learning what I have learned I can say that it is good for me*" (Participant 4).

3.3.2. Gaps in Clinical Practice. Nearly all participants believed that there is a theory-practice gap. Some participants indicated that they struggled to link theory to practice as what they did in school was different from what they experienced at the clinical area. They identified inadequate time, lack of equipment, and inadequate learning opportunities as major contributing factors to the theory-practice gap:

> "*. . . In theory or in class, we are told what we are supposed to do and what you are not supposed to do, but you go to the ward at times they will say time factor, so they do 'short cut', and we miss some of the steps. And at times too, we do not have the required equipment, so we have to improvise. So, we get to the ward, and you see there is a big gap*" (Participant 7).
>
> "*Sometimes you just do not see whatever is taught in the classroom on the ward and even on the practical aspect we learn [a] task that when we go to the ward, we do not see them at all*" (Participant 6).

3.3.3. Inadequate Clinical Practice. Some participants perceived their clinical experience to be inadequate and, therefore, did not acquire the clinical experience they would had expected:

> *"Comparing it to what we actually learn at the skills lab, I would say it's not adequate in the sense that we do not actually get the opportunity to practice everything that we've learned. What we do will sometimes be dependent on what is happening at the ward"* (Participant 8).
>
> "*If you get to certain wards and you do not meet [ward] in-charges who are willing and always devoted to help students, . . .we only go there and be asked to do this, do that, go and do this and then by the time you realise your session has ended and you have to leave the ward to the school*" (Participant 9).

3.4. Challenges in the Clinical Setting. This subtheme describes perceived challenges to effective clinical teaching. Participants reported several students, staff, and clinical environmental factors. These included poor staff attitude, lack of equipment, poor student attitudes, lack of learning opportunities, and lack of supervisors.

3.4.1. Poor Staff Attitude. Some participants bemoaned the negative attitude of staff nurses toward students. This attitude, they said, affected their ability to learn and achieve their fullest potential in the clinical setting:

> *"There were times that you go to the ward and then you do something, the nurses shout at you. Sometimes they will not even mind you. Sometimes you even try to help, and then they are like, 'go and sit down. I have to finish and document my thing and go'. Some of the attitudes sometimes are bad"* (Participant 6).
>
> *"What has been our problem throughout this training session has been [the] attitude of most [the] staff and in-charges in the ward. Sometimes most of us go there, and we really want to get involved in what is going on and know better, but the response somebody might give out to you would not even encourage you to get closer to the person and know much from the person. That is the main reason why sometimes we go to the ward, and you see students loitering around the hospital only because we feel the behaviours of some staff and in charges are intimidating"* (Participant 9).

3.4.2. Lack of Equipment. Lack of equipment prevented students from practicing what they had been taught in the classroom:

> *"My challenge is that some of the clinical institutions do not have the equipment, so we have to improvise"* (Participant 5).
>
> "*... I will use wound dressing, for example, we've been taught how to use the instrument for wound dressing and also how to use the sterile glove, but the issue at hand is for the three years, it's always the sterile glove that we use, there is no instrument for you to use. So, although we know its theory, we do not know it in practice*" (Participant 7).

3.4.3. Poor Student Attitude. To some participants, students' own attitude also affected their learning in the clinical setting:

> "*The other thing is the students' attitude too. Sometimes, the attitude of the students annoys the nurses, that is, why they are not able to teach us, or they are not willing to teach, so when we go to the ward, we should humble ourselves, we should respect them as they are*" (Participant 11).
>
> "*The nurses and the midwives look at how you students behave before they impart knowledge to you. First of all, when you go to the clinical setting, and then you exhibit that kind of zeal for the work, they also help us to develop our confidence, but if we go there and we do not feel like doing the work, they do not mind us, so that is one aspect of it*" (Participant 5).

3.4.4. Lack of Learning Opportunities. Although they are in the clinical setting to learn, the participants complained that they often felt left out and were not allowed to learn or practice the skills they are taught in school.

> "*We went to different clinical facilities; some are very conducive, and some . . . are (sic) not. The ones that are conducive when the patient comes students are allowed to work with them, but in some hospitals, students are supposed to observe. Thus, we observe, we do not participate in anything we just observe*" (Participant 13).
>
> "*The teaching of students has not really sunk down in some hospitals, so they feel students come and they are just there to volunteer and then learn through the process*" (Participant 3).
>
> *"Sometimes they do not give students the opportunity to do certain procedures that we have been taught in the class"* (Participant 14).

3.4.5. Lack of Supervisors. Participants complained about the lack of supervisors in some of the clinical setting which was illustrated by the following quote:

> "*We do not have clinical instructors to even guide us to learn whatever we have studied in School. We just go to the clinical setting; we present the objectives to them, and we will be doing something outside what we are supposed to do*" (Participant 1).

3.5. Improving Clinical Teaching and Learning. The theme highlighted the factors that can improve clinical teaching and learning. The factors identified were supervision, training of staff, separate practical and theory sessions, and strengthening clinical teaching.

3.5.1. Supervision. Most of the participants indicated that clinical supervision was key in improving clinical practice:

> "*...There should be clinical supervisors or instructors in the clinical setting who will guide students in whatever they do*" (Participant 1).
>
> "*... I wish we could have a setting whereby some of our lecturers will be with us on the ward, especially with medical-surgical, bridging those gaps. Sometimes you just do not see whatever is taught in the classroom on the ward and even with the clinical aspect, we learn [certain] task [s]. . . [but] when we go to the ward, we do not see them at all*" (Participant 6).
>
> "*...In the medical field, they have supervisors that come around, and they will go around. I'm suggesting that if the nursing department can do that, it will help improve our learning in the field. Supervisors are around, we go through the patient's folders, after that we all sit down and try to learn about it*" (Participant 12).

3.5.2. Training for Staff. Participants also highlighted the need for periodic training for clinical staff as illustrated in the quote below:

> "*...They should be put through some training maybe every three months or every two months to refresh everything they know because you know nursing sometimes certain things change. So that when something new comes into the system, they will be able to get an idea about it so that they would not go through the old way repeatedly*" (Participant 5).

3.5.3. Separate Practical and Theory Sessions. The participants highlighted the need for theory and practice sessions to bridge the theory to practice gap, as illustrated by the quote below:

> "*. . . If we set a period aside, where we finish class session, allocate some specific time for the clinical session and then come back so that we get to know the strong linkage between the two separate trainings, we are receiving*" (Participant 9).

3.5.4. Strengthening Clinical Teaching. The participants described measures for strengthening clinical teaching as illustrated by the following quotes:

> "*... At times, we would not get the nurses having time because of their duty schedule, but if your tutors' come around and they have time for you, I think that one will facilitate teaching and learning much effectively*" (Participant 4).
>
> "*...When students go to the ward, I suggest that after we are done, at least they should sit us down or gather us somewhere and lecture us on the ward. They should teach us new things. They are very good so they can sit us down and we can have some presentations and all that and not just with students for vital signs*" (Participant 14).

4. Discussion

This study aimed at exploring nursing students' perception of clinical teaching and learning in Ghana. The results revealed that students generally perceived clinical learning experience as an important requirement for achieving clinical competence. However, several factors are related to students, staff, and challenges within the clinical setting as barriers to effective clinical education. On the factors that promoted clinical learning, most of the students believed that maximum learning is attained when they are taught new things, properly supervised, and have adequate time and space to practice. In essence, the students valued much when they had mentorship or a chaperone to guide them through acquiring new knowledge and being supported to practice what is taught. It is evident that constructive feedback and resources are critical in promoting effective mentoring practices and bridging the theory-practice gap [Nkosi, 2017]. An earlier study found the nature of the mentoring relationship, quality of the mentor, and ability to facilitate learning, positive feedback, and timely decision-making as concerns raised by students [24].

With regard to the impact of clinical learning on students, the responses gathered indicated that effective clinical teaching and learning accorded them the opportunity to develop competence and confidence in clinical procedures. The clinical environment is the place that allows students to practice the theory learned in the classroom. The current findings agree with a study by Jonsén, Melender, and Hilli [17]. They emphasised the unique role of the clinical environment in the acquisition of skills needed to transition from a nursing student to a registered nurse. The consistent findings could mean that irrespective of where nursing education is pursued, clinical teaching and learning are a common importance.

The general students' perception of clinical teaching was that clinical practice is beneficial; however, most of them believed that there were gaps in theory and clinical practice experiences. The gap in theory and clinical practice could be attributed to the controversy between the ideal versus reality situations in the clinical environment. Most of the items required for demonstrations may be available in the school or classroom. Students go into the clinical environment expecting the same items and equipment. However, in the wards, the situation is different. Most of this equipment is not available, hence the need for improvision. The unavailability of resources mostly leaves these students frustrated and less interested. Previous work reported that core nursing skills learned through modelling tend to achieve higher impact compared with pre-learning levels [25].

Additionally, building competence in core nursing skills will enhance adaptability in the clinical area [20]. The students highlighted some challenges in the clinical setting, primarily referring to the environment not being conducive for learning. In particular, these elements include the following: poor staff attitude, students' complaint that staff nurses were not receptive, shouted at them at least provocation, and others were unwilling to teach or correct them. Contrary to this finding, Antohe and colleagues (2016) purported that students had their staff nurses being the most important professional role model for them. The difference in findings could be attributed to the workload. In developed countries, the nurse-to-patient ratio is lower compared with developing countries. This makes it possible for the staff nurses in the developed countries to have enough time for the student nurses.

In addition, the results of the study found another challenge to be the lack of equipment. Most of the participants revealed that medical supplies and equipment were inadequate; hence, they could not practice much because their supervisors would always remind them not to waste resources. This finding has been reported by Moyimane, Matlala, and Kekana [26]. In that study, they stated that due to a lack of medical equipment, clinical teachers often improvised during clinical teaching; as such, student nurses were not taught ideal clinical scenarios. This explains that the shortage of medical supplies is a common challenge in developing and developed countries.

Moreover, the students found another challenge to be poor student attitude. In this study, students admitted that some of their colleagues had a poor attitude to nursing. They seem less interested in their own clinical learning. Their general motivation in clinical learning was low, and most of them resorted to fidgeting with their phones while on clinical placement. Conversely, the findings of Riklikienė and Nalivaikienė [27] seem otherwise. In their study, student nurses estimated their individual input into clinical training mostly as high or very high. The correlation analysis revealed a positive relationship between the students' assessment of the learning environment in the unit and their individual input to their clinical placement. The different results could be attributed to the lost passion for the profession. In Ghana, some people venture into nursing as a means of livelihood. It is believed that once one completes nursing, there is a ready job available; hence, some people enter nursing school with no genuine passion but as a means to an end.

Lack of learning opportunity was another challenge that was highlighted. Most of the students indicated that they could not have the chance to try out some tasks. This was mainly due to an overwhelming student number and inadequate time that is needed to acquire the needed skills. The findings in this study are inconsistent with a study by AstaMažionienė, Staniulienė, and Gerikienė [28], where they found out that there were enough training cases and situations during their clinical placement. What could account for the difference could be the number of students admitted into the large nursing school and the availability of hospital facilities for clinical training. Most of the nursing schools in developed countries have strict compliance with the number of students to admit. Whereas the situation in Ghana is the opposite, there is a large student population.

Finally, the study found a lack of supervision as another challenge in clinical learning. A supervisory relationship was the most important factor contributing to clinical learning experiences [29]. However, most students complained of inadequate supervision. Students complained of being used as errand boys and girls because there is no assigned supervisor to monitor their work and progress. Most of these students tend to engage in nonprofitable activities making the clinical learning period of ineffective. The results agree with Antohe et al. [30], which revealed the importance of a good supervisory relationship and how it positively influences students' clinical learning experience.

In improving clinical teaching and learning, the participants suggested strengthening supervision. When students know they are being watched, they always do the right thing. Moreover, they suggested that the clinical staff responsible for students should be engaged in rigorous training and workshops. In addition, the students suggest different times for classroom learning and clinical learning, which implies having a specified number of weeks for the theory class and then a different set of weeks for only clinical sessions.

5. Strengths and Limitations of the Study

The study design allowed for the exploration of students' perspectives of clinical teaching and learning as it pertains to a bachelors' programme in nursing, which is critical in improving students' clinical nursing practice experiences. The use of telephone interviews did not allow nonverbal cues or body language of the participants to be explored to augment the information they provided. The researchers also acknowledged that the study may be limited by possible recall bias. The participants were expected to share experiences that may have occurred more than six months due to the suspension of clinical learning and teaching activities at the time of interviewing due to the COVID-19 pandemic.

6. Conclusions

This study explored nursing students' perception of clinical teaching and learning in Ghana. Although students found the clinical learning environment to be conducive for learning, they encountered challenges that required a holistic approach to address through the efforts of all stakeholders, including students, supervisors, healthcare agencies, and staff. Clinical teaching and learning are critical in facilitating the achievement of clinical competence. The findings suggest the need for innovations in current approaches to clinical teaching to enable students to have autonomy and to be afforded the opportunities to develop essential competencies.

Data Availability

The datasets used and/or analysed during this study are available from the corresponding author on reasonable request.

Ethical Approval

Ethical approval for this study was obtained from the University of Cape Coast Institutional Review Board (UCCIRB/EXT/2019/17).

Consent

Participants also signed informed consent forms before data collection began. To ensure anonymity and confidentiality, pseudonyms were used throughout the study.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Authors' Contributions

SAA*, NIEE, and CMB were involved in the conceptualisation of the study. SAA*, AAD, NIEE, RSW, PFD, and YBGA contributed to the methodology. SAA and NIEE wrote the data. AAD, CMB, and CO reviewed the analysis. RSW, YBGA, SAA, and NIEE wrote the draft manuscript. AAD, CO, PFD, CMB, NIEE, and SAA* reviewed the manuscript for important intellectual content. All authors read and approved the final version for submission to this journal.

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Research Article

Hesitancy toward Childhood Vaccinations: Preliminary Results from an Albanian Nursing Staff's Investigation

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Healthcare professionals are important models for their patients since their individual knowledge and attitudes toward vaccination can influence the patient's willingness to adhere to vaccination campaigns. After developing a structured questionnaire, it was administered to a sample of nursing staff working in public vaccination centers in Albania (December 2020-January 2021), in order to conduct a preliminary investigation aimed at describing knowledge, attitudes, beliefs, and hesitancy toward childhood vaccinations. Among the sample of nurses involved in the administration of vaccines (n.64, 92% females), most of them were confident about vaccines and favorable to childhood vaccinations (90%). However, when specifically investigating beliefs, nearly a quarter of the sample showed to be hesitant; 22% were unsure or partially agreed that vaccines might cause conditions such as autism and multiple sclerosis. A high risk of hesitancy was identified in the youngest staff especially when their work experience was below 10 years or when they graduated less than 10 years before (OR: 5.3, CI: 1.4–19.5; and OR: 4.2 CI: 1.2–14.6). Similarly, a low acceptance rate (54%) was detected for future childhood SARS-CoV-2 vaccines among the nurses, which is a sign of high levels of vaccine hesitancy. With regard to knowledge about childhood vaccine contraindications, none of the nurses identified all the ten correct answers, while only 13% answered at least six questions correctly. These preliminary results highlight the need of investigating more Albanian nursing staff's knowledge and attitudes toward child vaccinations, therefore investing in tailored training. Due to the ongoing Covid-19 pandemic and the roll-out of mass vaccination, the role of healthcare workers remains crucial and needs more support to manage the changing public opinion as well as quickly evolving vaccine technologies.

1. Background

Vaccination is one of the most effective ways of controlling infectious diseases, particularly in the pandemic era. However, vaccine hesitancy, the delay in acceptance or refusal of vaccines despite the availability of vaccination services, has become a growing concern globally [1]. Risk perceptions and concerns about vaccine safety, attitudes, inadequate or poor communication about vaccines, social and cultural norms, and structural barriers could all be associated with vaccine hesitancy [2]. Therefore, vaccine hesitancy is a complex and context-specific issue, with key reasons behind it defined as complacency, inconvenience, and lack of confidence [3].

The WHO recognized vaccine hesitancy as one of the top ten public health concerns and threats to global health in 2019 since it is one of the reasons for vaccination coverage decreasing all over the world [4]. To determine the rate of vaccine hesitancy across the globe, three years of available data (2014–2016) were reviewed from the WHO/UNICEF joint report form (JRF), showing that the number of countries that reported “no vaccine hesitancy” was globally very low (from 6 to 7%) [5]. In addition, the large study conducted between November 2015 and December 2019 by De Figueiredo et al. reported that confidence in vaccines is still a concern particularly high in Europe where vaccine confidence has been persistently low since 2015 compared with other continents. However, in the same report, some signs of an increase in vaccine confidence, despite slow, were noted in the most recent years in some EU member states [6].

Since healthcare professionals are important role models for their patients, their function is crucial in delivering recommendations based on scientific evidence and increasing public awareness about the benefits of immunization. Their individual perceptions, knowledge, and attitudes can influence the family’s decision to vaccinate their children. Therefore, it is essential to ensure that healthcare providers are aware of the characteristics, safety, and efficacy of vaccines [7]. Given the Strategic Objective n.2 of the Global Vaccine Action Plan, vaccine hesitancy surveys among health staff are crucial to promptly identify, understand, and address major determinants of vaccine hesitancy within different communities [8]. However, research in this area is still insufficient, especially in low-income and middle-income countries. This study aims at describing the preliminary findings about knowledge, attitudes, and beliefs of Albanian healthcare workers involved in the administration of childhood vaccines, therefore feeding the scientific literature with more evidence on nursing staff’s confidence and hesitancy toward well-known childhood vaccination in Albania.

2. Methods

2.1. Study Design and Sample. Between December 2020 and January 2021, we conducted an observational cross-sectional study consisting of data collected through a structured survey on a convenience sample of nurses working in public vaccination centers covering the majority of regions in Albania. This survey was a pilot study conducted during the Covid-19 pandemic, and the Albanian Ministry of Health indicated the main 14 centers active in childhood vaccination in order to represent north, central, and south regions, as well as urban and rural catchment areas.

All the nurses of every selected health center were asked to answer the self-administrated questionnaire. Before the survey, informed consent was obtained from all the participants.

In this report, we discuss only the preliminary findings of a survey among healthcare workers, which was approved by the Ethical Committee of the Ministry of Health and Social Protection of Albania (n.303/46 of October 16, 2020).

2.2. Questionnaire. After reviewing the literature [9, 10], we developed a semistructured questionnaire consisting of four sections:

(i) Nurses’ general information, including years of practice and years since graduation

(ii) Nurses’ beliefs, attitudes, confidence, and hesitancy toward vaccination topics were assessed with the support of a questionnaire composed of 14 statements (according to a five-point Likert scale)

(iii) Nurses’ perceived impact of different training tools in obtaining knowledge on pediatric vaccination

(iv) To evaluate their knowledge regarding vaccine contraindications, they were asked to classify 10 clinical conditions as contraindications or not

(v) To evaluate hesitancy about the SARS-CoV-2 vaccine in children, the question asked was “If a pediatric SARS-CoV-2 vaccine was available would you vaccinate your patients?”

The questionnaire was self-administrated. Participants were informed about the aim of the study and the usage of data. They were assured confidentiality and anonymity by using a codified number to identify each respondent. The respondents could not consult any material or each other when filling in the questionnaire.

2.3. Statistical Analysis. Data collected have been presented as numbers and percentages. The statistical elaboration of the data was performed using IBM SPSS Statistics (version 26). Odds ratios (ORs) were calculated with their 95% confidence interval (95% CI) in order to investigate factors that could be associated with an increased risk of vaccine hesitancy. When referring to knowledge regarding vaccine contraindications, the median incorrect answers were reported as for the total sample, then differences between answers’ scores of hesitant vs. not hesitant nurses were analyzed by using the nonparametric Mann–Whitney U test. Differences between the number of questions correctly answered based on having 10 years (or having less) of working experience or having graduated 10 years (or less) from the survey were also investigated using the nonparametric Mann–Whitney U test.

3. Results

Data from 64 Albanian nurses (92.2% females) were eligible for the analysis. The questionnaires covered 88.9% of the overall nursing staff of the centers. Figure 1 shows details of the sample.

Among the responders, 61% (n.39) were less than 45 years old; 93.8% (n.60) were working in a vaccination center located in urban areas (37.5% in Tirana, 17.2% in Elbasan, 12.5% in Vlora, 10.9% in Durres, 7.8% in Shkodra, and 7.8% in Lezha), while 6.3% (n.4) of them were in the rural area (Kruja).

Among the nurses, 62.5% (n.40) of them graduated more than ten years before the survey took place (including 9.4% of whom graduated more than twenty years before) and 37.5% (n.24) less than 10 years; 40.6% (n.26) were working in vaccination centers since less than 10 years and 59.4% (n.38)

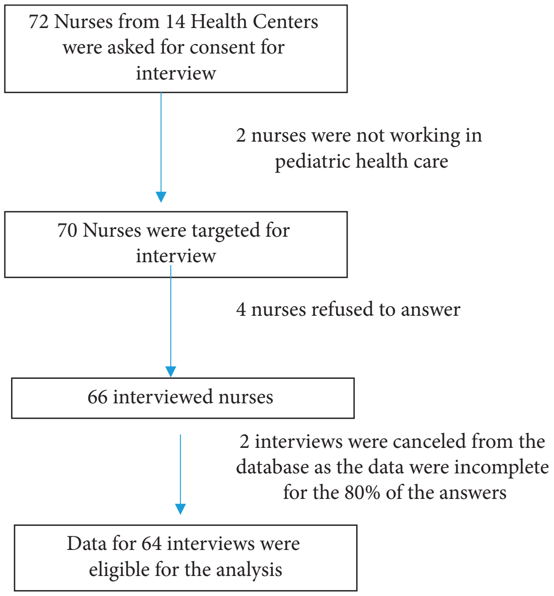

Figure 1: Flowchart of the health staff enrolled.

since more than 10 years (including 17.3% since more than 20 years).

When asked to rate their level of agreement with negative statements about vaccine safety and effectiveness (Table 1), nurses agreed completely or partially on "Vaccines weaken or overload the immune system" (nearly 18%), "Children receive too many vaccines" (nearly 8%), "Childhood vaccines are given too early" (more than 18%), and "It is better for children to develop natural immunity rather than to get a vaccine" (nearly 16%). Lower confidence was observed concerning the statement "Conditions such as autism and multiple sclerosis may be caused by vaccines" since 17.5% of the sample showed to be hesitant (unsure, partially agree, or fully agree) about it.

Conversely, nearly 75% of the sample agreed with both statements "Vaccines are among the safest and most tested medicinal products" and "Vaccine information provided by health authorities and scientific societies is reliable." When considering vaccines' cost-effectiveness, confident responders lowered to 42%.

Despite a substantial proportion of nurses showed hesitancy about specific vaccination aspects, most of them still reported high general vaccine confidence, with 90% fully or partially agreeing to the statement "Vaccinations are important for my patients' health" (Figure 2) and 84% fully or partially agreeing to the statement "When children get vaccinated, the whole community benefits."

When asked about training in the last five years, 34.4% (n.22) of nurses declared to have attended vaccine courses or conferences, while 28.1% (n.18) had never attended any training courses on vaccine topics. Having less than 10 years of work experience increased the risk for hesitancy (OR 5.3 CI: 1.4–19.5) compared to those with 10 or more years of experience. Similarly, hesitancy was significantly higher among nurses who graduated during 10 years before the survey (OR 4.2 CI: 1.2–14.6) compared to nurses who had graduated 10 or more years before.

Figure 3 shows the degree of self-perceived influence for different sources of information. High influence was attributed to the role of peer education: the most frequently reported influential source of knowledge on vaccines was the discussions with colleagues (84%). Nearly 80% of the sample considered formal university training of high importance, at the same level as scientific literature, followed by conference participation (73.4%) and institutional websites (59.4%). On the other hand, nearly half of the responders considered noninstitutional websites also of high importance (48.4%).

Because the questionnaire was submitted during the pandemic of Covid-19 just before the first SARS-CoV-2 vaccine authorization, the authors added a specific question: "If a pediatric SARS-CoV-2 vaccine was available, would you vaccinate your patients?." To that question, 35 nurses (54.7%) answered "yes" without hesitancy, 26 (40.6%) answered "I do not know," and only 3 (4.6%) were completely hesitant, answering that they would have refused to vaccinate children (Figure 4).

Nurses were also asked to classify 10 clinical conditions or situations related to administering hexavalent vaccines as false contraindications, temporary contraindications, or permanent contraindications. Specifically, Table 2 reports correct answers to the question "Your patient is scheduled to receive the second dose of Hexavalent vaccines. Which of the following conditions do you consider contraindicated?."

None of the nurses identified all the ten correct answers about contraindications to the hexavalent vaccine. Only 13% answered correctly to at least six questions. The median number of questions correctly answered was 4 (interquartile range 3.0), with no differences for years of working experience ($p = 0.9$) and years from graduation ($p = 0.8$). When dividing the sample into hesitant vs. not hesitant (n.14

Table 1: Nurses' beliefs and confidence toward vaccination.

Questionnaire statements	Completely disagree		Partially disagree		Unsure		Partially agree		Completely agree	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
Vaccines weaken or overload the immune systemˆ	43	71.7	3	5.0	3	5.0	6	10.0	5	8.3
It is better for children to develop natural immunity by getting sick rather than to get a vaccine°	40	64.5	7	11.3	5	8.1	10	16.1	0	0.0
Healthy children do not need to be vaccinated	58	90.6	2	3.1	1	1.6	3	4.8	0	0
Conditions such as autism and multiple sclerosis may be caused by vaccines	49	77.8	3	4.8	10	15.9	1	1.6	0	0.00
Allergies are on the rise because of vaccinations	51	79.7	2	3.1	9	14.1	0	0	2	3.1
I am afraid that one of my patients may develop a severe adverse reaction following vaccination*	13	20.6	10	15.9	15	23.8	19	30.2	6	9.5
Children receive too many vaccines	49	76.6	6	9.4	4	6.2	2	3.1	3	4.7
Vaccine policy is influenced by the financial profits of pharmaceutical companies°	33	53.2	10	16.1	11	17.7	6	9.8	2	3.2
Childhood vaccines are given too early*	39	61.9	7	11.1	5	7.9	3	4.9	9	14.3
The frequency of adverse reactions to vaccines is underestimatedˆ	38	63.3	6	10.0	12	20.0	3	5.0	1	1.7
Vaccination is cost-effective°	17	27.4	8	12.9	11	17.7	9	14.6	17	27.4
Vaccine information provided by health authorities and scientific societies is reliable	2	3.1	6	9.4	8	12.5	11	17.2	37	57.8
Vaccines are among the safest and most tested medicinal products*	1	1.6	5	7.9	9	14.3	11	17.5	37	58.7
The second dose of MMR is useful	1	1.6	1	1.6	9	14.1	9	14.1	44	68.6
When children get vaccinated, the whole community benefits	2	3.1	2	3.1	6	9.4	6	9.4	48	75.0

°2 not responder, ˆ4 not responder, and *1 not responder.

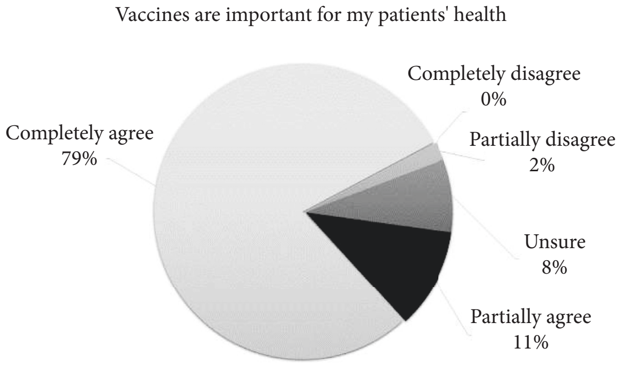

Figure 2: Confidence toward child vaccinations.

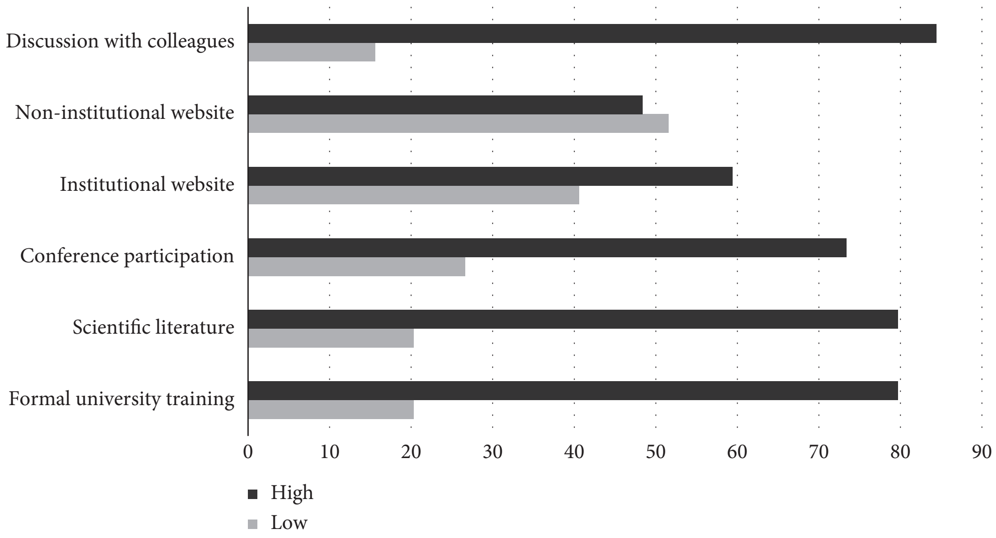

Figure 3: Self-perceived influence of different training tools in vaccine knowledge development.

hesitant: median 1.5, interquartile range 5.5; n.50 not hesitant: median 4, interquartile range 2.0), the difference between correct answer score was not statistically significant.

4. Discussion

Healthcare professionals, especially when employed in immunization delivery services in the primary healthcare sector, should acquire specific competencies in order to ensure that vaccines are provided to all those who need them in a safe and effective manner. Nurses in children's vaccination centers could play a key role in organizing and promoting immunization programs. Receiving information on knowledge gaps is of significant value for further management and development of focused educational programs [11].

In a study on vaccine confidence conducted in 2018 across 28 countries of the European Union, it was observed that even countries with well-established vaccination programs and high levels of confidence were not immune to rising vaccine hesitancy [12]. Despite the 2020 report's update showing growing confidence compared to the previous results, data confirmed that many Eastern European countries still rank particularly low in terms of their confidence in the safety, importance, and effectiveness of vaccines. These results show that rebuilding trust requires a long time and continuous efforts [9].

Few studies reporting healthcare workers' knowledge and practices toward vaccinations already exist in Albania [13, 14]. In our study, although most nurses were favorable to childhood vaccinations, we identified some associations between training gaps and overall attitudes towards vaccinations and/or specific knowledge and/or beliefs. In addition, in our analysis, we found a significant association between higher vaccine hesitancy attitudes and the youngest generations. As a matter of fact, a higher risk of being hesitant was identified among nurses with less than 10 years of work experience or those who graduated less than 10 years before the survey. Despite we acknowledge that other factors might have influenced these results, it is relevant to underline that nearly 30% of the survey participants referred that they never received training in vaccinology nor they attended conferences or vaccine courses in the last 5 years. It seems that vaccination training has not been a priority of

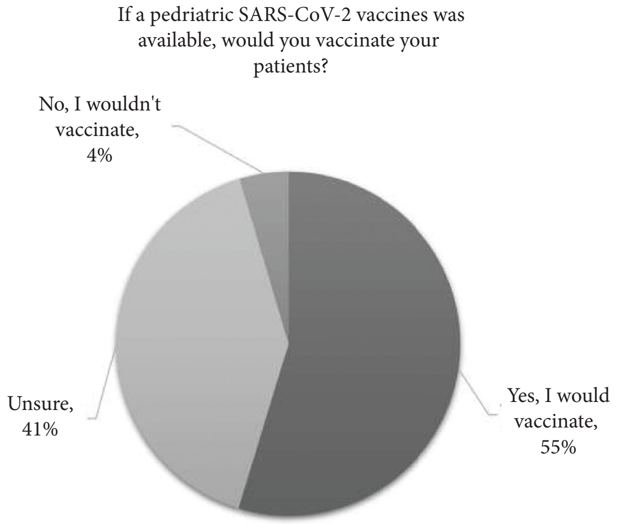

Figure 4: The acceptance rate of future SARS-CoV-2 pediatric vaccination.

Table 2: Correct responses on 10 clinical conditions or contraindications to administering the hexavalent vaccine.

Your patient is scheduled to receive the second dose of hexavalent vaccines. Which of the following conditions do you consider contraindicated?	Correct answer	Nurses answering correctly *n* (%)
Severe allergic reactions to a previous dose including anaphylaxis	Permanent contraindication	39 (60.9)
Fever following a previous dose	False contraindication	25 (39.1)
Acute severe gastroenteritis	Temporary contraindication	22 (34.4)
Otitis media without fever	False contraindication	17 (26.6)
Family history of adverse reactions following a pertussis vaccine dose	False contraindication	28 (43.8)
Acute upper airway infection without fever	False contraindication	14 (21.9)
History of mumps	False contraindication	27 (42.2)
Diagnosis of epilepsy well controlled	False contraindication	22 (34.4)
Fever 38–40° and moderate illness	Temporary contraindication	34 (53.1)
Fever >40° and severe illness	Temporary contraindication	19 (29.7)

continuous medical education in the Albanian health system at least in recent years. These results point out that a decline in vaccination knowledge might be related to declines in the education level, with the possibility of further deterioration in the future. The interaction between hesitancy and knowledge of healthcare workers is important since it improves adherence to the routine immunization programme for children [15].

These preliminary findings in Albanian nursing staff underline the need for further and detailed evaluation of knowledge gaps and vaccine hesitancy among health staff, in order to put the basis for continuous training and ongoing education on child vaccinations. This is particularly important in the case of instructing nurses about vaccine contraindications. Since the health personnel dedicated to vaccination services is essential for educating parents, they need to be equipped with appropriate skills and knowledge to address parents' vaccine hesitancy [16] and assure high vaccination coverage rates in the communities.

Furthermore, the low acceptance rate of future childhood SARS-CoV-2 vaccines among nurses demonstrates that vaccine hesitancy in healthcare workers remains a barrier to full population protection also in the context of the Covid-19 pandemic. These findings were in line with the hesitancy reported in nurses (45.5%) in another study conducted in Iraq on the health staff's willingness of receiving the Covid-19 vaccine [17] and with a recent survey among healthcare workers in Israel (55%) [18]. Similarly, another study by Aoun et al. conducted in the Middle East investigating healthcare staff attitudes toward any future COVID-19 vaccine found that the total rate of vaccine hesitancy in nurses was 63.2% [19]. All the three mentioned studies revealed that vaccine acceptance among nurses was significantly higher than among physicians, with fear of side effects followed by lack of confidence/information being the most common perceived barriers reported by Alhanabadi et al. and by Aoun et al.; however, these differences and these reasons were not investigated in the present study.

These results underline the need for stepping up immunization training campaigns for the health staff in Albania in the roll-out of mass vaccination campaigns, in order to fill current gaps and improve vaccination coverage in the future.

4.1. Limitations.

We acknowledge that our results should be interpreted in the context of several limitations. First of all, this was a pilot study, and we analyzed data of a convenience small sample including health centers suggested by the Albanian Ministry of Health that were active at the moment of the survey since the ongoing pandemic of Covid-19. The small sample allowed us to perform only a crude analysis; therefore, other factors contributing to the vaccine hesitancy might have not been investigated.

Being a voluntary survey, only nurses from public health centers who willingly participated were included. We are therefore unaware if those who did not wish to participate held more vaccine doubts or not. The self-reported evaluations may be subject to expectancy bias and complacency bias. In addition, few questions were not answered..

Nevertheless, we would like to emphasize that this is one of the first studies that addresses this issue in the country, and it was aimed in the future to interview the entire population of professionals in public vaccination centers.

Data Availability

The dataset used to support the findings of this study is available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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Research Article

Family-Centered Interventions and Quality of Life of Clients with Ostomy

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Background. Family-centered intervention can be used as a therapeutic intervention to improve the quality of life (QOL) in clients with ostomy. This study aimed to determine the effects of family-centered intervention on the QOL in ostomy clients. *Methods*. A quasi-experimental study was carried out with participation of 70 clients with colostomy and 70 caregivers (family members). The participants were selected through convenient sampling and randomly allocated into the experimental and control groups. The experimental group received family-centered education. The education program included four sessions, 50–60 min each, that were implemented in two weeks at hospital wards or clients' houses for the clients' companions. Afterwards, the caregivers implemented the care at home for one month. The subjects in the control group received routine care before being discharged. The QOL of the clients in both groups was measured using the city of hope-QOL-ostomy questionnaire before and one month after the intervention. *Results*. The mean scores of the QOL after family-centered intervention in the experimental and control groups increased from 197.97 to 207.49 and from 195.2 to 199.03, respectively. The paired t-test showed a significant change in the experimental and control groups after the intervention at a confidence level of 95% ($p = 0.0001$; $p = 0.002$). In addition, after the intervention, however, there was a significant difference between the two groups in all these areas except for social aspects ($p = 0.007$). *Conclusion*. Family-centered intervention can be used as a therapeutic intervention to improve the QOL in clients with ostomy. The intervention was effective in the physical, spiritual, psychological, and social health of these clients.

1. Introduction

An ostomy is a prosthetic medical device that creates a way of collecting wastes from the colon or bladder and depending on the organ that is affected; it is called colostomies or urostomies [1]. The surgery might be a measure to ensure the survival of the patient or to improve the QOL of the patient, and in either case, the patient faces immense mental pressure [2].

While the statistics of colorectal clients is easily accessible at the global scale, there is no international statistics report of ostomy [3]. More than one million in the United States [4] and 102000 individuals in the UK use colostomy [5]. These numbers are growing year by year so that 100000 in the United States [6] and 13500 in the UK start using colostomy every year [7]. There is no reliable statistics of ostomy clients in Iran; however, according to the latest report by the Iran Ostomy Society, there are about 30000 clients with ostomy in Iran [8].

Studies have shown that depression, loneliness, suicidal thoughts, low self-esteem, and avoiding social activities are common in these clients [9, 10]. In addition, these clients are usually worried about intestinal gas, diarrhea smell, ostomy leakage, and constant dissatisfaction of appearance and mental image of the body, which are of the common problems of these clients [11]. Anxiety and feeling shameful because of using ostomy create changes in the lifestyle of these individuals that appears in areas such as ability to find a job, reluctance to travel, and negative self-mental image. In addition, the patient's feeling about the physical changes might affect the way they treat their friends and family, which might lead to problems in social and marital lives [12].

All aspects of QOL in the clients who undergo ostomy surgery are affected [13]. In terms of physical aspect, urination and sexual functions are affected; in terms of psychological aspect, depression, loneliness, suicidal thoughts, humiliation, and low self-confidence are very common; and in terms of social aspects, a decrease in participation in social and leisure activities is notable [14]. In addition, these clients deal with skin side effects such as wounds and infection; feces smell, tympanites, and discharge of smelly gasses; nutritional problems; heavy medical costs; and changes in defection, dressing, exercising, and pregnancy [5]. Tsunoda et al. argued that ostomy attenuates the QOL of individuals so that clients who used to have a good QOL complain about the decline in the quality of their lives after using ostomy [15]. Yau et al. reported that ostomy surgery has a notable negative effect on the QOL of the patient [16].

According to the mentioned cases, it is vital to provide the required care to patients with ostomy [17]. Studies have shown that proper family care [18] and educating patients about self-care can improve the QOL notably [19]. Therefore, educating family members and the patients can have an impact on their QOL [17–19]. Using the results from different studies in this area, nurses can have a deeper knowledge of the challenges and the factors in the QOL of clients with ostomy. Through this, they can introduce better care educational programs for the clients and their families [20]. Family-centered empowerment model is designed in Iran for chronic clients, and it has been used for different diseases [3, 21]. The main objective of the family-centered empowerment model is to empower the family's (including patient and family members) QOL. This model is based on qualitative research based on a grounded theory approach including concept formation, concept development, definition of psychosocial processes, and inferring the central variable (family-centered empowerment). The model has been successfully implemented for the improvement of QOL in clients with different diseases [3, 21–25]. Family-centered care method empowers individuals and families and improves their independence. It supports family's participation in decision-making and providing care so that the family and patient's choices, values, beliefs, and cultural background are respected [26]. Nurses can employ these findings to have a deeper insight into the challenges and factors in the QOL of clients with ostomy. Through this, they can adopt and implement more effective care educational programs for clients and their families [27].

Marion concluded that family members of clients under intensive care felt being more useful when they were allowed to participate in providing care. In addition, the connection between the family and nurses created a participatory approach that made providing daily care to the patient more successful [25]. Therefore, more effective and empowered participation of family members in the care program can be effective in the improvement of health condition and welfare of these clients. This study is an attempt to determine the effects of family-centered intervention on the QOL in clients with ostomy.

2. Materials and Methods

2.1. Setting. A quasi-experimental study was carried out on clients with ostomy in Kermanshah-based public and state hospitals.

2.2. Participants and Selection. In this study, the main participants were the patients, whose QOL was examined. In addition, the patients' companions also received the necessary education to take good care of the patients. Therefore, both the companions and the patients participated in this study. The participants were selected through convenient sampling and then randomly (tossing a coin) allocated to the experimental and control groups. Inclusion criteria were caregiver living with patient, no mental/physical impairment, chronic physical and psychological clients, no narcotic drug dependence, and not participating in similar programs (client and caregiver). The required information was collected from patients' files and interviews with them. Exclusion criteria were leaving the study, missing more than one educational session, an incident that may affect the QOL, and development of psychological diseases throughout the study.

The minimum sample size was determined based on a mean comparison formula for one quantitative trait with two groups (confidence factor (1-α) = 95%, power of test (1-β) = 90%) following Xu et al. [28]. The minimum sample size for each group was obtained equal to 30, and taking into account probable leaves, 35 individuals were selected for each group (35 clients with ostomy and 35 caregivers for each group).

2.3. Method. The participants signed a written letter of consent and then filled out a demographics form. QOL of the clients with ostomy was measured using the city of hope-QOL-ostomy questionnaire. The caregivers in the experimental group received an educational course designed based on nursing references and family-centered approach and family empowerment model for chronic clients [3]. The educational content was provided to experts (three surgeons, four faculty board members, and three operating room nurses) to examine qualitative content validity and face validity (using the opinions of 5 participants) of the tool, and their opinions were used to make the required modifications in the tool. The educational content included information about ostomy, side effects, nutrition, position change, infection prevention, intestine function control, activity, interaction with clients, and personal hygiene. The course was a four session's program (50–60 min each) that was implemented in two weeks either in the wards or in the houses for the caregivers. The educational content for the caregivers of the experimental group was the same, and each caregiver received four training sessions; however, the duration of the sessions varied between 50 and 60 minutes depending on the questions and the expected time needed by the caregivers. Afterwards, the participants were asked to implement the care program based on the plan and the researcher monitored the implementation of care using a checklist (previously confirmed by experts as a valid tool). In this study, all caregivers obtained the required grades and one to two extra training sessions had been made available in case some of the caregivers fail to obtain the minimum score. After making sure that the caregivers are empowered enough (checklist score >95%), they were asked to implement the care program for four weeks at home. An educational booklet was also provided to the participants along with a phone number to answer any question 24 h. Throughout this month, the researcher visited the participants at their houses four times to ensure continuity of the cares. In addition, while reviewing the care needed by the patients, questions and concerns of the patients and their companions were answered. We tried to prevent any contact between the caregivers and patients of the experimental and control groups during the intervention. Only the routine interventions of the clinics were provided for the caregivers and patients of the control group, which were also available for the patients and caregivers of the experimental group. One month after the completion of the family-centered intervention, the two groups (clients with ostomy) were again evaluated using the specific questionnaire of the QOL of Hep City. One month after completion of the family-centered care intervention, the two groups (clients with ostomy) filled out the city of hope-QOL-ostomy questionnaire. All stages of the intervention were done by a researcher (second author), and evaluations before and after the intervention were done by a senior nursing expert who was not part of the research team (Figure 1).

2.4. The City of Hope-Quality of Life-Ostomy Questionnaire.

The data gathering tool was an ostomy clients' QOL scale designed by Hope City National Cancer Research Center, California, USA. The questionnaire contains 90 statements in three sections; section 1 (introduction) contains 13 questions on demographics and the disease. Section 2 (lifestyle impact) contains 34 multi-alternative questions on job, medical insurance, sexual activity, psychological concerns, dressing, diet, daily care for ostomy, and food groups. These questions are not scored and only give a description of the respondent. Section 3 (the effects of ostomy on the QOL) contains 43 questions on different aspects of physical health (1–11), psychological health (12–23), social health (25–36), and spiritual health (37–43) [29]. The questions in this part are scored based on Likert's rating scale of 0–10 and are used to calculate the mean score of the QOL. Some questions are scored inversely, so that a higher score indicates a better QOL in some questions and a lower QOL in some other questions. To calculate the score of the QOL, first by applying reverse changes to the questions with inverse scoring (questions 1–12, 15, 18, 19, 22–30, 32–34, and 37), the mean score of the QOL in each of its dimensions and also in general was determined. For the QOL as a whole and each of its dimensions, a minimum score (the worst) and the maximum score (the best) were zero and ten, respectively.

The validity of the tool has been determined based on face and content validity, and the reliability has been determined using test-retest and internal consistency. Cronbach's alpha of the tool is 0.95, and correlation coefficients for physical, psychological, social, and spiritual aspects of QOL have been reported equal to 0.82, 0.88, 0.83, and 0.78, respectively [20]. The tool has been validated for colostomy patient populations in Iran, and Cronbach's alpha for physical, psychological, social, and spiritual health aspects is 0.75, 0.85, 0.75, and 0.74, respectively [29]. In this study, the Cronbach's alpha coefficient for the tool was 0.874 and the subscales of physical, psychological, social, and spiritual health were 0.89, 0.691, 0.724, and 0.748, respectively.

2.5. Statistical Analysis.

Data analysis was done using descriptive and analytical statistical methods in SPSS (v25). The Kolmogorov–Smirnov test was used to determine the normality of the data distribution. For data with normal distribution, the paired *t*-test was used to compare the desired quantitative trait before and after the intervention. The independent *t*-test was used to compare the mean of the desired quantitative trait in the experimental and control groups. Nonparametric tests, equivalent to Wilcoxon and Mann–Whitney, were used for the data without a normal distribution (p value = 0.05).

2.6. Ethical Consideration.

After approval by the ethics committee (IR.KUMS.REC.1398.169), the objectives of the study were explained to the participants, they signed a letter of consent, the family members were asked for their permission before the researcher visited them at their home and implement family-centered intervention, the participants were ensured about the confidentiality of their information, and an ethical code was issued by the ethics committee of the university for the study. Given the fact that the intervention was effective and useful for the participants, the participants in the control group also took part in two educational sessions after the study.

3. Results

Totally, 70 clients and 70 caregivers took part in the study as the experimental and control groups (none of the participants left the study). Mean age of the clients was 51.86 ± 14.96 (min = 18; max = 92); mean age of the caregivers was 36.23 ± 11.2 (min = 18; max = 75); and mean body mass index (BMI) of the clients was 25.84 ± 3.27 (min = 21.26; max = 40.57). On average, the clients had used ostomy for 5.76 ± 2.03 days and the daily care time for ostomy was 118.21 ± 50.4 min. On average, the clients had 3.19 ± 2.18 children (min = 1; max = 9). For more demographic information, see Tables 1 and 2.

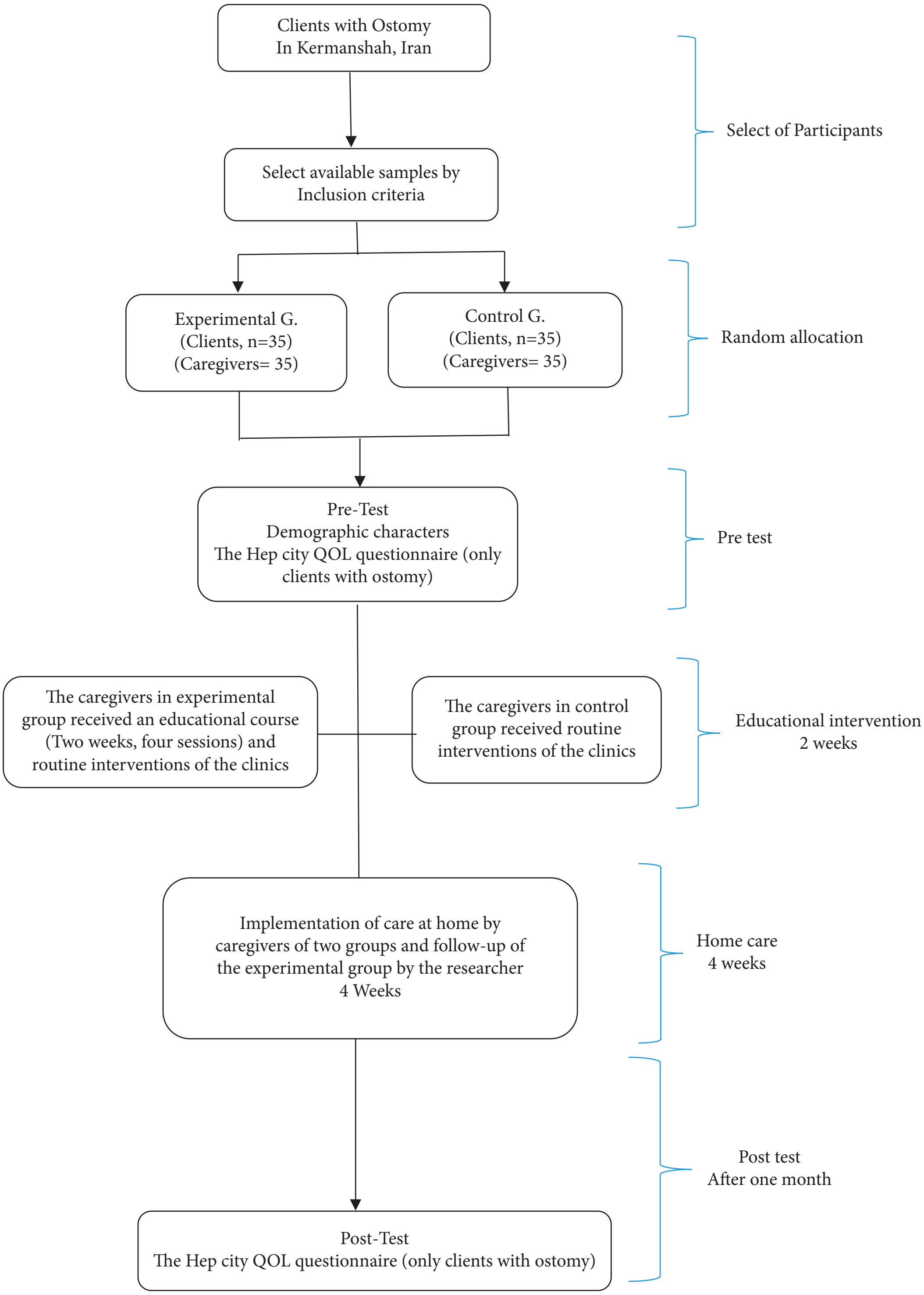

Figure 1: Study flowchart.

Based on the results of Kolmogorov–Smirnov (KS) tests and p value, normal distribution of the data of age of clients and caregivers, time duration of using ostomy, and BMI were supported. However, the time duration of daily care for the two groups and number of children in the experimental group were not normally distributed ($p < 0.05$). Based on the independent t-test, there was no significant difference between the experimental and control groups in terms of age of patient and caregiver, time duration of using ostomy, and BMI ($p > 0.05$). Therefore, the two groups were homogenous in terms of these variables. Based on the Mann–Whitney test, the two groups were homogenous in terms of number of children ($p = 0.451$) and there was a significant difference between them in terms of daily time duration of care ($p = 0.043$).

Table 1: Relative and absolute frequency of the experimental and control groups based on the demographics.

Variables		Control *N* (%)	Experimental *N* (%)	X^2/Fisher	p_{value}
Gender	Male	17 (48.6)	20 (57.1)	0.516*	0.18
	Female	18 (51.4)	15 (42.9)		
Marital status	Unmarried	6 (17.1)	13 (37.1)	3.45**	0.06
	Married	29 (82.9)	22 (62.9)		
Educational status	Elementary level	25 (71.4)	28 (80)	0.713*	0.7
	High school	6 (17.1)	4 (11.4)		
	Higher education	4 (11.4)	3 (8.6)		
Job	Employee	12 (34.3)	10 (28.6)	4.42*	0.219
	Housewife	15 (42.9)	9 (25.7)		
	Non-employed	3 (8.6)	7 (20)		
	Self-employed	5 (14.3)	9 (25.7)		
Residence	Urban	14 (40)	11 (31.4)	1.47*	0.48
	Suburb	12 (3.3)	17 (48.6)		
	Rural	9 (25.7)	7 (20)		
Family income (monthly)	400$	12 (34.3)	17 (48.6)	1.7*	0.45
	400-800$	12 (34.3)	8 (22.9)		
	800-2000$	11 (31.4)	10 (28.6)		
Ethnicity	Persian	0 (0)	2 (5.7)		
	Azeri	2 (5.7)	2 (5.7)		
	Kurd	28 (80)	29 (82.9)		
	Lur	5 (14.3)	2 (5.7)		
Type of ostomy	Temporary colostomy	17 (48.6)	20 (57.1)	4.48*	0.214
	Permanent colostomy	4 (11.5)	7 (20)		
	Temporary ileostomy	14 (40)	8 (22.9)		
Reason of ostomy	Cancer	21 (60)	19 (54.3)	0.367*	0.94
	Inflammation disease	2 (5.7)	3 (8.6)		
	Ileus	7 (20)	8 (22.9)		
	Other	5 (14.3)	5 (14.3)		

*Exact chi-square test. **Exact Fisher test.

Table 2: Relative and absolute frequency of caregivers of the experimental and control groups based on the demographics.

Variables		Control *N* (%)	Experimental *N* (%)	X^2/Fisher	P_{value}
Gender	Male	14 (40)	17 (48.6)	0.521*	0.47
	Female	21 (60)	18 (51.4)		
Marital status	Unmarried	6 (17.1)	13 (37.1)	3.54**	0.06
	Married	29 (82.9)	22 (62.9)		
Relation with clients	Parents	0 (0)	3 (8.6)	3.9*	
	child	32 (91.4)	27 (77.1)		
	Sibling	3 (8.6)	5 (14.3)		
Job	Nonemployee	8 (22.9)	6 (17.1)	3.42*	0.33
	Housewife	12 (34.3)	12 (34.3)		
	Employed	9 (25.7)	5 (14.3)		
	Self-employed	6 (17.1)	12 (34.3)		
Educational status	Elementary level	12 (3.3)	14 (40)	0.37*	0.83
	High school	13 (37.1)	13 (37.1)		
	Higher education	10 (28.6)	8 (22.9)		

*Exact chi-square test. **Exact Fisher test.

The KS test results showed the score of QOL, and the subscales had a normal distribution in the two groups before and after the intervention ($p > 0.05$). Only psychological scores in the control group and spiritual health in the experimental group were not normally distributed after the intervention ($p < 0.05$).

The mean scores of physical health, psychological health, and QOL of clients in the experimental and control groups were significantly different. However, the difference between the two groups as to social health and spiritual health was not significant. In addition, the two groups were not significantly different before the intervention in terms of physical, psychological, and spiritual health and QOL in general. However, after the intervention, the two groups were significantly different in terms of QOL and its subscales

Table 3: Comparison of mean scores of QOL and its subscales in clients of the experimental and control groups before and after intervention.

QOL_{Aspect}	Group	Mean ± SD		Paired t-test or Wilcoxon signed rank test	Sig.
		Pre	Post		
Physical health	Experimental	**9.69 ± 38.11**	**14.05 ± 47**	**$T = -3.22$**	**0.003**
	Control	**10.43 ± 39**	**8.14 ± 40.86**	**$T = -2.93$**	**0.006**
	Independent t-test	T = -0.37	T = 2.24		
		Sig = 0.71	Sig = 0.028		
Psychological health	Experimental	**5.6 ± 60.29**	**5.09 ± 64**	**$T = -11.125$**	**0.0001**
	Control	**6.07 ± 58.4**	**5.78 ± 59.71**	**$Z = -3.27$**	**0.01**
	Independent t-test/U	T = 1.35	Z = -3.12		
	Mann–Whitney	Sig = 0.18	Sig = 0.002		
Social health	Experimental	**5.63 ± 65.31**	**5.29 ± 67.48**	**$T = -3.7$**	**0.001**
	Control	**7.14 ± 64.2**	**4.86 ± 65.31**	**$T = 0.365$**	**0.717**
	Independent t-test	T = 0.72	T = 1.79		
		Sig = 0.47	Sig = 0.078		
Spiritual health	Experimental	**6.71 ± 34.26**	**6.16 ± 37.63**	**$Z = -4.56$**	0.001
	Control	**5.93 ± 33.6**	**5.74 ± 33.37**	**$T = -0.173$**	0.86
	Independent t-test/U	T = 0.434	Z = -2.597		
	Mann–Whitney	Sig = 0.66	Sig = 0.009		
QOL	Experimental	**14.49 ± 197.97**	**11.8 ± 207.49**	**T–/5.3**	**0.0001**
	Control	**15.11 ± 195.2**	**13.58 ± 199.03**	**$T = -3.32$**	**0.002**
	Independent t-test	T = 0.78	T = 2.87		
		Sig = 0.44	Sig = 0.007		

except for social health. The level of sig. for all the tests was 95% (Table 3).

The results of the mean scores of QOL before and after the intervention in the experimental group were ($M = 195.2$, SD = 14.49) and ($M = 207.49$, SD = 11.8), respectively, which imply significant differences that can be concluded to an improvement in QOL ($t = -3.32$, $p = 0.002$). Also, the results of the mean scores of QOL before ($M = 197.97$, SD = 15.11) and after ($M = 199.03$, SD = 13.58) the intervention in the control group indicate significant differences that resulted in an improvement in QOL too ($t = -5.3$, $p = 0.0001$). These differences in the mean scores between the two experimental and control groups were nonsignificant before ($t = 0.78$, $p = 0.44$) and significant after ($t = 2.87$, $p = 0.007$) the intervention (Table 3).

4. Discussion

As the results showed, the mean score of physical health in the clients of the experimental group had a significant increase compared with the control group. In addition, there was a significant increase in the mean score of physical health in the clients of the control group; however, this increase was less than that in the experimental group before and after the intervention. This increase in the clients of the control group can be explained by natural adaptation of the clients to ostomy. In addition, the control group received routine care and treatment during the study.

Naseh et al. found that clients with permanent ostomy did not have a good condition in terms of physical health and needed empowerment and care [20]. Rajabipour et al. reported that motivational interviews improved physical health of the clients with ostomy significantly [30]. Kalijzadeh Ganjalikhani et al. showed that structured education for ostomy care significantly improved physical health in clients with permanent ostomy [10]. Similar studies have shown that educating parents of children with ostomy can increase their care knowledge through family-centered empowerment to avoid ostomy side effects [23]. Clearly, there is good consistency between our results and other studies, which is an indicator of the right implementation of standard tools in this study. To explain the findings, we can say that the interventions were based on family-centered care for the clients and that family can play an effective role in improving client's condition [31].

Because of the family-centered intervention, the mean score of psychological health had a significant increase in the clients of the experimental group compared with the control group. The results supported a significant effect of family-centered intervention on psychological health of the clients. The increase in mean score in the clients of the control group can be the results of natural adaptation of the clients through time. Studies have emphasized on the effect of family-centered intervention on attenuating anxiety and stress [26] and improvement of self-confidence and self-efficacy [21] of clients. Here, family empowerment to provide proper therapeutic care and support to the clients, i.e., the key point in family-centered care program, was emphasized, which could be effective in the improvement of psychological health of the clients.

Nam et al. reported that clients with ostomy needed family and physician's support to adapt to the social and psychological challenges [32]. Hinton et al. found that family-centered care improved depression in clients [24]. To explain the findings, it is notable that along with empowering the family members to provide care to clients, family-centered care programs encompass several areas of psychological support. Additionally, studies have shown that family support has a significant relationship with the improvement of self-confidence [33], improvement of psychological condition [10, 32], and self-efficacy in patients [21].

The mean score of social health had a significant increase after family-centered intervention in the clients of the experimental group. This increase, however, was significantly higher than that in the control group, which might be due to the physical hardships and limitations in social interactions of the clients. Xu et al. concluded that self-efficacy interventions in clients with ostomy did not cause a significant change in the QOL in clients in the intervention group compared with the control group [28]. The results showed that the mean score of spiritual health had a significant increase after family-centered intervention. The results supported the effectiveness of family-centered intervention in the increase in spiritual health in care seekers. Several studies using other types of interventions have reported an improvement in different aspects of QOL along with attenuation of stress and anxiety in clients [28, 30, 32]; spirituality is one of these aspects.

As shown by the results, the scores of different aspects of QOL improved significantly after the intervention in the clients of the experimental group compared with the control group. The results supported the significant effect of family-centered intervention on the QOL in the clients. The increase in the mean scores in the control group might be due to the natural adoption process in the clients. Leyk et al. argued that time can be effective in gaining social support and improving health conditions of clients with ostomy and their families [34]. Koplin et al. maintained that psychological interventions can attenuate the decline in QOL in clients with ostomy [35]. To explain the findings, it is notable that educating family members and providing family-centered care can be effective in self-care skills and capabilities of clients with ostomy. As shown in [14], self-care activities can be effective in the improvement of QOL of clients with ostomy.

The mean scores in the clients of the control group increased during the four weeks of intervention. The natural adaptation process in the clients can explain this improvement so that they managed to handle many of their problems and improved their quality of lives. Time and education were effective in the QOL in clients with ostomy [36]. In addition, along with the client's attempt to solve their problem, social and family supports and routine educations and interventions can improve the QOL in clients [9, 35]. Several studies have shown that a variety of interventions are effective in the QOL in clients with ostomy [9, 14, 32, 35]. Our results also supported the effectiveness of family-centered intervention in the QOL of clients.

5. Limitation

A major limitation of the study was the large number of statements in the questionnaires that might have been tiring for the participants. To solve this, an assistant researcher was available to answer any question that the subjects could have. In addition, the questionnaires were filled out on different occasions with short time gaps. Another limitation was the challenge of finding clients with ostomy, which was done with the help of hospital officials. The study was carried out as an interventional study that needed a proper design and participation of the subjects. The study was part of a MSc. dissertation with a limited time. The sample groups were small, and the follow-up was limited to four weeks. Using a larger sample group and a longer follow-up term might lead to different and more reliable findings.

6. Conclusion

In general, family-centered interventions, as a therapeutic intervention, improved the QOL in clients with ostomy and improved their physical, social, spiritual, and psychological health. Therefore, the therapeutic intervention can be used by different surgery wards, nursing services, and social care services as an efficient intervention to improve QOL in clients.

Abbreviation

BMI:	Body mass index
WHO:	World Health Organization
QOL:	Quality of life
KUMS:	Kermanshah University of Medical Sciences.

Data Availability

The datasets used and analyzed during this study are available from the corresponding author on reasonable request.

Consent

Our manuscript does not contain any individual's data in any form (including individual details, images, or videos); thus, there is no need for any publishing consent.

Conflicts of Interest

The authors declare that they have no conflicts of interest about this work.

Authors' Contributions

AG contributed to study concept, designed study, collected data, and prepared manuscript. AJ contributed to study concept, designed study, analyzed data, prepared manuscript, and submitted the manuscript. TGh contributed to study concept, designed study, and prepared manuscript. EM and KM contributed to study design, analyzed data, and prepared manuscript.

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Research Article

Having a Parent with Early-Onset Dementia: A Qualitative Study of Young Adult Children

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Background. Children of a parent with early-onset dementia (EOD) are confronted with losing a parent to a progressive neurodegenerative illness, usually perceived as an older adult illness, which may have a great impact on their lives at a time that is usually preserved for self-development. *Objective*. The objective of this study is to explore the experiences and perceptions of young adult children of a parent with EOD, with specific focus on personal lives and family and social relationships in a Norwegian context. *Methods*. Semistructured interviews with 10 young adult children between the ages of 19 and 30 years of a parent with EOD were analysed using a thematic analysis. *Results*. The analysis identified six main themes. *"Upon discovering dementia, Keeping the family together, Others do not understand, A sense of relief, A need for support"* and *Apprehension for the future*. The participants expressed an overarching feeling of living parallel lives, summarised by the phrase *"We are not in the same boat."* Furthermore, the themes demonstrated that the participants experienced difficulties with managing new responsibilities, at the same time, as preserving their own lives. They also shared concerns about the future and often experienced a lack of understanding and support from others. Finally, the need for targeted support throughout the illness was a central theme, whereby many felt more comfortable talking with someone with similar experiences or knowledge of their situation. *Conclusion*. The findings in this study strengthen the notion that the children of persons with EOD experience a challenging life situation, underlining the need for a person- and family-oriented approach.

1. Introduction

Dementia is an acquired, irreversible illness, characterised by progressive and degenerative decline in mental functioning [1], severely impacting both the affected person and their family. Dementia is not just related to old age, as it can also affect younger persons and their subsequent younger caregivers. An onset of dementia under the age of 65 is referred to as early-onset dementia [2]. Like caregivers of older persons with dementia, the main caregivers of a younger person with dementia are reported to take on high levels of caregiving tasks. Research suggests that caregivers of younger persons with dementia encounter unique challenges and issues in their newfound caregiving role [3, 4]. Most researches have focused on the impact of early-onset dementia (EOD) on the main provider of informal support, most often the spouse [5]. However, it is not only the spouse who is affected, as the children are also faced with a new and uncertain situation.

The gradual decline in mental functioning in a parent can adversely influence the interpersonal relationships between family members and, by extension, family dynamics. Children may become occupied with responsibilities to buffer the loss of a parent at a time in their life that is usually reserved for separation from the family unit and self-development [6]. Furthermore, the idiosyncratic nature of EOD may leave children with few others in similar circumstances outside the family to turn to, thereby creating a potential for distress.

Moreover, even though there is growing recognition that EOD is a significant clinical and social problem [7], most studies do not distinguish between family members or caregivers when exploring how EOD affects the family [8]. This makes it difficult to understand the unique experiences of young adults. This paper explores the experiences and perceptions related to being a young adult child of a parent diagnosed with EOD.

2. Background

A systematic review found that the prevalence of all subtypes of EOD ranged from 38 to 420 per 100,000 of the population [9]. Moreover, a recent prevalence study from Norway found that the overall prevalence of dementia in the age group 45–64 years was 143 per 100,000 [10], which is higher than previous reports. Studies of life expectancy after diagnosis are inconclusive, but some have indicated that EOD is associated with higher mortality rates compared to late-onset dementia (LOD) [11].

In addition to known variation based on affected brain functions, persons with EOD may also present more atypical symptoms compared to persons with LOD [12]. They may have a more rapid rate of cognitive decline, although this has mostly been studied in persons with early-onset Alzheimer's disease (AD) [13]. The prevalence of non-memory presentations in persons with early-onset AD has, for instance, been found to be five times higher than with late-onset AD [14]. Other studies further suggest that cases of early-onset AD have more prominent difficulties with language, visuospatial skills, and executive functions [15, 16].

The task of providing care for a person with EOD is associated with both physical and emotional burdens, as shown in a review by Svanberg et al. [17]. The review further reports that EOD caregivers experience higher levels of depression and more psychosocial problems than LOD caregivers. The review further suggests that this may be related to the age or stage of life, such as employment problems and financial difficulties. Qualitative studies looking at the impact on spouses have reported that they struggle with the change in their relationship and feel burdened by their sole role as the economic provider for the family [4].

Most previous studies do not separate the spouses from the children, but rather consider all of the next of kin involved in everyday care of the person with dementia as caregivers, which makes it difficult to find research exclusively on the impact on children [8]. However, some of the existing studies indicate that having a parent with EOD may be a significant stressor. Findings of emotional impact have been identified in qualitative studies and have been associated with feelings of sadness and grief [3]. Family conflicts have also been reported in several qualitative studies, whereby children struggle to cope with their sick parent's behaviour and try their best to avoid confrontations [18] or experiences that their non-affected parent avoids or withdraw from the situation which can leave the children with more caregiving responsibilities and feelings of distress [3, 19]. Some studies also suggest that caretakers of persons with EOD experience feelings of isolation. The studies by Johannessen et al. [4] and Flynn and Mulcahy [1], interviewing spouses of persons with EOD, reported that their social network had shrunk due to their caregiving situation. Similar findings have also been suggested by Barca et al. [3]; where young adult children reportedly experienced difficulties with their social networks.

The families of persons with EOD need social and emotional support [17], but a literature review by Van Vliet et al. [20] found that the lack of designated services for persons with EOD was distressing for the caregivers, as they felt angry and guilty about being forced to accept a service intended for older persons. Studies also suggest that children feel overlooked and are not included in conversations regarding their parent's diagnosis or where to find available support [3, 18]. Some reports have stated that information is crucial to plan for the future [3], while others suggest that children might not want information, especially at the beginning, as they can be frightened by the information that they find [18].

Given that EOD as a form of parental illness has until recently received little attention leaves a need for further exploration. Furthermore, the existing literature often does not distinguish between the spouse and younger or older children when exploring how EOD affects the family [8, 20], making it difficult to understand the experiences and perceptions of young adult children.

3. Aim

This study aims to explore the experiences and perceptions related to being a young adult child of a parent diagnosed with EOD with specific focus on the impact on personal lives and family and social relationships in a Norwegian context.

4. Methods

4.1. Design. The study's design is qualitative with persons in-depth interviews using a semistructured interview guide with open-ended questions to create an exploratory atmosphere during the interview [21]. A test interview was conducted. The interview guide also underwent minor changes during the study to adjust the order of the questions. Prompt questions were also included to fill in or request clarification of what was said during the interviews.

4.2. Recruitment and Participants. Two inclusion criteria were established for the study, the participant had to

(i) Be between 18 and 30 years of age
(ii) Have a parent diagnosed with dementia before or at the age of 65

Two main recruitment sources were used. the Norwegian Health Association and the first author's social network. The first author sent an invitation and a description of the study to the Norwegian Health Association, which was then distributed to their social media pages (e.g., closed groups on Facebook) and to leaders of support groups of young caretakers of parents with EOD. Persons belonging to the first author's social network were also given the invitation to the study and were identified as potential participants through word-of-mouth. In total, 13 candidates responded, two candidates did not meet the inclusion criteria and one was turned down due to their geographical location. After interviewing 10 participants and producing 99 pages of transcribed material, we believed that enough data was collected to adequately illuminate the topic. Thus, the final sample consisted of 10 female candidates, seven recruited through the Norwegian Health Association and three from the first author's social network, all from the south of Norway.

4.3. The Interviews. All interviews were audio recorded with the participants' consent and conducted between December 2019 and February 2020. The length of the interviews varied between 45 minutes and 90 minutes and was conducted by the first author. Prior to the interview, the participants were briefed on the purpose of the study and the course of the interview. The interviewer further reaffirmed the participants' consent, in addition to asking whether the participants had any questions before the interview, which is in line with Brinkmann and Kvale [22]. The interviewer considered that the interview could cause emotional upset and encouraged the participants to take breaks if needed. The interviews were conducted in the participants' own homes when possible; otherwise, a neutral venue was chosen.

4.4. Analyses. The interviews were transcribed verbatim by the first author. Even though the transcription was a time-consuming process, it also became a valuable experience as it offered the opportunity to capture both tone, volume of voice, and line of flow in the interviews, rather than just spoken words, which is highly beneficial for further analysis according to Malterud [23]. All interviews were transcribed in Norwegian, but quotations used in the final paper were translated into English.

Both authors read the transcribed interviews and the transcriptions were analysed for core concepts and subthemes using a thematic analysis [24]. The analysis also followed an inductive approach, meaning that the themes were strongly linked to the data itself. According to Terry et al. [24], the data were therefore not driven by the researcher's theoretical interest in the area or topic. The interviews were analysed with a focus on each participant's experiences and perceptions within their personal lives and social contexts, as well as their relation to service providers.

At the start of the analysis, all of the transcribed interviews, together with initial notes taken after the interviews by the first author, generated a list of ideas and possible themes based on perceived importance [22]. The next stage of the analysis involved creating initial codes from the raw data. A code identifies a feature of the data that appears interesting [25] and the phrase "smallest meaningful unit" is often used as a designation [26]. During this phase of the analysis, the software tool NVivo [28] was used.

In order not to exclude any data, the data were coded for as many potential themes/patterns as possible whilst still removing data perceived as being irrelevant, as recommended by Terry et al. [24]. During this phase, individual extracts of data were also coded several times. This is in line with Malterud [26] and Brinkmann and Kvale [22], who argued that the analysis should be flexible and dynamic, constantly trying to optimise the coding process.

The next stage of the analysis was to take a step back, gaining an overview and identifying how the different codes could combine to form a potential theme [24]. During this phase, a digital mind map was used to organise the codes (containing extracts of raw data) into theme piles. An example of the coding process is shown in Table 1.

5. Results

All ten participants were female, ranging from 19 to 30 years of age; only two of them still lived in the family home when the sick parent was diagnosed. Table 2 shows the detailed information on the participants.

The parent with EOD ranged from 53 to 61 years; four of them were mothers and six were fathers of the participants. Table 3 shows detailed information on the parents.

5.1. Themes. The analysis resulted in 6 main themes and 20 subthemes (Table 4) which described how their parent's dementia affects the participants' relationships with family and friends, their personal life, and their support needs.

5.1.1. Upon Discovering Dementia. Some of the first or most frequent signs of dementia noticed by the participants were lapses in memory or mood swings in their parent. The signs were mostly insidious and appeared inconsistently; many participants therefore attributed the signs to other causes like stress or depression. Others experienced more rapid or dramatic changes in their parent, as explained by one participant.

> *"We were sitting outside eating lunch when all of a sudden, he just took his chair and sat it in between my mother and me and told me "no one comes between us;" he was looking at me like I was some kind of threat (P3)."*

First, the road to diagnosis was a period of questioning the changes observed in the parent. Very few participants tried to speak to their sick parent about the symptoms. Some explained that the parent seemed unaware of any change, or that the parent became defensive whenever they were asked about their abnormal behaviour. Some participants said that the family members were divided in their belief that the symptoms were caused by dementia, or as explained by one participant, refused to believe others' observations and used this as a protective mechanism.

> *"I was very angry with anyone who implied that my mother had Alzheimer's and I remember that I could come up with excuses for her behaviour. Even though my sister and father told me that my mother most likely has Alzheimer's disease*

Table 1: Example of three final subthemes of the main theme: "keeping the family together."

Data-extract	Coded for	Subtheme
You have to look out for yourself, because there is such an enormous pressure at home, that if you are pressured at work as well, you will just collapse-P1	Must consider yourself in order to not become overburdened	Considering one's own life
I want to be there for him, but it is not easy. He never wants to do any of the things I suggest, like going for a walk. I just find it really hard to know exactly how I am supposed to be there for him-P6	Finding it difficult to provide social support to sick parent	Assuming responsibility for the sick parent
I mostly just talk with her (healthy parent) about her thoughts and feelings. She has been very upset and cries a lot and has this need to talk. You just try the best you can, but it has not been easy knowing what to say to her, or how I should deal with it-P10	Having to provide emotional support to healthy parent while bottling up own feelings	Having to support the healthy parent

Table 2: Characteristics of the participants.

The participants				
Participant	Siblings	Relationship status	Residence	Age
P1	None	Cohabitant	Lives outside family home*	30
P2	Three	Cohabitant	Lives outside family home**	28
P3	One	Single	Lives in family home*	22
P4	One	Single	Lives in family home**	19
P5	Two	Single	Lives outside family home**	23
P6	Three	In a relationship	Lives outside family home*	26
P7	Three	Single	Lives outside family home*	24
P8	Seven	Cohabitant	Lives outside family home*	29
P9	Four	Cohabitant	Lives outside family home*	22
P10	One	In a relationship	Lives outside family home**	22

*Lived outside family home when parent was diagnosed; **lived in family home when the parent was diagnosed.

Table 3: Characteristics of parent with EOD.

The parent with EOD				
Relationship to participant	Relationship status	Residence	Diagnosis	Age and years since diagnosis
Mother (P1)	Married	Family home	Alzheimer's disease	61 and 3
Father (P2)	Married	Family and nursing home	Frontotemporal dementia	58 and 13
Father (P3)	Married	Family home	Frontotemporal dementia	55 and 3
Father (P4)	Separated	Private apartment	Alzheimer's disease	56 and 4
Father (P5)	Married	Family home	Alzheimer's disease	60 and 4
Father (P6)	Married	Family home	Alzheimer's disease	65 and 4
Mother (P7)	Married	Nursing home	Alzheimer's disease	53 and 5
Mother (P8)	Single	Public apartment	Alzheimer's disease	54 and 2
Mother (P9)	Single	Public apartment	Alzheimer's disease	54 and 2
Father (P10)	Married	Family home	Alzheimer's disease	60 and 4

> *one year before the diagnosis, I refused to listen; I did not want my mother to be sick (P7).*"

Several participants noted a lack of openness regarding the diagnostic process from both parents and reacted with shock when they were told about the diagnosis. However, accounts of shock and disbelief were also evident among participants who had been more involved in the diagnostic process. Some felt angry, frustrated, or bitter over the fact that someone as young as their parent was suffering from dementia. Others felt a deep sadness; one participant especially spoke of how she right away thought she had to plan for a funeral. For some participants, however, the diagnosis provided a sense of relief.

> *"It might not be the right thing to say, but it was a relief. Because I now had an explanation for why she behaves the way she does (P9)."*

Table 4: Main themes and subthemes.

Main themes	Subthemes
Upon discovering dementia	The first symptoms The road to diagnosis The reaction to diagnosis
Keeping the family together	Assuming responsibility for sick parent Experiencing a role change Having to support the healthy parent Considering one's own life
Others do not understand	It is difficult to relate Forgetting things is the smallest problem You have to see it to believe it
Sense of relief	Choosing to share Moving away Have something meaningful to do
A need for support	Finding information Meeting others in the same situation One to one support
Apprehension for the future	Before it is too late what happens next My parent in a nursing home Two dependent parents

5.1.2. Keeping the Family Together. As the changes in the parent became more evident, the parent became increasingly dependent on assistance. Many of the participants felt that they were needed or obligated to care for their sick parent.

> *"I feel that this is my responsibility; this is my mother, and I will make sure that she has everything she needs. I feel like I owe it to her in a way, to be there for her, like she has been there for me (P9)."*

The level and type of care the participants provided for their parents differed, depending on factors such as family structure and functioning, living situations, and level of support from healthcare services. However, it was often not easy to find the best way to identify their sick parent's needs.

> *"I want to be there for him, but it is not easy. He never wants to do any of the things I suggest, like going for a walk. I just find it really hard to know exactly how I am supposed to be there for him (P6)."*

All participants expressed that their relationship with their parent with dementia had changed. *"Everything has changed, she is not my mother anymore; it is an awful thing to say, but I cannot talk to her in the same way I used to (P8)."*

The altered relationship not only meant losing a special person, but also a role-change, as the participants felt that they had undergone a transformation from being a recipient of care to becoming a caregiver.

Even though most spoke about the role-change in negative terms, some also stated that the parental illness and subsequent role-change had some positive aspects, such as increased maturity and improved personal qualities. The participants not only provided support for the sick parent, but also most found it equally important to support other family members. Some participants raised concerns regarding the health and wellbeing of the other parent, and there seemed to be a sense of duty to provide support in order for their healthy parent to be able to maintain their dual role.

> *"When our father told us that he wanted to take some time-off one weekend, we (siblings) right away supported and encouraged him to go and told him "We will take care of her, go and have fun." When he came back, he felt more energised and could be a much better father to us and husband to my mother (P7)."*

As expressed above, the feeling of cooperating and openly communicating with each other to support the healthy parent, or each other, was significant; as a result, some participants stated that they had become closer to their healthy parent and/or siblings. In contrast, some participants spoke of how tension between their parents, small family units, family members who withdrew from the situation, or lack of support from healthcare services, left them with more sole responsibilities.

The participants described, in various ways, how their increasing concerns and/or needs of their sick parent and/or other family members impacted on their personal life and mental state. Some felt that they never had time or energy for their social life, or stated they had to postpone their plans for higher education or even marriage. It seemed like the overall feeling was that their own lives often clashed with the needs of their sick parent and/or other family members.

> *"It is very tiring because you have a constant bad conscience whenever you do something else. I have in some sense gotten used to it by now, but you do have a bad conscience all the time for not doing enough (P6)."*

5.1.3. Others Do Not Understand. When others learned about their parent's diagnosis, many participants had met with reactions of shock and disbelief. It seemed to be a common experience that others felt uncomfortable speaking with participants about their parent's illness, which led some to feel unsupported or not understood. *"I think that they do not understand what it means to have a parent with dementia. But they do not talk to me either, it seems that they do not know how; instead, they just completely avoid the subject (P10)."*

In contrast, a few participants noted that they felt lucky to have persons in their social network who either were knowledgeable of dementia or had similar experiences of parental illness and who could provide them with a kind of emotional and instrumental support that others could not.

That their parent would only become a bit forgetful was a frequent misconception that the participants faced from others. *"Others do not understand how it feels to be a child and see your parent have these episodes of total confusion, or how he can get very angry, childish, and show little sympathy; they do not know that this is happening, they only think you become a bit forgetful (P4)."*

Even though this lack of understanding has resulted in loss of contact with friends and/or family members for some participants, they expressed that they in some way understood them.

> *"I think it has been difficult for people because the illness is a bit invisible before you get really ill, it is not like cancer where you can really see that you are sick (P6)."*

5.1.4. Some Sense of Relief. Some of these negative reactions and experiences were reported to cause some participants to feel reluctant talking about their parent's diagnosis. For some, the reluctance to share was also caused by being asked to keep the diagnosis a secret due to the reported feelings of shame by the sick parent. Nevertheless, those participants who chose to be open, or whose parents chose to share their diagnosis, expressed that this provided them with some relief.

> *"Since we (mother and participant) agreed that I could tell others about the diagnosis, it has become much easier. If you are having a bad day at work, they will know why; you do not have to explain anything even if you come to work looking like a zombie (P9)."*

Most of the participants and some of the parents with dementia had moved out of the family home, resulting in a completely altered living situation. One participant, where the sick parent had recently moved out the family home, described her experience.

> *"I finally feel free (. . .) and it feels much easier bringing friends home (P4)."*

Many stated that their relationship with the sick parent felt less strained after moving away. *"I think in general that it has been easier for me when I do not live at home. I feel that I have more energy now because I am not in it every day in a sense. When I do come home, I feel less irritated by him (P6)."*

Their sick parent's wellbeing was expressed as a constant cause of concern among most participants. It was important for the participants to feel that their parent had something meaningful to do during the day. However, for a daycare offer to be useful, it was important that it was adapted to the sick parent's needs. When the sick parent had to be in groups of older persons with dementia, they disliked going there, therefore not rendering the same sense of relief.

> *"It was difficult for me when we were sending him to a place he did not want to go to. I understand that it is difficult to create an offer that fits everyone, but I do not know, it made me feel bad (P6)."*

5.1.5. A Need of Support. Following the diagnosis, very few participants were offered an opportunity to talk directly to healthcare professionals or were informed of support offers; many felt forgotten or ignored.

As a result, they had to rely on other family members and most often the healthy parent for information, which was described as problematic in several ways. Firstly, the information the healthy parent received regarding dementia, its prognosis, and available support networks was not always passed on to the participants. *"I had to look up things on my own; my father has not been great at asking questions and getting information about what we need to do (P1)."*

"Most participants expressed a need to know as much as possible about the progression of the illness, support offers for themselves and their parents. Many said they searched for this on their own and stated that the Internet was a helpful tool. However, being exposed to detailed and unfiltered information about the illness was described by some as a frightening experience. In addition to a need for information, the participants also expressed a need to meet others in the same situation. *"To have someone my own age to talk to and learn that their experiences are similar to mine would have been nice, because I have always felt that I am the only one who experience this (P2)."*

Those participants that had attended support groups only for young adult children had positive experiences; it is easier to be open with someone in the same situation. However, some expressed a need for one-to-one counselling. "*I wish to have someone who will follow up on you, because you are in a very vulnerable situation when you have a sick parent. I know that my father has Alzheimer's disease and will not be here in the future, but this is a process that takes many years (P10)."*

The timing of the counselling also seemed relevant; for some, a meeting with healthcare professionals immediately after the diagnosis was too early, while others found it useful. Nevertheless, all participants expressed that support offers should become more proactive.

> *"You know how to get a psychologist, but it is a hassle to pick up the phone and do it yourself; if you get this "look here is your appointment, all you need is to meet up," it is so much easier (P7)."*

5.1.6. Apprehension for the Future. The progression of dementia seemed to occupy the participants' thoughts and a common theme was the uncertainty of how fast the progression of the illness would be. This raised a frequent dilemma of how much time they should spend with their parent while minding their own life.

> *"I've been worried about not spending last Christmas with my father. At the same time, I do not want to worry whether I should spend Christmas with him every year for the rest of his life. That is how you would think about your 93-year-old grandma; we celebrate this Christmas with her because it might be the last (P2)."*

Some further expressed how this uncertainty caused stress in their everyday life, as some felt that whenever they had the opportunity, they should go and see their sick parent. Some also said it influenced how they planned and said they would think twice before studying abroad for instance. Another difficult aspect of the progression of the illness was the unpredictability of how it would unfold.

> *"No one ever told me that he could behave like that (aggressively); I get that, but there is no plan, no "first comes this stage and then the next stage." I really do not want to think about the future; it just seems like no one can tell me how things will turn out (P4)."*

Not knowing how the illness would progress made many participants feel stressed. Another emotional challenge for the participants was that their parent would forget who they are and this appeared to be something that was too difficult to contemplate.

The participants expressed mixed feelings regarding nursing homes. Many felt concerned about whether the nursing home could facilitate their parent's needs. Therefore, many wanted to have their parent living at home for as long as possible.

> *"My father will live at home until he does not understand where he is anymore. It is out of the question putting him in an institution now; he will only be left to rot among 80-year-olds. He also walks several miles per day, so if he only has one hallway to walk in, you will have to put him in a psychiatric ward, because then he really needs help (P3)."*

The thought of their parent in a nursing home was unimaginable for some and evoked feelings of bitterness and frustration, as it felt unfair to visit their parent in an institution many regarded as a place for older persons.

Another concern was related to the burden of caregiving. Some feared that with the progression of the illness, the demands of caregiving would exceed the healthy parent's abilities to cope. As a result, some were fearful that not only their sick parent, but also their healthy parent, would become dependent on them, something that would impact their life for the foreseeable future.

> *"I am really worried about the future. I fear that she will not cope, which means that I have to find a balance of living my own life and being there for her; I cannot take mum with me everywhere though-I am supposed to have a life with my boyfriend too (P10)."*

6. Discussion

The aim of this study was to explore the experiences and perceptions of young adults with a parent with EOD, with the specific focus on personal lives and family and social relationships.

The participants experienced an overall challenging life situation which led to a need for information and support, something that they sought from other family members, peers, and/or public healthcare services. However, many participants experienced difficulties finding a source of information that was both sufficiently informative and adapted to their needs.

This study also found that the participants' lives were negatively affected by their parents' illness; e.g., by way of interrupting the normal family dynamic and giving the participants different responsibilities compared to their peers. In addition, the role-change impacted their life choices, affecting their transition into adulthood. Furthermore, as the participants' lives differed greatly from that of their peers whose parents were healthy, a recurring and overarching theme was a feeling of living a parallel life. As one participant summarised when comparing their experience with that of their peers. *"We are not in the same boat."*

6.1. Changes in Family Dynamic.

The insidious progression of cognitive decline associated with EOD has a profound impact, not only on the affected person, but also on the entire family. As a result of changes in social dynamic and roles within the family, children of parents with EOD pass into adulthood with a parent-child relationship that radically deviates from the expected norm [27].

A central theme in the findings was how the relationship with their parent had suffered due to their diagnosis. According to the participants, the sick parent's personality had changed and they had become more difficult to relate to, which is in accordance with Aslett et al. [29] who suggest that the possibilities of closeness, intimacy, and a meaningful relationship with the parent diagnosed with EOD are strained. Many participants noted that the deterioration of their parent's condition and their gradual removal from their former selves led to a sense of continual loss, with subsequent mixed feelings and emotions. Such a situation, wherein the parent is physically present but psychologically absent, can be described as a psychological ambiguous loss [30] and has been found by previous studies to be a central component in the process of grief experienced by those whose loved ones are affected by dementia [31]. The culmination of this continual and premature sense of loss, as highlighted by many participants, was the feared or actual realisation of no longer being recognized by their own parent. Furthermore, the parent's gradual decline not only led to the aforementioned sense of premature physiological loss, but also led to the loss of a parental figure from which to seek advice or support, on both practical and emotional matters.

This study's findings further suggest that the parent's illness changes the family dynamic, forcing young adults to take more responsibility in keeping the family together, both practically and socially. Some felt a strong sense of filial duty to reciprocate care and support for their sick parent, with mentions of feeling closer to their sick parent, as also found by Aslett et al. [29]. This feeling of being responsible for their parents' emotional wellbeing, also known as emotional parentification, can, in the short term, be an adaptive response to parental illness or a family crisis [32]. However, it is worth noting that emotional parentification in childhood has been found to be a predictor of depression in adulthood [33]. The fact that some participants also muted their own thoughts and feelings, supported by the findings of Gelman and Rhames [27]; shows the importance of research reporting on children's own experiences and not only being represented by their parents. A study of young adult caregivers (18–24 years of age) suggests that it is important to have a perceived choice in caring, especially in a phase where young adults are undergoing extensive changes and taking major decisions on career issues [34]. Moreover, the findings in this study suggest that participants who moved away from their sick parent found that their relationship improved by reducing their daily involvement with the sick parent, as supported by Johannessen et al. [35]. However, moving away from the family home led to feelings of ambivalence, stress, and guilt regarding not being able to contribute as much at home, in accordance with Barca et al. [3].

6.2. Transition to Adulthood. The findings of this study suggest that having a parent with EOD can be particularly difficult for young persons' transitioning to adulthood, affecting both short- and long-term life choices. The participants reported that their own life and needs often clashed with those of their sick parent, with some postponing higher education or moving back home as a result. Findings such as these are worth considering as career recognition provides a major foundation for developing a positive view of oneself in young adulthood [36]. It is worth noting that young people in Norway tend to move out from their family home when they are younger than most of their European counterparts [37, 38]. While the majority of young adults in Norway move out by the age of twenty, young adult in southern Europe move out in their late twenties. Young adults in Norway may therefore experience a greater loss of independence when comparing themselves with fellow Norwegian students and friends.

A longitudinal study by Johannessen et al. [35] suggests that resilience gradually evolves as young adults of a parent with EOD master the situation over time. Crucially, this depends on having at least one social relationship with someone who is understanding and supportive of their situation. This is consistent with the findings of the current study, where the importance of having one person in their social network that they could relate to or confide in was emphasised. This is also supported by George et al. [39], who found that social support and increased awareness regarding the psychological burden faced by family members caring for a sick relative, significantly reduced the psychological distress, both for full- and part-time caregivers.

6.3. In Need of Targeted Support. The participants in our study felt that their own needs were not specifically considered by the healthcare and/or support services. A dominant experience, also found by Barca et al. [3], was a feeling of being overlooked or ignored by professionals, both in terms of receiving information about their parent's illness and gaining access to available support offers.

In relation to support offers for caregivers of younger persons with dementia, a Norwegian national survey from 2012 revealed few offers within municipality and specialist healthcare services [40]. While the Norwegian Health Association and the Norwegian Centre for Aging and Health, together with other organizations, offer two annual courses in addition to support groups for children of a parent with EOD, there is no formal system ensuring that young adults (over 18 years of age) are contacted by the service system.

To meet someone who could identify and empathise with their own situation was, as previously mentioned, one of the participants' most important needs, something that has also been described in other studies [3, 35]. In line with the findings of Barca et al. [3] and Johannessen et al. [35]; many of the participants valued the social support and guidance from the support groups.

However, in contrast to the findings in Barca et al. [3]; some participants found support groups to be unhelpful. This was particularly in situations where the other participants in the group had parents at a more advanced stage of the illness. Their accounts and experiences did not offer support, but rather contributed to creating more uncertainty in the study participants, rendering them unsure of whether they would be able to cope with their parent's illness in the future. The participants also highlighted the need for support offers throughout the illness and to be included in the diagnostic process; they also stated that support services should be proactive in their approach, which has also been suggested by Millenaar et al. [18].

The need for targeted support can also be extended to the whole family. As described by the participants in this study, meaningful activities for their sick parent provided by the public health services' daycare offer lessened their burden of care. However, specialised daycare offers for persons with EOD are scarce, and typically only available in the most populous municipalities [41]. Most of the offers are designed for older persons with dementia, leaving younger persons with dementia without adequate activities and thus more dependent on their families. The last stage of service from the public healthcare is moving away from the home and into a nursing home. This transition seemed particularly troublesome for many participants. The study by Larsen et al. [42] reports that family caregivers of LOD experienced dilemma regarding the assumed duty of care for the person with dementia and the caregivers' own needs. Feelings such as guilt and a sense of betraying their loved one was prominent, especially when the person with dementia rejected admission to a nursing home. While this was also expressed in this study, the participants seemed particularly troubled with having their parent in a nursing home not suited for younger persons with dementia.

There has been a movement in the government policy towards a whole family approach [43] and such an approach could support parents in retaining their role and promoting positive experiences for the children. This is also important for the healthy parent, as the findings suggested that the non-affected parent often struggles and that the children therefore fear having two dependent parents. Moreover, the participants in this study, similarly to those of the study by Svanberg et al. [44], highlight that healthcare services should strive to cater for the individual needs of young adult children throughout the course of the illness. The fact that some participants experienced a lack of support from their family and friends highlights the need for a public whole family approach to caring. Such an approach has also been supported in the literature to help to maintain cohesiveness in the family [27].

6.4. Ethical Approval. The study was assessed and approved by the Norwegian Center for Research Data (NSD) (reference number 529451), ensuring that the anonymity of the participants in the study was sufficiently safeguarded. The study also followed the ethical guidelines of the revised Declaration of Helsinki [45]. In addition, the Regional Committee for Ethics in Medical Research (REC) assessed the study prior to its commencement, concluding that it fell outside their mandate of approval.

6.5. Limitations and Strengths of the Study. This study highlights important individual differences in the perception of and response to their circumstances. It provides some insight into how young adults experience and navigate relationships and role changes, what kind of challenges they face associated with EOD during their young adulthood and their need for social and professional support. As the study is qualitative and descriptive in nature, the findings cannot be generalised due to the intrinsic limitations of the study design. However, given the recurring themes across the interviews, it seems plausible that the experiences of the study participants may also be valid for the wider population of young adults with a parent affected by EOD. The study population only consists of female participants; thus, the findings may not necessarily be applicable to males. In addition, some participants had already moved out of their family home prior to their parent's diagnosis, thus perhaps experiencing the expectation of staying at home to provide informal care to a lesser extent, as noted by several study participants.

7. Conclusion

7.1. Final Conclusion. In summary, the main findings of this study suggest that young adult children with a parent affected by EOD face numerous challenges. Within the family, the parent's diagnosis led to a reversal of roles that deviated from the expected norm and severely altered the family dynamic. In a wider social context, the findings suggest that EOD and its manifestations are poorly understood, which caused an additional burden and led to a perceived lack of emotional support. In combination, these factors, in addition to the timing of the disease, had major implications on important life decisions, affecting the participants lives both in the short- and long-term.

7.2. Clinical Implications. The findings suggest that young adult children should be invited to give their opinions and take part in the planning of public services and support offers. Given the isolation experienced by some participants, both from healthcare services and their peers, it is vital for dementia services to become proactive and consider the needs of young adult children. Offers of support should also be available from the start of the diagnostic process throughout the course of the illness.

7.3. Suggestion for Future Research. Future research should aim to include male participants, as the existing literature, including this study, has mainly involved female participants. The findings in this study also suggest that longitudinal studies should be conducted in order to look at the long-term consequences of children's experiences and their need for healthcare services over time. Additional research is also needed to understand what adequate and age-appropriate support is required to prevent social isolation and promote emotional and physical wellbeing.

Data Availability

Data are available on request to the corresponding author, Wenche K. Malmedal, wenche.k.malmedal@ntnu. Note that all data are in Norwegian.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

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Research Article

The Reasons for Self-Medication from the Perspective of Iranian Nursing Students: A Qualitative Study

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Background. The prevalence of self-medication has increased dramatically worldwide. This study was conducted to determine the reasons for self-medication from the perspective of Iranian nursing students. *Methods*. This qualitative study was conducted using the content analysis method. Fifteen nursing students were selected by the purposeful sampling method. Data were collected by in-depth semistructured interviews. Qualitative content analysis method was used for data analysis. The MAXQDA software was used for data management. *Results*. Data saturation was achieved with fifteen interviews with nine women and six men, with a mean age of 26.5 ± 4.8 years. The reasons for self-medication were explained in five categories and fifteen subcategories. Some of the reasons for self-medication were having medication information, having previous experience, easy access to medicine, lack of enough time, access to medical staff, cost of a doctor's visit, inadequate respect for patient privacy, pharmaceutical advertising in the media, and information explosion. *Discussion*. Several factors are involved in self-medication. Given the dangers of self-medication, health policymakers must adopt strict policies for pharmacies that sell drugs without a prescription. Furthermore, it is helpful to run training courses on self-medication risks for students.

1. Introduction

Self-medication refers to the use of one or more medications without a physician's prescription [1]. It is one of the health problems in many countries, including Iran [2]. It has been viewed as one of the main social issues on economic and health systems with variety in prevalence based on contextual determinates such as education level, knowledge, income, and gender [1, 2]. The prevalence of self-medication has increased dramatically worldwide. Evidence suggests that about 80% of all medications in developing countries can be bought without prescriptions [3]. Self-medication, due to its lower cost, is a substitute for people who cannot afford proper medical care [4]. Today, the arbitrary use of drugs is increasing among the young people, especially students, and the probability of self-medication is greater among nursing students because of their easy access to information sources and their relative familiarity with different drugs [5]. Evidence suggests that the prevalence of self-medication is relatively high among medical science students in different countries. In this regard, the prevalence of arbitrary drug use has been reported to be 78.6% in India, 76% in Brazil, 78.5% in Jordan, 97.5% in Kuwait, and 70.1% in Iran [1, 6–9]. Major problems associated with self-medication include adverse drug reactions, drug resistance, waste of resources, and serious health risks such as death [1, 10]. There is also the possibility of incorrect treatment due to misdiagnosis of the disease [4]. There are numerous reasons for self-medication. In this regard, the results of a study in Ethiopia showed that previous experience, access to pharmacies, family pressure, and availability of medications at home were among the reasons for self-medication in medical science students [10]. The mildness of the disease and previous knowledge about medications are among other reasons for self-medication [2, 3, 11].

The results of a study in Bangladesh showed that education and socioeconomic status had a great impact on self-medication [12]. Most studies conducted on the reasons for self-medication from the perspective of students are quantitative. As self-medication is largely related to the subjective factors, qualitative methods such as surveys can identify the individuals' experiences and rationales that otherwise cannot be determined by quantitative methods [13]. Therefore, due to the lack of knowledge on the reasons for self-medication in nursing students, this study was conducted to explain the reasons for self-medication from the perspective of nursing students.

2. Methods

2.1. Design. The conventional qualitative content analysis approach, based on the Graneheim and Lundman's method, was used to undertake this qualitative research [14].

2.2. Participants and Sampling Method. The sample consisted of 15 undergraduate and graduate nursing students who were recruited by purposive sampling. To increase the richness of the data, and in line with the rigor principles, the participants were selected from both sexes, different age groups, and undergraduate and graduate students. The inclusion criteria consisted of having a history of self-medication, consent to participate in the study, and employment in the field of nursing. It should be noted that the samples of this study included those who had a history of self-medication based on the results of a cross-sectional study on the prevalence of self-medication [2] and expressed their consent to participate in future studies by providing e-mail and phone number. Sampling was carried out until the data were saturated.

2.3. Setting. This study was performed at Imam Reza Hospital Complex in Kermanshah, Western Iran.

2.4. Data Collection. The data were collected by semi-structured interviews. The interviews were conducted in the researcher's room, located in Imam Reza Hospital Complex. The researcher began the interview with guiding questions like "What are your reasons for self-medication?" and "What factors prevent you from visiting a doctor?" The researcher then used phrases such as why, how, and please explain more to clarify the issue. All interviews were recorded by using an audio recorder. Each interview lasted 30–50 minutes. Interviews were continued until data saturation was accomplished. Data saturation occurs when adding an interview does not produce any new information [15]. In the fifteenth interview, the data were saturated. Interviews were conducted by the first author, a woman with a master's degree in nursing and 18 years of clinical and educational experiences.

2.5. Data Analysis. Data analysis and collection were performed simultaneously. After each interview, the participants' statements were transcribed and then fed into the MAXQDA-2013 software [16]. This software was used for initial data coding. The texts of the interviews were then read several times. Meaning units were then extracted, condensed, and labeled. At this stage, the subcategories were emerged. In the next step, the categories were determined based on differences and similarities [17]. The classification of primary codes and their relationship with new data and the formation of subcategories and categories were carried out by the research team on a regular basis. To confirm the coding process, the codes, categories, and subcategories were provided to four nursing students, who approved them.

2.6. Trustworthiness. Denzin and Lincoln have proposed four criteria of credibility, transferability, dependability, and confirmability for assessing interpretive research [18], which were used in this study. To increase the credibility of the data, the researcher tried to convey the feeling of comfort and security to the participants, so that they could easily talk about and explain the reasons for self-medication. Moreover, the texts of interviews were shared with the participants for more certainty. To enhance the transferability of the results, the phenomenon of self-medication was thoroughly investigated, and the participants' characteristics such as age and sex were described. The results of this study were also given to four students, including two undergraduate and two graduate students to compare with their experiences in order to confirm the codes, subcategories, and categories. To increase the dependability of the data, all stages of the study were described step by step to be easily verified during external auditing. To increase the confirmability of the data, some of the interviews and transcriptions along with the coding were provided to two research colleagues who were expert in qualitative research and were not part of the research team in order to confirm the accuracy of the coding process.

2.7. Ethical Considerations. The Ethics Committee of Kermanshah University of Medical Sciences approved the study. The objectives of the study were explained to all participants, and informed written consent was obtained from all of them. Participants were reassured about the anonymity and confidentiality of their personal information. To protect anonymity, participants' identical information was coded in written documents as well as when sent to other researchers and external audit. The audio files were also saved by the corresponding author in a file with a username and password. In addition, the personal information of the participants is not mentioned in the paper, and this data will be protected forever by the corresponding author.

3. Results

The mean age of the participants was 26.5 ± 4.8 years. Seven of them were undergraduate students and eight of them were postgraduate students. Furthermore, nine of them were female and six were male. After analyzing the data, five main categories and fifteen subcategories were developed. The main categories included individual factors, economic factors, physician-related factors, culture, and media impact (Table 1).

4. Individual Factors

In the present study, the individual factors related to self-medication were expressed in six subcategories, including "having medication information, having previous experience, easy access to medicine, not having enough time, access to medical staff, and not taking the disease seriously."

Table 1: Categories and subcategories related to the nursing students' perspectives about the reasons for self-medication.

Categories	Subcategories
Individual factors	Having medication information Having previous experience Easy access to medicine Not having enough time Access to medical staff Not taking the disease seriously
Economic factors	Cost of a doctor's visit Cost of paraclinical services Travel cost
Physician-related factors	Crowded doctors' offices Inadequate respect for patient privacy Doctors' low-quality visit
Cultural factors	Acceptance of self-medication in society
Media impact	Pharmaceutical advertising Information explosion

4.1. Having Medication Information. All participants considered their field of study one of the reasons for self-medication and believed that they were familiar with illnesses and medications through their nursing education. They also believed working with physicians and clinicians increased their awareness of the treatment of many illnesses. One of the participants in this regard stated *"My field of study affects my self-medication because I study extensively. Also, as we work with physicians, we use their experiences"* (participant no. 4).

Another participant said *"Nursing students are familiar with a variety of diseases and medications, and this is one of the reasons for self-medication. Passing four credits of pharmacology in the first semester is effective in self-medication"* (participant no. 14).

4.2. Having Previous Experience. Having a positive or negative previous experience of self-medication is an important factor in performing self-medication. This experience can be related to the person or his/her friends and relatives.

> *"When I go to a doctor for a particular problem and receive certain medications, I use the same medications next time I develop the same problem and have the same symptoms"* (participant no. 15).
>
> *". . .. if my friends or relative who have the same symptoms recommend me to use certain medications, I will use them because I know that they have used them before and have become well"* (participant no. 2).

4.3. Easy Access to Medicine. The sale of medication by pharmacies without a doctor's prescription is one of the main reasons for self-medication. Unfortunately, some pharmacies provide the requested medication to clients without informing them about the risks of self-medication.

A participant in this regard stated "*One of the reasons for self-medication is easy access to medicine in the pharmacy*" (participant no. 8).

Another interviewee commented *"The availability of medications affects self-medication, and currently the sale of over-the-counter medication is excessive. When medications are available, people may easily buy and take them on others' recommendation"* (participant no. 5).

4.4. Not Having Enough Time. Nursing students have an intensive curriculum from morning to evening and do not have enough time to visit a doctor or go to a medical center, so they may opt for self-medication.

One of the participants said:

> *"I attend classes from morning to evening, and if I get sick, I do not have a chance to see a doctor"* (participant no. 1).
>
> *"Many doctors are in the office until 8 pm, and it is closed when I get to the office from school"* (participant no. 12).

4.5. Access to Medical Staff. One of the reasons that can play a role in self-medication is the presence of a nurse or doctor among the family members, friends, and relatives. However, these doctors and nurses may be consulted due to their knowledge of various diseases.

> *"My friend is a specialist. Whenever I have a question about the treatment of a certain disease, I ask him"* (participant no. 5).

4.6. Not Taking the Disease Seriously. A person's attitude toward health is effective in his/her treatment process. Unfortunately, someone who does not value his/her health does not take his/her illness seriously and tries to self-medicate.

> *"Some students do not take their illness seriously and therefore try to self-medicate"* (participant no.3).
>
> *"Some do not take their illness seriously at all and try to treat it arbitrarily"* (participant no. 5).

5. Economic Factors

There is a close relationship between economic status and the desire for self-medication. Inadequate economic situation can be the basis of self-medication, which was mentioned in the statements of all participants. This category included the subcategories cost of a doctor's visit, cost of paraclinical services, and cost of travel.

5.1. Cost of a Doctor's Visit. In Iran, some doctors do not have an insurance contract, and the patient has to pay for the visit out of pocket. However, for those doctors who have a contract with insurance companies, their visit costs a significant amount. For this reason, they preferred to treat themselves rather than to see a doctor.

> *"The cost of a doctor's visit is very high and my income is limited, this prevents me from visiting a doctor, and I have to do self-medication"* (participant no. 4).
>
> *"Many doctors do not have insurance contracts, and we have to pay all the cost for the visit out of our own pocket, which is a significant amount"* (participant no. 2).

5.2. Cost of Paraclinical Services. Sometimes laboratory tests and radiographic examinations are needed to make a medical diagnosis, which are expensive. Some participants stated that in addition to the cost of visit, they also have to pay for paraclinical services; therefore, they do not go to see a doctor and do self-medication instead. One of the participants stated:

> *"Many doctors do laboratory and radiology studies such as ultrasonography to diagnose the disease, which costs me a lot as a student"* (participant no. 1).
>
> *"It's not just the visit cost, laboratory tests, radiography, and ultrasound are also too costly"* (participant no. 11).

5.3. Travel Cost. The cost of commuting to doctors' offices or medical centers is high, which can lead to patients' use of self-medication. One participant stated: *"Someone who goes to the doctor is forced to travel across the city and spend lots of money on transport"* (participant no. 13).

Another participant said: *"I have to spend time and pay for travel expenses to visit a doctor, I do self-medication for simple illnesses instead"* (participant no. 9).

6. Physician-Related Factors

Self-medication was found to be partly associated with doctors. It included subcategories crowded doctors' offices, inadequate respect for patient privacy, and doctors' low-quality visit.

6.1. Crowded Doctors' Offices. The crowded doctors' offices and medical centers were another factor that was mentioned by the participants.

> *"It takes several months to visit some specialists, and the patient has no choice but to self-medicate"* (participant no. 3).
>
> *"Many doctors' offices are so crowded that I have to wait for hours, so I have no choice but to self-medicate"* (participant no. 7).

6.2. Inadequate Respect for Patient Privacy. Patient privacy should be a physician's priority, but some participants believed that this was not the case in some physicians' offices.

> *"I used to have too much acne, so I went to a skin clinic. When I arrived, students encircled me and I felt very bad. I felt like a lab mouse. It was very unpleasant for me; such things make you do self-medication"* (participant no. 9).
>
> *"In some doctors' offices, a secretary sends two or three patients to the doctor's room at the same time! How am I supposed to talk about my sexual organs in front of others? These make the patient self-medicate rather than go to visit a doctor"* (participant no. 10).

6.3. Doctor's Low-Quality Visit. Clinical examination is an important part of the diagnosis process. Some participants believed that some physicians do not examine the patient at all and only rely on a variety of expensive tests and high-resolution imaging for diagnosis. This factor leads to patients' reluctance to visit a doctor, so they perform self-medication.

> *"Some physicians only take into consideration the patient's complaints and do not examine him/her"* (participant no. 8).

Another participant stated *"Some physicians prescribe a comprehensive set of tests and imaging in the first visit and do not perform any physical examination, which is an important part of medical practice"* (participant no. 6).

7. Cultural Factors

Another factor that contributed to the participants' self-medication was culture. This category was mentioned by the participants and included a subcategory entitled acceptance of self-medication in society.

7.1. Acceptance of Self-Medication in Society. Self-medication is closely related to the culture of society. In the Iranian society, self-medication is common and accepted, and a significant proportion of Iranians think that medicine is needed for any particular disease. Others think that the other persons' disease is similar to theirs; therefore, they arbitrarily take the same drugs.

> *"In society, if someone gets sick, he/she first seeks treatment from friends and acquaintances, and people not only do not have a bad attitude toward this type of behavior, but also*

> *recommend various treatments to him/her"* (participant no. 3).

> *"Unfortunately, self-medication is a socially accepted behavior, and people who recommend medication to others are considered literate"* (participant no. 7).

8. Media Impact

All participants repeatedly mentioned the role of mass media in promoting the phenomenon of self-medication. This category included two subcategories entitled pharmaceutical advertising and information explosion.

8.1. Pharmaceutical Advertising. Mass media have a profound effect on the members of society, but they are like a double-edged sword that can either make the public aware of the dangers of self-medication or take steps to spread the ominous phenomenon of self-medication by distributing the advertisements of various pharmaceutical companies.

"Satellite networks, newspapers, and magazines play an important role in encouraging people to use a variety of chemical and herbal remedies for weight loss, height growth, and so on" (participant no. 2).

8.2. Information Explosion. Today, information explosion is occurring in all fields, including medical knowledge. A simple search on Google can yield a large amount of information about various diseases and their treatments. All participants reported they had easy access to medical information through the media, especially the Internet.

> *"When I get sick, I go online and search my illness, and according to the symptoms, I take medications"* (participant no. 8).

9. Discussion

The purpose of this study was to explain the reasons for self-medication from the perspective of Iranian nursing students. The results showed that one of the reasons for self-medication was related to individual factors, including having medication information, having previous experience, easy access to medicine, not having enough time, access to medical staff, and not taking the disease seriously. Previous studies have reported reasons such as previous self-medication experience [2, 9, 19–21], availability of drugs [2, 10, 22–24], having sufficient medical knowledge [2, 9, 25–27], lack of time [2, 24, 28], access to medical staff [2], and non-seriousness of the disease [2, 24] for self-medication. However, it should be noted that there is a possibility of misdiagnosis by students that can exacerbate the risks of self-medication [4].

Another reason for self-medication from the perspective of participants was economic factors. In this regard, the participants mentioned reasons such as cost of a doctor's visit, cost of laboratory tests, and transportation cost, which are in line with previous studies [2, 20, 29–31]. Students are financially dependent on their family and may not be able to pay for their treatments, which is a great incentive for self-medication.

Another reason for self-medication was related to the physicians. In this regard, the participants noted reasons such as crowded offices, lack of patient privacy, and poor quality of visits. Previous studies have also reported reasons such as distrust in the physician's diagnosis [25, 32, 33], crowded physicians' offices [4, 9, 33], and lack of attention to patient privacy [2, 34, 35].

Cultural reasons for self-medication were also reported by the participants, which included the subcategory of acceptance of self-medication in society. The belief in the indiscriminate use of various medicines as well as the safety of self-medication is rooted in the culture of the society. In this regard, evidence indicates that the cultural context is one of the reasons for self-medication [12, 36]. The results of a systematic review showed that the main reasons for self-medication with antibiotics in the Middle East were sociocultural factors and economic reasons [21].

9.1. Study Limitation. Due to the impact of various factors, including cultural, social, and economic, on self-medication, the generalizability of the results is limited.

10. Conclusion

The results showed that social media such as the Internet and satellite play a role in self-medication, and following drug advertisements and online information can be dangerous. Mass media play an important role in promoting public health by institutionalizing the culture of visiting a physician instead of performing self-medication. Given the dangers of self-medication, the health policymakers must adopt strict policies for pharmacies that sell over-the-counter drugs. Developing training programs to change nursing students' attitudes toward self-medication can also be helpful. Similar studies are recommended to be conducted on students of different disciplines. However, self-medication is a common issue among nursing students and should be tailored to suit any context. In this regard, researchers can examine the effects of intervention measures on the students' self-medication rate by considering the reasons for self-medication.

Data Availability

The identified datasets analyzed during the current study are available from the corresponding author on reasonable request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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Research Article

Perceived Caregiver Strain, 3- and 18-Month Poststroke, in a Cohort of Caregivers from the Life after Stroke Trial (LAST)

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Aim. To gain more knowledge of caregiver strain in the Life After Stroke Trial (LAST) population. *Methods*. This is a substudy of the LAST study, including all caregivers' reports of perceived Caregiver Strain Index (CSI) at inclusion and 18-month follow-up irrespective of group allocation. The checklist "STROBE Statement—Checklist of items that should be included in reports of cohort studies" was used. Caregivers to adults (age ≥18 years), here defined as the person living with, a patient with a first-ever or recurrent stroke, community dwelling, with modified Rankin Scale (mRS) <5 and no serious comorbidities, was invited to fill out the Caregiver Strain Index at three months (10–16 weeks) poststroke. Domains indicating differences of change in perceived strain in the total sample were analyzed in a linear regression analysis. *Results*. Caregiver strain ($n = 147$) varying from 5% to 27% was reported by the caregivers at baseline and between 2% to18% at 18-month follow-up. The items indicating the highest level of strain at baseline and 18 months were as follows: "Care giving is confining," "There have been changes in personal plans," "There have been emotional adjustments," and "I feel completely overwhelmed." The samples were divided into age groups 0–79 years and 80–100 years, indicating a higher strain on the caregiver for persons 80–100 years at 18 months. *Conclusion*. Caregiver strain was relatively low both at baseline and at 18-month follow-up. Main caregiver strains were reported in terms of a sense of confinement, a tendency of emotional strain, and the altering of plans at both time points. Depression was one of the main explanatory factors for the perceived caregiver strain. The perception of caregiver strain was higher in age groups 80–100 years than age groups 0–79 years.

1. Introduction

Most of the long-term care for chronically disabled elders is provided by informal caregivers. Caregiving has been recognized as an activity that both confers perceived benefits and produces caregiver strains. The caregiver strain is a complex construct, usually defined by its impact and consequences for the caregiver [1]. It can be an important way of coping with stress, contributing to "meaning-based coping" by the caregiver [2]. But informal caregivers, family members, friends, or neighbors, are unpaid individuals who may provide as much as 90% of the in-home long-term care without compensation [3]. For many caregivers, caregiving is a job that is stress filled, overwhelming, and isolating. Emotional, psychological, physical, and economic impacts of caregiving have been used to define and assess caregiver strain [1]. Caregivers may be prone to depression, grief, fatigue, and changes in social relationships and/or, experience physical health problems of their own [4].

Caregiver strain has been broadly classified into two categories: objective and subjective caregiver strains [5].

Objective caregiver strain refers to its physical effect on the other household members for day-to-day tasks they undertake for the "patient," such as the time invested by the caregiver on helping, supervising, and feeding him or her [6]. It also includes their experiences of family disturbance and relationship problems, and loss of employment and/or leisure because of the caregiving tasks [7].

The perceived subjective caregiver strain relates to the psychological, social, and emotional impacts that caregivers may experience [8]. Experiences of changes of roles, feelings of guilt, shame, embarrassment, and self-blame in families of people with chronic illness have been revealed in several studies [9–11].

The perceived caregiver strain is universal, independent of the type of chronic disease. However, stroke caregivers have to cope with variable levels of cognitive deficits and/or physical disability that imply considerable objective and subjective caregiver strain [12]. In addition, stroke caregivers are possibly older persons and may be experiencing challenges in their own health [13], which cause levels of anxiety and depression above normal [14].

Despite this knowledge, little attention is paid to caregivers of persons with stroke [15] and the phenomenon of being an informal caregiver to a home-dwelling family member suffering from stroke is little explored.

The aim of this substudy was to gain more knowledge of caregiver strain including the caregiver's perception of domains of strain poststroke.

2. Materials and Methods

This is a substudy of the Life After Stroke Trial (LAST) study of caregiver strain [16]. The LAST study was a multicentre, pragmatic, single-blinded, randomized controlled trial performed at two centres in Norway (Trondheim University Hospital and Bærum Hospital), in close collaboration with the primary healthcare service in the municipalities of Trondheim, Asker, and Bærum to evaluate a longitudinal follow-up of coaching and physical activity, and details of this randomized controlled trial are provided in reference [16].

The results of this trial were neutral, so this substudy entails all caregivers irrespective of group allocation. The material was analyzed as one sample of caregivers. Caregiver strain was evaluated with a questionnaire screening at two time points at 3- and 18-month poststroke in the total cohort of caregivers. The STROBE Statement—Checklist was used ("STROBE statement Strengthening the reporting of observational studies in epidemiology").

Ethical approval for the trial was granted by the Central Regional Committee for Medical and Health Ethics (REC no. 2011/1428).

2.1. Subjects. Caregivers to adults (age ≥18 years), here defined as the person living with, a patient with a first-ever or recurrent stroke, community dwelling, with modified Rankin Scale (mRS) <5 and no serious comorbidities, was invited to fill out the Caregiver Strain Index at three months (10–16 weeks) poststroke. Data were collected indirectly, and questionnaires have been delivered to caregivers, husbands, or wives, if they met with their partner at test, both at inclusion and at 18 months follow-up. Alternatively, it was sent with the participant for delivery at home with cohabitant caregivers. Answers were sent back in prepaid envelopes. Sex and marital status but no other descriptive data of the caregivers were recorded. Only data from respondents and the person with stroke are included in the analyses.

2.2. Baseline Characteristics. Baseline variables of the patient population were age, sex, and marital status. In addition, Barthel Index (BI), Modified Rankin Scale (mRS), Gait speed, six-minute walk test (6MWT), Hospital Anxiety and Depression Scale (HADS), and Mini-Mental State Examination (MMSE) were used to describe their functional, physical, cognitive, and emotional levels at baseline [16]. In addition, the caregivers were invited to fill out Caregiver Strain Index (CSI) at baseline and at 18-month follow-up, which is the outcome reported in this substudy.

2.3. Caregiver Strain Index. The Caregiver Strain Index (CSI) was developed in 1983 [17] and is an easy-to-use tool that can quickly screen for caregiver strain in long-term caregivers. The tool has 10 questions that measure different domains of strain related to care provision [17]. The replies are categorized as yes/1 and no/0 answers, for example: "I am going to read a list of things that other people have found to be difficult. Would you tell me whether any of these apply to you? Sleep is disturbed (e.g., because . . . is in and out of bed or wanders around at night") [18]. It may be used to assess individuals of any age who have assumed the caregiving role of an older adult. The internal reliability coefficient is reported for the CSI in 1983 (0.86), as well as a cutoff score of 7 or more positive items, indicating higher levels of stress underpinning the need for further assessment [17]. Minimal detectable change is reported as ±2.8 [19]. The Caregiver Strain Index has been reported to be reproducible, but only moderately responsive, when measuring caregiver strain perceived by caregivers of stroke patients [17, 19].

2.4. Analysis. Descriptive data of the persons with stroke whose caregivers answered the Caregiver Strain Index are presented as mean (SD), frequencies, and percentages. Caregivers' perceived caregiver strain is presented in frequencies and percentages.

Domains indicating differences of change in perceived strain in the total sample were further analyzed in a linear regression analysis. The items were entered as dependent factors, with age, sex, BI, 6MWT, HADS-D, and mRS as independent factors. The independent variables were tested individually for their associations and included in the multiple linear regression analysis if they reached the predefined statistical levels of $p < 0.2$. Residuals of the regression models were tested for normality using the Shapiro–Wilks test. The alpha level was set to $p < 0.05$.

3. Results

Table 1 lists the characteristics of the patient population divided into groups of perceived strain at both 3 and 18 months, as well as dropouts. Total CSI forms received at

Table 1: Baseline demographic and clinical characteristics in mean (m) and standard deviation (SD). In persons with stroke divided into groups of reported change in Caregiver Strain Index (CSI), in frequencies (n) and percentages (%), between 3 and 18 months.

	Improved ($n = 7$)	Minor/no difference baseline/18 mo ($n = 130$)	Deteriorated ($n = 10$)	No data CSI ($n = 233$)
Age (m; SD)	67.3 (9.6)	70.9 (10.5)	73.2 (10.1)	72.7 (11.7)
Gender females/males (n, %)	2 (29%)/5 (71%)	51 (39%)/79 (61%)	5 (50%)/5 (50%)	91 (39%)/142 (61%)
Civil status single/cohabitant (n, %)	3 (43%)/4 (57%)	36 (28%)/94 (72%)	2 (20%)/8 (80%)	65 (28%/168 (72%)
Barthel Index (m; SD)	94.29 (6.1)	96.87 (7.64)	95.5 (6.4)	95.2 (8.9)
Barthel Index 18 mo (m; SD)	96.43 (4.8)	96.56 (9.86)	87.48 (19.0)	84.66 (30.9)
6MWT[1] baseline (m; SD)	457.5 (55.1)	445.93 (147.2)	352.5 (178.4)	389.23 (153.4)
6MWT 18 mo (m; SD)	453. 20 (115.2)	455.16 (124.8)	379.0 (187.8)	361.29 (198.8)
Gait speed baseline m/s (m; SD)	1.22 (0.6)	1.48 (0.6)	1.46 (0.6)	1.25 (0.5)
Gait speed 18 mo·m/s (m; SD)	1.57 (0.7)	1.48 (0.6)	1.23 (0.6)	0.81 (0.7)
MMSE[2] baseline (m; SD)	26.86 (2.9)	28.12 (2.3)	28.1 (2.1)	27.9 (2.3)
MMSE 18 mo (m; SD)	28.7 (1.9)	27.97 (2.5)	26.6 (5.5)	27.4 (3.6)
HADS[3] baseline (m; SD)	3.0 (2.3)	2.55 (2.6)	4.22 (5.3)	3.69 (3.1)
HADS 18 mo (m; SD)	2.86 (3.6)	3.0 (2.82)	5.8 (5.9)	3.81 (3.0)
TMT-A[4] baseline s (m; SD)	61.5 (33.5)	57.58 (28.6)	92.5 (60.0)	64.53 (36.9)
TMT-B[5] baseline s (m; SD)	2.86 (3.6)	143.92 (70.4)	196.83 (95.8)	138.51 (77.4)
TMT-A 18 mo s (m; SD)	51.29 (23.1)	63.31 (42.4)	72.56 (54.5)	62.2 (36.8)
TMT-B 18 mo s (m; SD)	154.57 (92.3)	140.06 (76.9)	122.80 (54.1)	125.09 (68.5)
mRS baseline (m; SD)	1.3 (1.3)	1.34 (1.1)	1.57 (1.4)	1.51 (1.1)
NIHSS[6] total baseline	1.2 (1.6)	1.5 (2.5)	1.5 (1.6)	1.5 (2.2)

[1] 6MWT = 6 minute walk test, [2] MMSE = minimal mental status evaluation, [3] HADS = hospital anxiety and depression scale, [4] TMT-A = trail making test A, [5] TMT-B = trail making test B, [6] NIHSS = the national institutes of health stroke scale. mo, months.

baseline were 269 and 174 at 18-month follow-up, with a total of 147 completing CSI at both baseline and 18 months. The majority answering the questionnaire were caregivers of male stroke participants at baseline ($n = 161$, 60%) and 18 months ($n = 106$, 61%). The respondents were cohabiting/married to the person with stroke and of approximately the same age (Table 1).

Caregiver strain ($n = 147$) was reported as low as 5% (answering "yes, financial strain") and up to 29% ("I feel completely overwhelmed") by the caregivers at baseline (Table 2) [17]. The items indicating the highest level of strain at baseline were as follows: "Caregiving is confining" (24%), "There have been changes in personal plans" (27%), and "There have been emotional adjustments" (26%) and "I feel completely overwhelmed" (29%). At 18-month follow-up, the same tendency remained but now varying with a slightly lower perception of caregiver strain with 2% "yes" answers ("Caregiving is a physical strain") to 18% ("I feel completely overwhelmed") (Table 2). Items indicating most strain at this time point were as follows: "There have been changes in personal plans" (15%), "There have been emotional adjustments" (17%), and "I feel completely overwhelmed" (18%). In general, CSI scores indicated no change/less perceived strain from baseline to 18 months (Table 3). Twelve percent of the participants had a minimal detectable change ±2.8 of total score, of which 6% was a change for the better (19).

In this study, including 269 caregivers of persons with stroke, 40% were females ($n = 108$) and 60% males ($n = 161$) at baseline. One hundred and ninety-seven persons with stroke ($n = 197$) were 0–79 years of age, 38% females ($n = 74$) and 62% males ($n = 123$) and ($n = 72$) were ≥80 years of age, 34 women (47%), and 38 men (53%).

The sample divided into age 0–79 years and ≥80 years indicated a higher strain on the caregiver for persons ≥80 years, especially at 18 months (Table 4). The domains "Caregiving is inconvenient" both at baseline and 18 months, "Caregiving is confining," and "There have been emotional adjustments" at 18 months indicated a perceived higher strain in the caregiving (for a person ≥80 years of age). In addition, financial strain in the same group showed a tendency to increase, at the 18-month follow-up. When divided into gender groups, female caregivers for persons with stroke ≥80 years reported worse sleep at baseline and 18 months. Male caregivers reported higher emotional strain in persons with stroke ≥80 years at baseline and 18 months.

In terms of change between 3 and 18 months, two domains were reported significantly changed (Table 2) and were further analyzed in a regression analysis. In the domain, "there have been other demands on my time," the main explanatory independent factor was depression (HADS-D, $\beta = 0.212$, $p = 0.01$) with $R^2 = 0.08$ at 18 months. The second domain, "I feel completely overwhelmed," the explanatory independent factors at baseline, 3 months, were age ($\beta = -0.235$, $p = 0.001$), BI ($\beta = -0.153$, $p = 0.0025$), 6 MWT ($\beta = -0.166$, $p = 0.003$) and HADS-D ($\beta = 0.168$, $p = 0.01$) with an $R^2 = 0.137$. At 18 months, HADS-D was the main explanatory independent factor ($\beta = 0.196$, $p = 0.019$) with $R^2 = 0.074$ for the same domain.

4. Discussion

In this sample of relatively highly independent persons with stroke, included 3-month poststroke, the caregiver strain, defined as >7 positive answers on total CSI, indicates a slight decrease in perceived caregiver strain over time in the total

Table 2: All reported answers of Caregiver Strain Index (CSI) items at baseline 3 and 18-month follow-up. The yes/no answers are reported in frequencies (*n*) and percentages (%). In addition, a total score of more than 7 positive answers is reported reflecting a high burden of caregiver strain.

CSI items	Baseline 3 months	18 months
My sleep is disturbed	($n = 269$)	($n = 175$)
Yes	42 (16%)	20 (11%)
No	227 (84%)	155 (89%)
Caregiving is inconvenient	($n = 266$)	($n = 170$)
Yes	32 (12%)	14 (8%)
No	234 (88%)	156 (82%)
Caregiving is a physical strain	($n = 264$)	($n = 174$)
Yes	12 (5%)	4 (2%)
No	252 (95%)	170 (98%)
Caregiving is confining	($n = 266$)	($n = 174$)
Yes	63 (24%)	23 (13%)
No	203 (76%)	151 (87%)
There have been family adjustments	($n = 266$)	($n = 172$)
Yes	41 (15%)	17 (10%)
No	225 (85%)	155 (90%)
There have been changes in personal plans	($n = 265$)	(173)
Yes	72 (27%)	26 (15%)
No	193 (73%)	147 (85%)
There have been other demands on my time	($n = 267$)	($n = 173$)
Yes	46 (17%)	12 (7%)
No	221 (83%)	161 (93%)
There have been emotional adjustments	($n = 264$)	($n = 174$)
Yes	69 (26%)	29 (17%)
No	195 (74%)	145 (83%)
Caregiving is a financial strain	($n = 267$)	($n = 174$)
Yes	15 (6%)	7 (4%)
No	252 (94%)	167 (96%)
I feel completely overwhelmed	($n = 266$)	($n = 172$)
Yes	78 (29%)	31 (18%)
No	188 (71%) ($n = 242$)	141 (82%) ($n = 122$)
(i) Total score of 7 positive answers	$n = 10$ (4%)	$n = 15$ (12%)

Table 3: Caregivers divided into groups, based on level of perceived strain, and comparisons of change in Caregiver Strain Index domains between 3 and 18 months, in frequencies (*n*) and percentages (%).

	Improved	No/minor change	Deteriorated
My sleep is disturbed $n = 147$	7 (4.8%)	130 (88.4%)	10 (6.8%)
Caregiving is inconvenient $n = 140$	12 (8.6%)	121 (86%)	7 (5%)
Caregiving is a physical strain $n = 143$	1 (0.7%)	140 (97.9%)	2 (1.4%)
Caregiving is confining $n = 142$	18 (12.7%)	115 (81%)	9 (6.3%)
There have been family adjustments $n = 140$	9 (6.4%)	122 (87%)	9 (6.3%)
There have been changes in personal plans $n = 139$	17 (12.2%)	111 (79.9%)	11 (7.9%)
There have been other demands on my time $n = 143$	14 (9.8%)	127 (88.8%)	2 (1.4%)
There have been emotional adjustments $n = 142$	12 (8.5%)	123 (86.6%)	7 (4.9%)
Caregiving is a financial strain $n = 143$	4 (2.8%)	134 (93.7%)	5 (3.5%)
I feel completely overwhelmed $n = 142$	27 (19%)	103 (72.5%)	12 (8.5%)
Total score $n = 142$	36 (25%)	88 (62%)	18 (13%)

sample. The main domains of caregiver strain were an inconvenience, sense of confinement, tendency to need emotional adjustments, and altering of plans at both time points (Table 2). There was, however, a perception of higher strain in age groups ≥80 years of age, which is in line with earlier studies on the subject [13, 14].

The responses "Caregiving is confining" and "There have been emotional adjustments" both indicated higher strain in the assumed older caregivers than with the "younger" 0–79 years of age (Table 4). This may be related to the caregiver's health, which may suffer due to not being able to (confining) maintain physical and psychological social interactions with "others" (participation) because of duties within the home and in relation to the person with stroke [20, 21]. It may also be an interaction with the persons with stroke's worsening health/disability, since physical functioning in general deteriorated between baseline and 18-month follow-up [16, 22]. The tendency of emotional strain has been reported

Table 4: All answers of the Caregiver strain index (CSI) at baseline and 18-month (mo) follow-up in groups divided in age groups 0–79 years and >80 years, with yes/no answers in answer frequencies (n) and percentages (%).

	Baseline	18 mo	Baseline	18 mo
Items (n; %)	Age 0–79 $n = 197$	Age 0–79 $n = 139$	Age ≥ 80 $n = 72$	Age ≥ 80 $n = 36$
My sleep is disturbed				
Yes	29 (15%)	13 (9%)	13 (18%)	7 (19%)
No	168 (85%)	126 (91%)	59 (82%)	29 (81%)
Caregiving is inconvenient				
Yes	18 (9%)	5 (4%)	14 (19%)	9 (26%)
No	176 (91%)	130 (96%)	58 (81%)	26 (74%)
Caregiving is a physical strain				
Yes	9 (5%)	3 (2%)	3 (4%)	1 (3%)
No	186 (95%)	135 (98%)	66 (96%)	35 (97%)
Caregiving is confining				
Yes	46 (24%)	12 (9%)	17 (24%)	11 (31%)
No	149 (76%)	126 (91%)	54 (76%)	25 (69%)
There have been family adjustments				
Yes	26 (13%)	10 (7%)	15 (21%)	7 (21%)
No	168 (87%)	128 (93%)	57 (79%)	27 (79%)
There have been changes in personal plans				
Yes	50 (26%)	16 (12%)	22 (31%)	10 (28%)
No	145 (74%)	121 (88%)	48 (69%)	26 (72%)
There have been other demands on my time				
Yes	34 (17%)	9 (7%)	12 (17%)	3 (8%)
No	162 (83%)	128 (93%)	59 (83%)	33 (92%)
There have been emotional adjustments				
Yes	53 (27%)	18 (13%)	16 (24%)	11 (69%)
No	143 (73%)	120 (87%)	52 (76%)	25 (31%)
Caregiving is a financial strain				
Yes	9 (5%)	7 (5%)	6 (9%)	35 (100%)
No	188 (95%)	132 (95%)	64 (91%)	—
I feel completely overwhelmed				
Yes	59 (30%)	24 (18%)	19 (27%)	7 (20%)
No	137 (70%)	113 (82%)	51 (73%)	28 (80%)

in caregivers of persons with stroke in terms of depression but also in terms of perceived quality of life [20]. The emotional strain in the caregivers has also been related to the level of disability of the person with stroke [20, 22].

In the acute and postacute stages, the tendency of total life crisis, both for the person with stroke and also for their next of kin, has been well described [11]. The last item "I feel completely overwhelmed" was reported relatively high at baseline and slightly less at 18 months, in line with those reports [12]. In addition, there was no difference between 0–79 years or ≥80 years of age, indicating that the global perception of a severe life crisis was present in the subacute phase but subdued over time (Table 2). The reason for this may be twofold: it may reflect that the persons with stroke were relatively high functioning and had no cognitive deficits (Table 1). Another reason may be that the municipal services are well developed in Norway, relieving financial and physical strains. This relatively low perception of caregiver strain may be a reflection of the fact that services for formal care are satisfactory for this group of relatively high functioning persons with stroke and their caregivers [23].

However, there were tendencies for an increased caregiver strain with higher age in the 18-month follow-up, indicating a change for the worse, which may be related to both the person with stroke and their caregiver's health combined with general ageing (Table 4) [24].

The item "financial strain" was reported by 5% in the age group ≥80 years and 9% in the group 0–79 years at baseline, again perhaps mirroring a well-functioning welfare state with a functioning social security system for the majority [20]. On the other hand, at 18 months, the financial strain in the group ≥80 was reported to have increased (Table 4). This may indicate that those caregivers/persons with stroke encounter increased financial problems in a longitudinal perspective perhaps related to health issues and disability, which may lead to the reduced working capacity for both the person with stroke and their caregiver [20, 24].

Interestingly, the explanatory factor for the domains changing significantly for the worse in terms of perceived strain was depression in the person with stroke, in line with other studies [15]. Depression has also been related to the reported feelings of being overwhelmed and suffering emotional strain [12].

4.1. Limitations.

There are several limitations to this substudy. First, the main study was a randomized controlled study but not a prospective cohort including all persons with stroke and their next of kin. The results can only be transferable to persons with stroke with the inclusion criteria of the trial and their married or cohabiting partners. The recruitment of caregivers was in most cases indirect via the person with stroke and the sample may not be representative for a general population of caregivers to persons with stroke. In addition, a relatively high drop-out rate of informants of caregiver strain was registered at 18 months, which makes it challenging to compare the findings from baseline and 18-month follow-up. Furthermore, any in-depth description of caregivers is lacking. However, the sample was large compared to other studies on the subject. The informants were recruited from urban areas, not representing the rural and more sparsely populated areas, which limits the generalizability of the results. The results may be indicative for groups with minor to moderately disabled persons with stroke and their partners and may serve as indicators for the needs in this group of caregivers.

5. Conclusion

In this sample of relatively independent persons with stroke, including 3 months poststroke, caregiver strain was relatively low both at baseline and at 18-month follow-up. Main caregiver strains were reported in terms of a sense of confinement, a tendency for emotional strain, and the alteration of plans at both time points. Depression was one of the main explanatory factors for the perceived caregiver strain. The perception of caregiver strain was higher in age groups ≥80 years than age groups 0–79 years.

5.1. Relevance to Clinical Practice. The items indicating the highest level of strain at baseline and 18 months were related to psychological adjustments (“Caregiving is confining” (24% vs. 13%), “There have been emotional adjustments” (26% vs. 17%), “I feel completely overwhelmed” (29% vs. 18%)), and practical issues (“There have been changes in personal plans” (27% vs. 15%)). This indicates a need for supportive psychological and practical services for caregivers during and after rehabilitation, which nurses have an opportunity to initiate to alleviate caregiver strain.

Data Availability

Data are available on request to the authors.

Conflicts of Interest

The authors report that they have no conflicts of interest.

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Research Article

Use of Foundational Knowledge as a Basis to Facilitate Critical Thinking: Nurse Educators' Perceptions

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Critical thinking frequently involves the ability to interpret information and make informed decisions based on such information, which usually includes foundational knowledge. There is a need in nursing practice for graduates with critical thinking skills to enable them to make informed clinical decisions that will benefit patients. The facilitation of critical thinking has been elusive to many nurse educators. Critical thinking (CT) is not taught in a vacuum, but integration into content has been found to be beneficial in its facilitation. Consideration of foundational knowledge as a basis for facilitation of CT during teaching and learning remains a challenge in nursing education. This paper explored and described the perception of nurse educators on how foundational knowledge can be used as a basis to facilitate CT during teaching and learning. A qualitative, exploratory, and descriptive design that is contextual in nature was employed. A sample of thirteen ($n = 13$) nurse educators was purposively selected, and data were collected through unstructured individual interviews. The collected data were transcribed verbatim and analysed using Tesch's method of qualitative data analysis. The following themes emerged from the analysed data: (i) conducive environment for thinking; (ii) facilitation strategies to stimulate foundational knowledge; and (iii) foundational, conceptual, and procedural knowledge. It was concluded that CT does not take place in a vacuum and therefore foundational knowledge will be used by students in class to answer questions and in clinical settings as they reason about patients' health problems and to come up with relevant and accurate care plans. They will use the foundational knowledge as an anchor upon which they construct new knowledge using their facilitated CT skills.

1. Introduction

Foundational knowledge is the original knowledge upon which new knowledge is built. It can take the form of knowledge of a problem, the solution and foundational competencies that include capacity for critical thinking [1]. It further includes the domain knowledge acquired through education and practice experience in a particular field [2]. Foundational knowledge is made up of the facts, theories, principles, methods, skills, terminology, and modes of reasoning that are essential to more advanced or independent learning in an academic discipline [3]. Students in nursing programmes are expected to identify, explain, and apply foundational concepts, terms, and nursing-related theories to practice. It is mandatory for students to have foundational knowledge as a prerequisite for other courses as they progress from one level to another; for example, the foundational knowledge of sociology is required for holistic care of patients [4]. Foundational knowledge is activated as students return to basic knowledge involving clarification of terminology, distinction between related terms, analyses of definitions considering ensuing learning, and contradictions in the application thereof [5].

Foundational knowledge refers to the basic information that students need to solve problems and construct new knowledge [1]. All nursing students learn from the same body of nursing knowledge that allows for greater depth and breadth of foundational knowledge [4]. On the other hand, CT is the intellectually disciplined process of actively and skillfully conceptualizing, analysing, evaluating, and synthesizing information as a guide to belief and action [6].

Facilitation of critical thinking involves the use of foundational knowledge and skills. Nurse educators are required to tailor didactic activities to meet the learning needs of students and outcomes, as well as fostering engagement in CT using foundational knowledge as a base. The challenge is in the understanding that CT does not take place in a vacuum but is in a context of domain-specific foundational knowledge [7]. This raises the question of how foundational knowledge can be used as a basis to facilitate CT.

2. Materials and Methods

The researcher used a qualitative, exploratory, and descriptive design that was contextual in nature [8]. The design was found to be appropriate in that the nurse educators were given an opportunity of sharing their perceptions on how foundational knowledge is used to facilitate critical thinking. A purposive sample of thirteen ($n = 13$) nurse educators who taught in the undergraduate Bachelor of Nursing programme participated in the study. The sampling method was appropriate in that the participants gave in-depth information regarding the research topic.

2.1. Study Setting. The nursing department is located in the Faculty of Health Sciences at a university in Johannesburg. The research was conducted in a department of nursing, where the interviews took place in each participant's office where the researcher and the interviewee were present.

2.2. Participants. A purposively selected sample was approached face-to-face. The participant was selected based on their experience in teaching in higher education and their in-depth knowledge in nursing. The sampling method was suitable in that participants would be able to provide in-depth and meaningful information. The participants consisted of 13 nurse educators whose ages ranged from 30–60 years. Their experience of teaching in higher education ranged from 10–30 years. Four ($n = 4$) held a PhD qualification, while nine ($n = 9$) held a Masters qualification in nursing, also holding an additional qualification in nursing education and registered as such with the South African Nursing Council. Nurse educators who did not meet the inclusion criteria were excluded. The sample size was determined by data saturation which was reached at the tenth participant; however, further interviews were undertaken with the remaining three participants to confirm data saturation [8].

2.3. Data Collection Procedure. Data were collected on a date and time determined by the participants in their offices. Unstructured individual interviews were used to collect data from the participants who responded to the following central question: "How can foundational knowledge be used as a basis to facilitate critical thinking?" Follow-up questions were asked based on the participant's response. The participants consented to the use of an audiotape to record the interview to enable the researcher to obtain verbatim transcription of the data and field notes on their nonverbal cues. The interviews lasted for 60–90 minutes. The researcher used communication strategies, such as probing, paraphrasing, and reflecting to ensure the participants do not move off the focus of the study and to elicit the meaning and accuracy of the collected data. The interviews were held in English. The transcripts were taken back during analysis to the participants as a member checking procedure to ensure that the responses were accurately recorded, thereby establishing credibility, confirmability, and dependability of the data [9].

2.4. Ethical Considerations. The study was approved by the Ethics Committee of the Faculty of Health Sciences at the University of Johannesburg as a part of a PhD project (14/05/00). Signed informed consent was provided by the participants and participation was voluntary. Their anonymity and confidentiality were ensured in that neither their names nor information were used anywhere in the study. The participants were also made aware of their right to withdraw at any stage from the study without repercussions [10].

2.5. Analysis. The researcher and independent coder analysed the data using Tesch's eight-step open coding method of data analysis [11]. Recorded interviews were transcribed verbatim. This involved listening to the tapes and reading each transcript several times to get a sense of the whole and gain accurate information. The researcher wrote ideas as they came to mind. The most interesting and shortest interview was chosen and read through to look for underlying meaning in the information, while continuing to record any thoughts that came to mind in the margin.

After completing this task, a list of all the topics were made and similar topics were clustered together. The researcher then arranged the topics into columns that were assembled into major topics, unique topics, and leftovers. The list was examined against the original data. Abbreviations of topics were done as codes and these were written next to appropriate segments of the text to determine whether new categories emerged. The researcher found the most descriptive wording for the topics and arranged them according to the way they were related to each other. Lines were drawn between categories to show interrelationships. Finally, the researcher decided on the abbreviation of each category and the corresponding alphabetized codes. The material belongs to each category in one place and performed a preliminary analysis and the existing data were recoded.

The transcribed audio-taped interviews, field notes, and Tesch's protocol for data analysis were presented to an independent coder, who was purposively selected based on a PhD qualification and experience in the qualitative research method and data analysis methods. The independent coder analysed data independent of the researcher, after which a consensus meeting was held to compare data analysis and codes, further ensuring credibility and dependability of data analysis and findings. Trustworthiness was established using strategies of credibility through member checking, whereby themes were taken back to the participants to ensure accuracy and prolonged engagement. Dependability was ensured by providing detailed data of the methods used in the study and confirmability through keeping an audit trail. Lastly, transferability was established through the provision of detailed information that will enable prospective researchers to transfer findings to other contexts. The following themes emerged from the categories: conducive environment for thinking, strategies to stimulate foundational knowledge, and the use of critical thinking language.

3. Results

Thirteen ($n = 13$) nurse educators participated in the study. There were 10 women and 3 men, with teaching experience from 10–30 years. Their age ranged from 30 to 60 years. Data analysis yielded three themes, namely, (i) conducive environment for thinking, (ii) facilitation strategies to stimulate foundational knowledge, and (iii) foundational, conceptual, and procedural knowledge.

3.1. Conducive environment for Thinking. The nurse educator cited the importance of a conducive learning environment in the facilitation of critical thinking. Nurse educator P7 said: "Where there is trust, the learners will feel free to engage in discussions, arguments and sharing of ideas without fear of being judged. They will know that it is 'ok' to make mistakes." Another added that it is important to allow the students to engage freely with the classroom activities without fear of being ridiculed or made to feel stupid.

> I agree that an environment where there is trust the learners understand that they can challenge their own thinking and that of others, with the teacher included, without fear of victimization is one that is conducive to thinking. (P4)
>
> "Mutual respect between the nurse educator and students is also important, in that it will assure the students that their input is also valued and important. (P1)
>
> . . .the student must be made aware that in the critical thinking the nurse educator is a co-*learner.* (P2)

The classroom environment needs to be one where there is mutual trust between the nurse educator and students and among students themselves. This trust relationship will make the students feel psychologically safe and interact or voice their opinion [12].

3.2. Facilitation Strategies to Stimulate Foundational Knowledge. The nurse educators asserted that teaching strategies that will stimulate retrieval of foundational knowledge and the use thereof in critical thinking should be used. This was supported by the following assertions by the participants:

> The educator must use content and teaching strategies that will enable the student to use their foundational knowledge, such as concepts, categories and theories related to a discipline to enable them to use their facilitated critical thinking skills to build domain-specific knowledge. (P1)
>
> Questioning is one of the strategies that can be used to stimulate foundational knowledge that can be used as a base to facilitate critical thinking. (P9)
>
> Nursing discipline-specific knowledge construction depends on the foundational knowledge of subjects such as biological sciences through which critical thinking can be facilitated. (P5)

Foundational knowledge gives students confidence in practice with an understanding that they have a solid base upon which their critical thinking skills are developed. It is used to draw inferences from, deduce, or move inductively from to draw conclusions about the issue at hand through the application of CT. The participants said:

> . . .the ability to use foundational knowledge as a frame reference enables students to adopt the underlying perspectives, paradigms, processes, and methods of inquiry of one or more disciplines, which can in turn enable an interdisciplinary perspective through the application of their critical thinking skills. (P3)
>
> Critical thinking teaching methods, such as argumentation and group discussion should be used to stimulate the students to use their foundational knowledge to construct new knowledge for themselves through their critical thinking skills. (P6)
>
> The facilitated critical thinking skills will enable the students to learn meaningfully by drawing from their foundational knowledge to solve problems in a meaningful manner. (P12)

3.3. Foundational, Conceptual, and Procedural Knowledge. Foundational knowledge is used as a trigger to apply CT skills in emerging areas of science, in core courses of nursing science and research methods, prerequisite student knowledge and skills, and in-depth interdisciplinary training in supporting area of nursing content and methods [13]. The participants asserted that:

> Foundational knowledge aids the knowledge related to concept used in nursing. (P7)
>
> Using conceptual knowledge also brings into play the use of procedural knowledge that is applied to skills required in practice. (P4)
>
> Foundational knowledge serves as a conception from which the students pull out concepts that they use to analyse, apply knowledge, and make sense of what is being taught. (P2)
>
> It will be difficult for the student to think critically about the taught content if they don't have the necessary nursing and related sciences foundational knowledge. (P1)

> The students need to go through a number of schema of foundational knowledge to draw, analyse and arrive at a judgement (CT skills) that determines its relevance and how it can be used to solve a problem. (P8)

4. Discussion

The classroom environment should exhibit democratic values such as dialectical dialoguing, negotiating, and consensus-building to enable the students to develop freedom in expressing their views [14]. The students should share their thoughts without fear of ridicule and negative attitudes that hinder CT. According to this principle, for example, an environment where the class rules are agreed upon by the class supports CT. The learning environment climate needs to encourage the students to feel free to take risks and try out new things in the learning area. The student should feel that their attempts to solve problems are respected. The learning area needs to be organized in a manner that makes working together easy for students [7].

The foundational knowledge provides a core set of knowledge that allows the student whose CT is facilitated to identify problems that are important to the discipline and to develop appropriate solutions. Foundational knowledge forms a basis for students to resolve practice problems using discipline-specific knowledge coherently and meaningfully though their taught CT skills [15]. It was asserted [1, 15] that to solve problems specific to the discipline of nursing, the student must be familiar with foundational knowledge from a range of related disciplines that form a framework within which they will develop CT skills [1]. Foundational knowledge is enduring in that it is used repeatedly to solve problems within the discipline by applying CT skills, such as argumentation. As new phenomena within a discipline emerge (for example, new treatment modalities), foundational knowledge provides the basis for the students to apply CT to predict and explain phenomena within the discipline [3]. This type of knowledge is also substantive and is based on sound, innovative, insightful research and is coherent. It is not piecemeal; instead, it is integrated and cumulative. For content to be learnt meaningfully, foundational knowledge provides a set of general principles that allows for the use of CT to scaffold discipline-specific theoretical and practical aspects for problem-solving and decision-making [12].

The above assertion is supported by researchers [5] who cited that basic, foundational learning of facts, theories, formulas, and skills involving a higher level learning associated with, for example, evaluation of knowledge through application of critical skills includes discipline-specific knowledge and skills, as well as discipline- and profession-transcendent competencies (writing and speaking, information literacy, and research). CT from disciplinary and/or interdisciplinary perspectives involves the student's ability to adopt the underlying perspectives and paradigms, processes, and methods of inquiry of one or more disciplines. The ontology of critical thinking refers to knowledge representation [4]. It involves development of intelligent application of domain-specific knowledge. CT includes the intellectual skills associated with high-quality, self-aware thinking, conceptual clarity, logical reasoning, the ability to interpret information from multiple perspectives, and representing others' ideas with integrity [6].

Foundational knowledge in these content areas will provide in-depth training in the content and methods needed for facilitating the CT of students in nursing science [16]. Conversely, the belief is that students' attainment of foundational skills and factual knowledge occur without active engagement in CT. On the contrary, discipline-specific roles require a degree of domain-specific knowledge; therefore, students may choose to use knowledge based on prior educational or professional experience, giving them enough foundational knowledge to construct better arguments and justifications as CT skills [17]. In this instance, the nurse educator can use argumentation as a teaching strategy in order to stimulate dialogue that will force the students to tap into their foundational knowledge as they analyse, evaluate, justify, and pass judgement on the issue under discussion. The educator is required to have the ability and willingness to recognize the importance and value of strong foundational knowledge that provide a basis for facilitating CT [7].

On the other hand, CT reflects the capacity for higher-order thinking, including reflection on one's own thinking, evaluation of information, and hypothetical thinking about alternatives [18]. Students should be encouraged to analyse, compare and contrast, draw inferences, and explain the content using their foundational knowledge. These CT skills are employed by the student to progress to developing functional, conceptual, and procedural knowledge that is applied in practice. Although written tests and examinations are still needed to assess the foundational knowledge comprehensively, integrating assessment of CT skills is essential to determine the competence of a student [18]. Teaching and learning should allow for greater application of foundational knowledge, decision-making, CT, leadership, research utilization, and resource management in clinical practice [7]. Integration of all areas of the discipline affords the opportunity for students not only to provide relevance to practice but also to delineate discipline approaches, whilst integrating foundational knowledge into their facilitated CT to solve problems [19].

CT activities that involve evaluation of cases by students from a variety of disciplines lead to horizontal integration of foundational knowledge that is both intradisciplinary and interdisciplinary in nature [20]. Likewise, CT is more than using a particular skill in an appropriate context; it is both the ability to recognize when a skill is needed and the willingness to apply it. It is highlighting the importance of teaching students how to use their CT skills specifically, CT requires the right knowledge, thinking skills, and the right attitude [6, 16]. Furthermore, developing the attitude, or dispositions, of a critical thinker is an essential component of CT and that many errors occur because people do not think critically, not because they are not able to do so but because they are not disposed to doing so. Therefore, a range of important CT dispositions including a unique focus on planning, mindfulness, and metacognitive monitoring is highlighted [21].

It is, therefore, important for nurse educators to unearth different methods of teaching that engage and encourage students to be actively involved in CT and to make it their daily cognitive tool to enhance their quality of patient care. This challenges the nurse educators to reshape education by adopting instructional strategies that equip students with CT skills, which will empower them to solve practice problem creatively while collaborating with other role players in the multidisciplinary healthcare team in the day-to-day care of patients [12, 20]. This enhances the use of interdisciplinary learning and knowledge construction using critical thinking skills. Given the centrality of self-efficacy to the aforementioned areas of influence on the nursing practice of students and graduates, it is vital to recognize the importance of both self-efficacy and foundational knowledge in the facilitation of CT [22].

In fact, it could be argued that clinical practice lies at the intersection of self-efficacy in CT and knowledge of core concepts of a discipline [15]. Foundational knowledge involves understanding and remembering information and ideas, developing the ability to apply acquired skills, such as performing a complex nursing procedure meant to trigger critical, creative, and/or practical thinking, linking concepts, ideas, and experience. Finally, the student will acquire new skills of an intellectual nature, thereby becoming self-aware and exhibiting attributes of CT, such as intellectual humility, intellectual perseverance, and fairness in judgement among others [13].

Educator-directed reinforcement of independently acquired knowledge to connect foundational knowledge and its application is important. This involves moving towards acquisition of foundational knowledge outside the classroom through the development of self-paced learning content and using class time for active and applied-primarily case-based-learning which provides for acquisition of CT skills [4, 19]. Foundational concepts may be necessary to achieve the full benefit of applied learning, such as analysis of clinical cases. The focus lies in the educator's ability to identifying essential foundational content and condensing foundational knowledge. They need to concentrate on key concepts with emphasis on such knowledge and its application and active knowledge construction as a means for stimulating CT and a deeper sense of learning [23, 24]. Integration involves the blending of foundational knowledge across subject areas (often within the same discipline) that require the students' use of facilitated CT skills to apply that knowledge to problem-solving and decision-making in clinical practice.

Students are usually challenged to use CT to connect different types of foundational knowledge (horizontal integration) and then apply it practically to a real or fictional patient (vertical integration) [1, 17]. The use of foundational knowledge of the discipline in practice should include the application of CT skills [25]. Foundational knowledge involves using propositional knowledge and beliefs concerning the meaning and descriptions of relevant concepts and the relationships between them. It includes multiple factors that are identified as being significant to the teaching and learning of CT, the ontological status of CT, and the purpose of teaching it [18].

Foundational knowledge is what is needed to know which is core content knowledge of the disciplines, information literacy (sometimes called digital literacy), and cross-disciplinary knowledge or synthetic knowledge [2]. The suggestion is that the conceptual knowledge (information) and procedural knowledge (process-based information) used for problem-solving or step-by-step task completion forms the basis for acquisition of domain-specific knowledge [26]. For example, the student who analyses relationships between a respiratory condition and cardiac output and those defined as "other" will need conceptual knowledge of the respiratory and circulatory systems and mechanisms within the two systems to understand their points of convergence or divergence. However, they rely on procedural knowledge of various disciplines to promote critical probing, for example, physiology, physics, and so on. The foundational knowledge will form a basis on which the CT skills within the knowledge parameters are facilitated, developed, and applied to problem-solving [27]. Therefore, it is essential to integrate units forming their existing schema to promote the students' ability to think critically about the presented content. Foundational knowledge provides foundational competencies that include the capacity for CT and the domain or technical knowledge acquired through education and practice experience in a particular field [26].

This means that foundational knowledge includes multiple factors that have been identified as being significant to the teaching and learning of CT, the ontological status of CT, and the purpose of their facilitated CT skills to explore contemporary educational experiences and to promote the fundamental principles of learning [3, 24]. Therefore, it is important that the educator is aware of the importance of the use of foundational knowledge as a basis of facilitating CT skills in students. The student draws from the schema forming their foundational knowledge as a point of reference to think critically. The educator needs to scaffold the foundational knowledge of the students to enable them to use facilitated CT skills to construct new knowledge [20].

5. Conclusions

This study has implications both for nursing education in the classroom and clinical setting. The nurse educator and the clinical facilitator need to understand what foundational knowledge is relevant for each level of study, be able to engage the students in such a manner that they are able to retrieve it. Furthermore, they must be able to select appropriate teaching strategies that will facilitate the students' critical thinking skills to enable them to use their foundational knowledge as an anchor upon which they will be able to develop domain-specific and discipline-specific knowledge [20]. Nurse educators need to make use of dialogue that involves questioning and group discussions as facilitation strategies while assessment involves identification of arguments, analysis of arguments, identifying flaws in arguments, evaluating credibility of an argument, and building further argument. These strategies will encourage the students use their meta knowledge consisting of critical thinking to draw and apply on their foundational knowledge which consists of core disciplinary knowledge, cross-disciplinary knowledge, to problem-solving through collaboration with others [2].

It can be concluded that CT cannot be taught in isolation but that foundational knowledge forms a basis for its facilitation. The use of foundational knowledge to facilitate CT as an essential skill in nursing is recommended. This means that foundational knowledge is important in that it forms a knowledge-specific frame of reference that will be used to create new knowledge using their facilitated critical thinking [18]. It is important to trigger cognitive identification of stored knowledge during teaching and learning to enable the student to develop and apply critical thinking skills to construct new knowledge that will be used in real-life clinical settings.

Data Availability

The data used in this paper are available upon request.

Conflicts of Interest

The author declares that there are no conflicts of interest regarding the publication of this paper.

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Research Article

Integrating HIV-Associated Neurocognitive Impairment Screening within Primary Healthcare Facilities: A Pilot Training Intervention

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HIV-associated neurocognitive impairment (H-NCI) remains a common comorbidity, which may affect several key health outcomes among people with HIV. However, there are shortages of appropriately skilled healthcare workers able to identify and manage H-NCI in low- and middle-income countries. We conducted an exploratory, quasi-experimental, pre- and post-cohort training intervention in KwaZulu-Natal, South Africa. Thirty-four healthcare workers (two general medical doctors, twenty-two nurses, and ten adherence counsellors) from six facilities and a mobile clinic unit attended two, two-hour face-to-face, training sessions. The training included knowledge and skill transfer components. Pre- and post-knowledge questionaries demonstrated an improvement among 82% ($n = 28$) of the attendees from all three cadres. Knowledge was retained by 88% ($n = 30$) of the attendees after eight weeks. The H-NCI screening tools were administered with 78% accuracy. After eight weeks, two general medical doctors and eight senior nurses were able to accurately administer the tool. The Primary Healthcare H-NCI training was successful in improving knowledge among primary healthcare workers; however, several healthcare workers experienced challenges with administering such tools.

1. Introduction

HIV is now recognized as a manageable, multisystem, chronic illness, following the widespread availability of virologically suppressive antiretroviral therapy (ART) [1]. More than two-thirds of the global population of people with HIV (PWH) are found in sub-Saharan Africa [2]. South Africa is the country most severely affected by the epidemic, accounting for approximately 8.2 million PWH. South Africa is also home to the largest ART program worldwide, with 72% of PWH in the country currently accessing treatment [3, 4]. The overall HIV prevalence rate is approximately 13,7% among the South African population [3].

Over the past decade, there have been significant declines in several AIDS-defining illnesses, including severe HIV-associated neurocognitive impairment (H-NCI), such as HIV-associated dementia (HIV-D) [1]. However, while the incidence of HIV-D has fallen dramatically, the lifetime prevalence may remain stable or even increase as PWH on effective ART experience longer life expectancies [5].

PWH with symptoms of H-NCI experience difficulties with attention, memory, learning, problem solving, decision making, and activities required for everyday functioning, including ART adherence [6]. Healthcare providers in clinical settings have been noted to have limited knowledge of H-NCI, and screening practices remain uncommon in low- and middle-income countries [7–9]. Reasons for low H-NCI screening may be underdetection due to low incidence and prevalence rates in the context of effective ART, poor knowledge, and screening skills among healthcare workers in this setting, limited skilled personnel, treatment alternatives, and/or medical costs associated with neurocognitive care.

Low- and middle-income countries experience severe shortages in trained healthcare providers, especially mental and neurological healthcare workers [10]. The medical, surgical, and neurosurgical specialties have adopted task-sharing to address human resource shortages in this setting [11]. This approach involves the redistribution of duties through delegation [12]. Several healthcare workers from various tiers form a collaborative team of specialists and less-qualified cadres, relying on iterative communication, as well as ongoing training to preserve high-quality outcomes [12].

It is unclear whether targeted H-NCI screening for neurocognitive and functional symptoms can be effectively integrated into a primary healthcare clinic through task-sharing from specialists to primary healthcare workers [10, 13]. A systematic review conducted by Liu et al. [14] reported several studies exploring task-sharing through the delegation of mental health services from specialists to general medical doctors, nurses, and community healthcare workers. However, few studies included H-NCI in the training interventions [14]. Although one H-NCI training intervention found improved confidence in identifying H-NCI symptoms among clinical officers in Kenya, this training did not include general medical doctors, nurses, and adherence counsellors [10]. Task-sharing, which is commonly evaluated through training, practice, and maintenance, has not been explored among general medical doctors, nurses, and/or adherence counsellors administering H-NCI screening in this setting [12].

Our study aimed to provide preliminary evidence needed to inform the design of an H-NCI training intervention targeting primary healthcare workers in low- and middle-income countries. The aim of this intervention is determine whether task-sharing of H-NCI screening from specialists to primary healthcare workers would be feasible in this setting. Our primary objective was to explore the viability of H-NCI screening by primary healthcare workers. We examined the initial uptake of knowledge and skills among general medical doctors, nurses, and adherence counsellors following the training intervention. Our secondary objective was to examine the appropriateness of an in-field, H-NCI training intervention among primary healthcare workers at this level of care.

2. Methods

2.1. Study Design. An exploratory, quasi-experimental, pre- and post-cohort intervention study was conducted among primary healthcare workers. These healthcare workers provide the majority of HIV services in KwaZulu-Natal, South Africa. We developed a four-hour training programme that was spread over two weekly, two-hour sessions. The programme design comprised didactic lectures for knowledge and H-NCI skill transfer delivered over a short period. This was with a view toward making the training cost-effective and easily replicated by future interventions in low- and middle-income countries. The on-site design also ensured that the healthcare workers remained in the facility and were available to deal with emergencies, thus ensuring minimal impact on patient services in already burdened facilities. The development process of the pilot H-NCI training is described.

The training sessions took place at primary healthcare facilities based on the principles of academic detailing. Academic detailing involves peer-to-peer outreach processes involving visits to the work setting of a target audience from a trained professional. The approach allows the trainer to demonstrate and discuss topics including new skill sets to improve patient services [15]. The main aim of academic detailing is to increase the uptake of a new intervention, such as the use of a standardized assessment tool in community practice, which is otherwise uncommon [15, 16]. The iterative processes of academic detailing involving peer-to-peer skill transfer, demonstration, and feedback were appropriate for our pilot training.

2.2. Ethical Considerations. The University of Cape Town Faculty of Health Sciences Human Research Ethics Committee, the City of Cape Town Department of Health, and the KZN Department of Health in the Ugu District provided approval for this study. The training was approved by the HIV and Sexually Transmitted Infections (HAST) district manager, district mental health manager, the operational manager, and the chief executive officer at each facility. All participants provided informed consent prior to participation.

2.3. Population and Sample. We applied the general rule which suggests a minimum of 30 subjects or greater for pilot studies [17]. This sample size was sufficient to evaluate procedures and processes which will inform future training interventions. To recruit participants for the Primary Healthcare H-NCI training, we approached medical managers from the HAST units at primary healthcare facilities in the Ugu district under the KwaZulu-Natal Department of Health. General medical doctors, nurses, and adherence counsellors working in these units were invited to participate in the training. The healthcare workers were informed by the medical manager that participation was not mandatory. Between June and July 2021, 34 primary healthcare workers (2 doctors, 22 nurses, and 10 adherence counsellors) from five primary healthcare facilities and a mobile clinic unit attended both sessions of the pilot training.

2.4. Curriculum Development. The Primary Healthcare H-NCI training curriculum was developed by the first author (AM) and senior researchers from the University of Cape Town (JJ, HG, SN, and GS). Table S1(supplementary material) provides an outline of the training curriculum. We used a participatory curriculum design approach to evaluate the training curriculum [18]. This approach relies on the involvement of stakeholders and end users in the design process, as well as facilitating buy-in from key personnel [18, 19]. The Primary Healthcare H-NCI training curriculum was evaluated by the HAST district manager who provides continued education to healthcare workers, the district mental health manager, and trainers from the various districts. These key stakeholders provided feedback and input to ensure that the training would be appropriate.

The first author developed a workbook to facilitate learning during the training, in consultation with the other authors (GS, HG, SN, and JJ). The workbook included the training content. Additional reading material providing more information that could not be covered, such as a detailed background of H-NCI was also provided in this workbook. The content of the workbook was summarised in point form and was presented to the training recipients by the first author using a power point presentation. This was guided by a trainer's manual developed by the first author with input from the co-authors. The trainer's manual included session directions, a speech guide for the trainer to follow and a list of required materials for each session. Visual aids in the form of video demonstrations of the screening tools were used to supplement the information provided in the workbook.

We used the International HIV Dementia Scale (IHDS) and the Cognitive Assessment Tool-rapid version (CAT-rapid) for this training. These tools have been validated for use in South Africa [20, 21]. The IHDS tests three neurocognitive domains, including motor speed (timed finger tapping), psychomotor speed and processing (timed alternating hand sequence test), as well as short-term memory (recollection of four words in two minutes) [22]. The CAT-rapid includes four symptom questions, short-term memory (registration of four words), executive functioning (a mini-trail-making test), psychomotor speed and processing (timed alternating hand sequence test) and verbal learning and memory (word recall) assessments [20]. A detailed description of the administration of the IHDS and the CAT-rapid is described by Sacktor et al. [22] and Witten [23].

2.5. Data Collection

2.5.1. Delivery of the Training. The first author (AM) delivered the training. The first author has experience in HIV/TB training facilitation among general medical doctors, nurses, and adherence counsellors providing healthcare services at various levels in South Africa. The first author received training on neuropsychological screening tools whilst working on a research study conducted at the University of Cape Town, under the supervision of HG, who is a registered neuropsychologist. The Primary Healthcare H-NCI training sessions comprised didactic lectures, case vignettes, interactive discussions, and roleplaying. The first session focused on the theoretical components of H-NCI. The second session involved practical training on H-NCI screening tool administration.

2.5.2. Participant Evaluation and Measures. The knowledge and skill assessments were designed using Miller's pyramid for assessing clinical competence [24, 25]. This framework has been used to assess clinical competence beyond test-taking or memorising of information [24]. The model emphasises the importance of acquiring knowledge to perform a task in practice [25]. The lowest level in the model is knowledge (knows), followed by competence (knows how), performance (shows how), and action (does) [24, 25]. We examined participants' attitudes and views of the H-NCI training in the post-training evaluation.

2.5.3. Knowledge and Attitudes. Multiple-choice questionnaires were used to evaluate knowledge, as well as participants' attitude and comfort with H-NCI screening tools before and after the training. Pre- and post-testing is the most common technique adopted in academic detailing [15]. The current questions were adapted from a tool developed by Johnston et al. [26]. The tool consisted of 43 items, measuring nonskill attributes including knowledge, attitude, and behaviour among undergraduate medical students. A 20-item pre-test questionnaire was used to assess knowledge, attitudes, and views in the Primary Healthcare H-NCI training (Supplementary table S2*). This tool was appropriate for our study as it sought to evaluate the teaching and learning of the medical curriculum.*

2.5.4. Skills. Direct observations of procedural skills (DOPS) were used to assess a healthcare worker's ability to administer the H-NCI screening tool. DOPS have been described by Wass et al. [27] as an appropriate assessment of clinical competence. Each trainee was assigned a one-on-one time slot to demonstrate the H-NCI screening tool on a standardized patient as part of a simulation. The simulations were assessed using a checklist detailing the steps required to accurately administer the selected screening tools and interpret the results. The participants' performances were scored by a counselling psychologist with previous experience in neuropsychological testing. Tasks that were accurately demonstrated were given a score of two, tasks that were listed on the checklist but were performed inaccurately were given a score of one and tasks that were incorrect or excluded were given a score of zero. Healthcare workers who did not accurately demonstrate the use of the screening tool were given immediate feedback by the trainer once the simulation was completed.

2.5.5. Evaluation Procedures. Data collected at baseline included participant demographics and pre-test questions. Knowledge of H-NCI and screening skills were assessed immediately after the training and after eight weeks. Training evaluation data were collected at the end of the second session. This is illustrated in the flow diagram (Figure 1). All data were collected anonymously using a unique participant identifier. Documentation containing participant names and their unique identifiers was kept confidential by using a hardcopy linking log that was stored in a separate location to the data.

2.6. Analysis. IBM Statistical Package for the Social Sciences (SPSS) 27 was used to analyse the data (IBM-Corp., 2017). We compared H-NCI knowledge among general medical

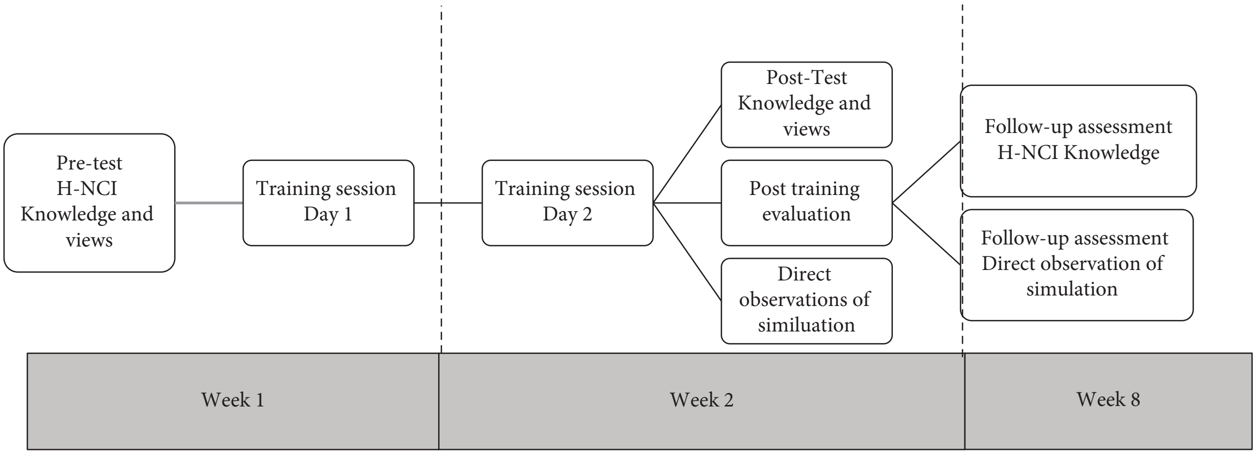

Figure 1: Flow diagram of HIV-associated NCI training and evaluations.

doctors, nurses, and adherence counsellors before the training, immediately after the training, and eight weeks later. The data were analysed using frequency analysis and Fisher's exact *t*-test and are reported as the mean and standard deviation. We report healthcare workers' ability to administer H-NCI screening tools using chi-square analyses. We compared performance between the three cadres to establish which cadres would be appropriate to administer the H-NCI screening tools. We examined whether these skills were retained eight weeks after the training by comparing the three cadres.

3. Results

After describing participant characteristics, we present the results from the pre- and post-tests, DOPS, and follow-up assessments.

3.1. Participants. Of the 42 healthcare workers who initially enrolled to participate in the training, thirty-four participated in two training sessions (21 from facility one and 13 from facility two). Eight healthcare workers were excluded from the final analysis, including six who were required to address patients during the second session and two who were unavailable as they were scheduled to work the night shift on the day of the training.

Study participants consisted of two general medical doctors (6%), 22 nurses (65%), and ten adherence counsellors (29%) recruited from six primary healthcare facilities and a mobile health clinic. Most healthcare workers were females (71%, $n = 24$). The mean age of participants was 39 years ($SD = 9.5$, range: 26–62) and the median number of years in service was 12 years ($SD = 7.8$, range: 2–40).

3.2. H-NCI Knowledge Pre- and Post-Training. To determine whether the pilot training intervention led to improved H-NCI knowledge among primary healthcare workers, contingency tables were used to compare pre-test questionnaire and post-test questionnaire scores for the total sample of 34 (Figure 2). The results showed that there was a significant increase in H-NCI knowledge overall. Prior to the training, the mean knowledge score was 61% ($SD = 1.48$). Healthcare workers demonstrated sufficient knowledge of H-NCI after the training ($M = 83\%$, $SD = 1.25$). There were significant improvements in knowledge among 82% ($n = 28$). This was among all three cadres. Five (15%) healthcare workers (one nurse and four adherence counsellors) showed no change in knowledge, while one adherence counsellor (3%) scored lower as they intermittently dealt with patients during the training.

Figure 2 illustrates the change in knowledge scores between cadres eight weeks after the training intervention. Overall, 62% ($n = 21$) of healthcare workers scored the same before and after the training (one general medical doctor, 13 nurses, and six adherence counsellors). Nine (26%) healthcare workers (one general medical doctor, five nurses, and three adherence counsellors) demonstrated improved knowledge. There was a decline in knowledge among four (13%) healthcare workers (one nurse and three adherence counsellors).

One-tail paired-sample *t*-tests were used to compare healthcare workers' views on their knowledge of H-NCI before and after the training. These results are illustrated in Figure 3. Those who had limited or no knowledge of the impact of HIV on the brain prior to training agreed that they had a significantly better understanding of the impact of HIV on the brain after the training. Prior to the training intervention, primary healthcare workers were unsure whether H-NCI was addressed in previous training. By the end of the H-NCI training, this was clarified and healthcare workers agreed that previous training did not address the impact of HIV on the brain or H-NCI.

3.3. Administering an H-NCI Screening Tool

3.3.1. Overall Performance of Screening Tools Immediately after the Training. To understand whether primary healthcare workers would be able to accurately administer and interpret an H-NCI screening tool, we observed the demonstration of an H-NCI screening tool on a simulated patient. The mean performance scores are summarised in Table 1.

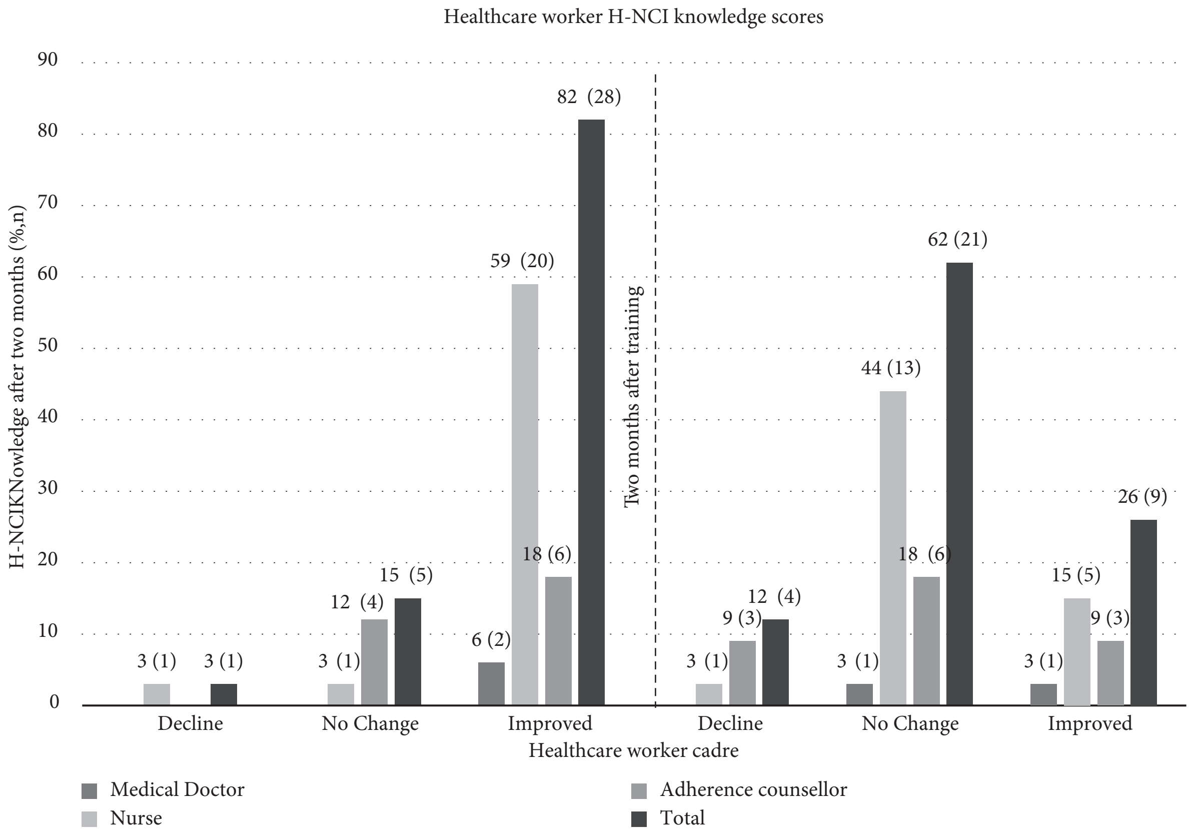

FIGURE 2: Healthcare workers' HIV-associated NCI knowledge scores before and after training.

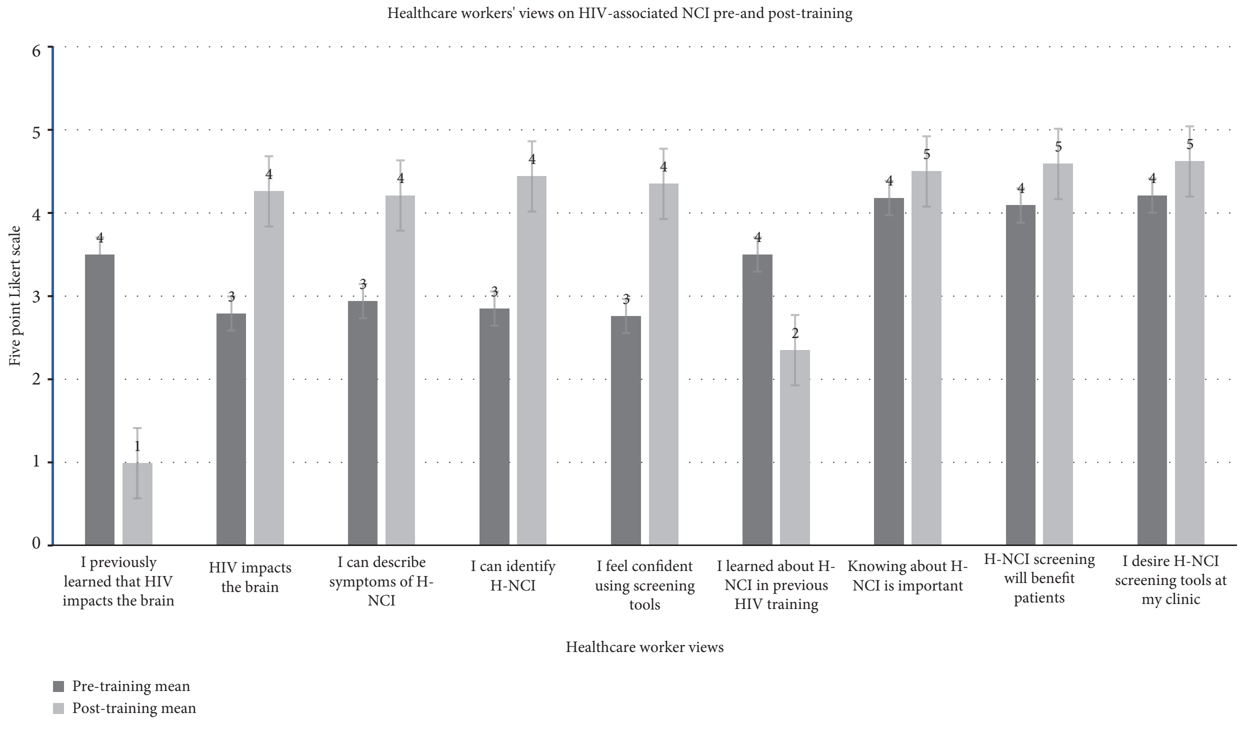

FIGURE 3: Healthcare worker views on HIV-associated NCI pre-training and post-training. *Note*: 5-point Likert scale. 0: strongly disagree, 1: disagree, 2: I do not know enough to answer, 3: agree, and 4: strongly agree

Table 1: Accuracy of healthcare workers' HIV-associated neurocognitive impairment screening tool delivery.

Screening tool	Task% (score)	Doctor ($n = 2$)	Nurse ($n = 22$)	Adherence counsellor ($n = 10$)	Total ($n = 34$)	Std. deviation	Minimum	Maximum	Chi-square	Df	-value
IHDS	Motor speed	88 (14)	83 (13)	64 (10)	77 (12)	4,2	3,0	16,0	35,4	22,0	0.07
	Psychomotor speed	89 (16)	77 (14)	66 (12)	75 (13)	4,6	4,0	18,0	20.65	20	0.41
	Memory recall	92 (11)	77 (9)	62 (7)	73 (9)	3,1	2,0	12,0	39.29	16	0.002
	IHDS total	90 (43)	82 (39)	57 (28)	75 (13)	11,4	11,0	48,0	36.47	32	0.31
CAT-R	Symptoms	100 (6)	94 (5)	100 (6)	96 (6)	0,6	3,0	6,0	3.97	4	0.33
	Trail making	88 (7)	76 (6)	56 (5)	71 (6)	2,2	1,0	8,0	10.77	14	0.72
	Motor speed	91 (15)	79 (13)	67 (11)	76 (12)	4,6	2,0	16,0	24.93	22	0.34
	Psychomotor speed test	81 (15)	70 (13)	61 (11)	68 (12)	5,4	3,0	18,0	12.42	14	0.55
	Memory recall	95 (10)	87 (9)	64 (6)	81 (8)	2,4	1,0	10,0	41.79	36	0.28
	CAT-rapid total	90 (58)	84 (54)	66 (42)	79 (51)	13,7	18,0	64,0	34.62	40	0.76
Total combined score		91 (101)	85 (93)	64 (70)	78 (86)	24,0	29,0	110,0	38.02	42	0.73

Overall, primary healthcare workers demonstrated the combined screening tool with 78% ($n = 34$) accuracy ($M = 78.1$, $SD = 24.0$). One general medical doctor and one nurse administered the combined screening tool with 100% accuracy (6%). Four (12%) healthcare workers (one general medical doctor and three nurses) demonstrated the screening tool with few errors, scoring between 96% and 99%. Overall, 41% ($n = 14$) of healthcare workers administered the screening tool with reasonable accuracy (range: 71%–95%), 21% ($n = 7$) administered the screening tool somewhat accurately (range: 40%–70%), and 6% ($n = 2$) administered the tool poorly (range: 0%–39%). The accuracy of the demonstrations varied among the three cadres. General medical doctors (91%, $n = 2$) and nurses (85%, $n = 22$) demonstrated the screening tools with greater accuracy compared to adherence counsellors (63%, $n = 10$).

3.3.2. Healthcare Workers' Performance on the CAT-Rapid. Healthcare workers performed marginally better on the CAT-rapid screening tool ($M = 79.0\%$, $SD = 13.7$) compared to the IHDS ($M = 75.0\%$, $SD = 11.4$; see Table 1).

The CAT-rapid was administered with 100% accuracy by 15% ($n = 5$, one doctor and four nurses) of healthcare workers. Five (15%) healthcare workers (one general medical doctor and four nurses) demonstrated the CAT-rapid with few errors, scoring between 96% and 99%. Overall, 50% ($n = 17$) administered the CAT-rapid with reasonable accuracy (range: 71%–95%), 18% ($n = 6$) somewhat accurately (range: 40%–70%) and 12% ($n = 4$) administered the CAT-rapid poorly (range: 0%–39%). Overall, general medical doctors performed the CAT-rapid with 90% accuracy ($n = 2$), followed by nurses who demonstrated 84% accuracy ($n = 22$). The adherence counsellors ($n = 10$) demonstrated the CAT-rapid somewhat accurately (66%).

Our results show that primary healthcare workers were least successful with the following components of the CAT-rapid: demonstrating the timed finger tapping test, demonstrating the alternating hand sequence test, scoring the alternating hand sequence test, scoring the mini trail-making test, administering the memory recall clues, ensuring that the nondominant hand was used during the test and the use of the timer for the alternating hand sequence test (see Figure 4).

3.3.3. Healthcare Workers' Performance on the IHDS. The IHDS was administered with 100% accuracy by 21% ($n = 7$) of primary healthcare workers (one general medical doctor and six nurses). Four (12%) healthcare workers (one general medical doctor and three nurses) demonstrated the IHDS with few errors, scoring between 96% and 99%. Overall, 38% of healthcare workers ($n = 13$) administered the IHDS with reasonable accuracy (range: 71%–95%), 29% ($n = 10$) somewhat accurately (range: 40%–70%) and 12% ($n = 4$) administered the IHDS poorly (range: 0%–39%). Between the cadres, the IHDS was demonstrated with greater accuracy by general medical doctors (90%) and nurses (82%). Adherence counsellors demonstrated the IHDS somewhat accurately (57%).

Primary healthcare workers were least successful with the following components of the IHDS (Figure 5): the administration of the memory recall clue, scoring the memory recall task, scoring the alternating hand sequence test and ensuring that the non-dominant hand was used during the test.

3.3.4. Two-Month Posttraining. Primary healthcare workers were asked to demonstrate the screening tools eight weeks after the training. The results of the follow-up DOPS are summarised in Table 2.

Ten (29%) healthcare workers (one doctor and nine nurses) demonstrated the combined tool with 100% accuracy after eight weeks of daily practice. Overall, 41% ($n = 14$) of health care workers (one general medical doctor, ten nurses, and three adherence counsellors) improved on their demonstration of the screening tools. The results show no significant differences among the cadres who improved

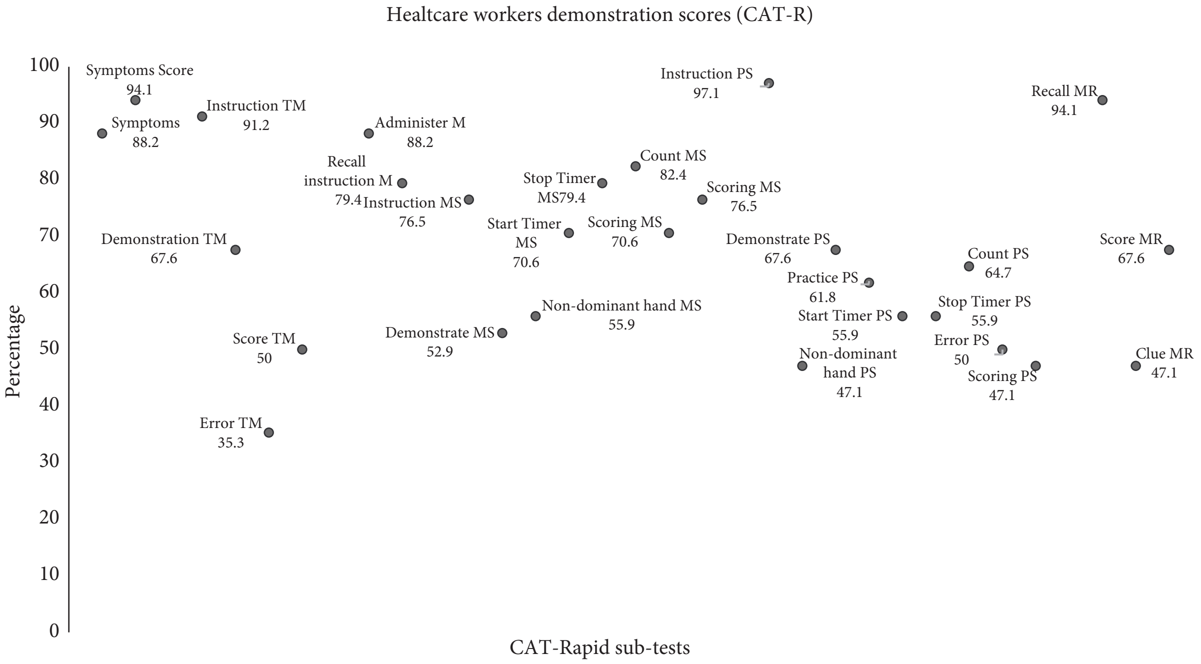

Figure 4: Healthcare workers' performance of the CAT-rapid subtests.

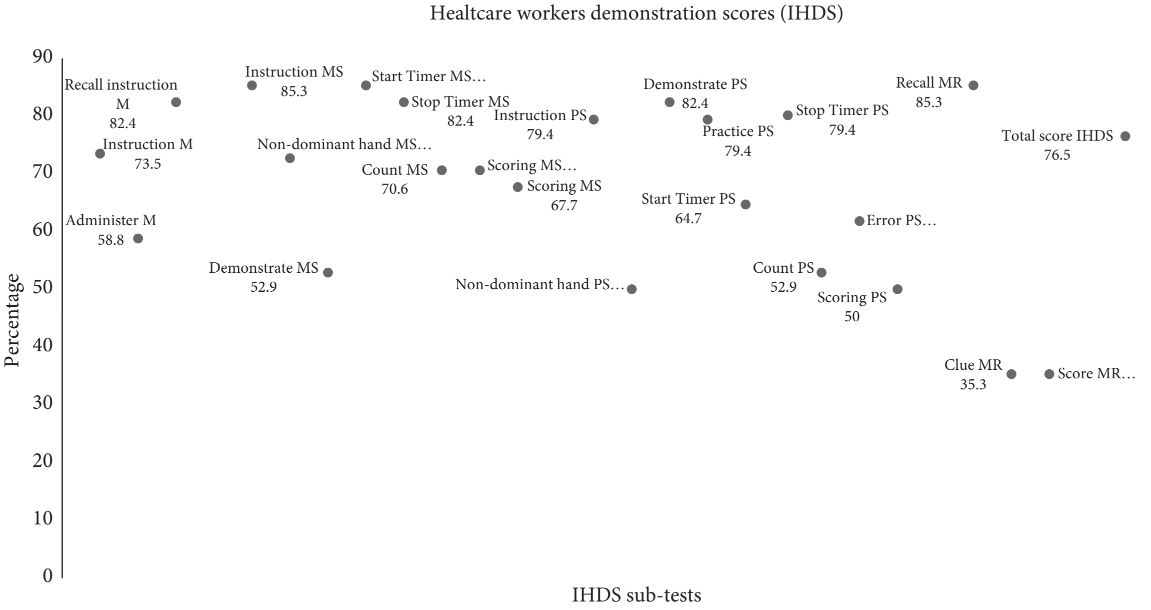

Figure 5: Healthcare workers' performance of the International HIV Dementia Scale subtests.

when administering the screening tools. Fourteen (41%) primary healthcare workers (one general medical doctor, ten nurses, and three adherence counsellors) demonstrated no change, and H-NCI screening skills declined among eight (24%) primary healthcare workers (one general medical doctor, two nurses, and five adherence counsellors).

Eight (24%) healthcare workers (one general medical doctor, six nurses, and one adherence counsellor) showed improvements on the CAT-rapid, while five (15%) healthcare workers (one general medical doctor, two nurses, and two adherence counsellors) scored lower than they did immediately after the training. Fifty-nine percent ($n = 20$) of health care workers (14 nurses and six adherence counsellors) showed no change. The IHDS was demonstrated with no changes by thirteen (38%) healthcare workers (ten nurses and three adherence counsellors). Thirteen (38%) healthcare workers (one general medical doctor, nine nurses, and three adherence counsellors) improved when demonstrating the IHDS. There were eight (24%) healthcare workers who scored lower than they did immediately after the training

Table 2: Accuracy of healthcare workers' HIV-associated neurocognitive impairment screening tool delivery two months posttraining.

Cadre		Doctor ($n = 2$)			Nurse ($n = 22$)			Adherence counsellor ($n = 10$)			Total ($n = 34$)			Chi-square	Df	p-value
Screening tool	Task	No change	Improved	Declined	No change	Improved	Declined	No change	Improved	Declined	No change	Improved	Declined			
IHDS	Motor speed	5.9 (2)	0 (0)	0 (0)	55.9 (19)	5.9 (2)	2.9 (1)	17.6 (6)	0 (0)	12 (4)	79.4 (27)	5.9 (2)	14.7.8 (5)	7.99	4	0.09
	Psychomotor speed	0 (0)	2.9 (1)	2.9 (1)	35.3 (12)	23.5 (8)	5.9 (2)	17.6 (6)	5.9 (2)	5.9 (2)	52.9 (18)	32.4 (11)	5.9 (5)	4,29	4	0.37
	Memory recall	5.9 (2)	0 (0)	0 (0)	35.3 (12)	23.5 (8)	5.9 (2)	14.7 (5)	5.9 (2)	8.8 (3)	55.9 (19)	29.4 (10)	8.8 (5)	4,37	4	0.36
	IHDS total	0 (0)	2.9 (1)	2.9 (1)	29.4 (10)	26.5 (9)	8.8 (3)	8.8 (3)	8.8 (3)	11.8 (4)	38.2 (13)	38.2 (13)	23.5 (8)	4.20	4	0.38
CAT-rapid	Symptoms	5.9 (2)	0 (0)	0 (0)	41.2 (14)	20.6 (7)	2.9 (1)	11.8 (4)	8.8 (3)	8.8 (3)	55.8 (20)	29.4 (10)	11.8 (4)	5.6	4	0.20
	Trail making	5.9 (2)	0 (0)	0 (0)	41.2 (14)	17.6 (6)	5.9 (2)	20.6 (7)	2.9 (1)	5.9 (2)	67.6 (23)	20.6 (7)	11.8 (4)	2.75	4	0.60
	Motor speed	2.9 (1)	0 (0)	2.9 (1)	26.5 (9)	32.4 (11)	5.9 (2)	17.6 (6)	5.9 (2)	5.9 (2)	47.1 (16)	38.2 (13)	14.7 (5)	5.32	4	0.26
	Psychomotor speed test	0 (0)	2.9 (1)	2.9 (1)	41.2 (14)	17.6 (6)	5.9 (2)	17.6 (6)	2.9 (1)	8.8 (3)	58.8 (20)	23.5 (8)	17.6 (6)	4.46	4	0.35
	Memory recall	0 (0)	2.9 (1)	2.9 (1)	41.2 (14)	17.6 (6)	5.9 (2)	17.6 (6)	2.9 (1)	5.9 (2)	58.5 (20)	23.5 (8)	17.6 (6)	4.20	4	0.38
	CAT-rapid total	0 (0)	2.9 (1)	2.9 (1)	41.2 (14)	17.6 (6)	5.9 (2)	17.6 (6)	2.9 (1)	5.9 (2)	58.5 (20)	23.5 (8)	17.6 (6)	4.20	4	0.38
Total combined score	Total	0 (0)	2.9 (1)	2.9 (1)	29.4 (10)	29.4 (10)	5.9 (2)	5.9 (2)	8.8 (3)	14.7 (5)	35.3 (12)	41.2 (14)	23.5 (8)	7.97	4	0.09

(one general medical doctor, three nurses, and four adherence counsellors). There were no statistically significant differences among the three cadres.

3.4. Healthcare Workers' Confidence Using a Screening Tool. Healthcare workers who had limited or no knowledge of H-NCI symptoms or screening tools prior to the training were able to describe the symptoms of H-NCI ($M = -1.27$, $SD = 1.14$), identify H-NCI symptoms ($M = -1.35$, $SD = 1.26$), and felt more confident using an H-NCI screening tool after attending the Primary Healthcare H-NCI training ($M = -1.59$, $SD = 1.05$). This was measured after the second session of the training.

4. Discussion

To our knowledge, this study is the first to assess the viability of H-NCI screening by general medical doctors, nurses, and adherence counsellors at a primary healthcare level, in low- and middle-income countries. This study also focuses on the acceptability of in-field H-NCI training in a clinic setting. There were significant improvements in H-NCI knowledge among all three cadres following the training intervention, and this was sustained by most healthcare workers at eight weeks. Although only a few general medical doctors and nurses were able to administer the H-NCI screening tools with 100% accuracy immediately after training, several others made minor errors which improved over time. Junior nurses and adherence counsellors demonstrated greater difficulty with the administration of the screening tool, especially at eight weeks. Primary healthcare workers were in favour of attending future training that was brief and in-field, like the design adopted by the Primary Healthcare H-NCI training.

H-NCI knowledge improved among all three cadres of primary healthcare workers following the training intervention [10]. These preliminary findings are important for two reasons. First, there are extreme shortages of trained professionals in low-income and middle-income countries and second, there is a paucity of literature describing the adoption of task-sharing for H-NCI screening [28, 29]. Our training intervention was helpful as it provided clarity that H-NCI had not been addressed during previous primary healthcare worker HIV training. This study highlights that once equipped with knowledge of H-NCI, general medical doctors, nurses, and adherence counsellors could potentially fill in the skills gap by task-sharing the identification of neurocognitive or functional challenges among PWH. Each of these cadres would also be able to flag patients for further investigation at the facility or for referral to the next level of care among those with severe H-NCI. We hypothesize that the inclusion of H-NCI in future training, particularly HIV training targeting primary healthcare workers, may serve as a potential mechanism for bridging the neurocognitive skills gap in low-income and middle-income countries.

The viability of H-NCI training by nonspecialist healthcare workers at a primary healthcare level is still unclear. Our findings show that the administration of the H-NCI screening tools varied between general medical doctors, nurses, and adherence counsellors, similar to other local research comparing adherence counsellors and nurses [30]. Few general medical doctors and senior or mid-level nurses were able to administer the screening tool correctly. Several others demonstrated the screening tool with minor errors. This was not unexpected given that H-NCI screening tools differ from general clinical procedures or checklist-type examinations. H-NCI screening tools are interactive and require healthcare workers to master and perform demonstrations, as well as time tasks performed by patients. We saw several improvements in the administration of H-NCI screening tools among this group over time, suggesting that with additional time and mentorship, nonspecialist healthcare workers may be able to accurately administer H-NCI screening tools.

Several other junior nurses, including staff nurses or certified nursing assistants, as well as adherence counsellors experienced more challenges with the H-NCI screening tools. This did not improve over time. These cadres were only able to administer subsections of the screening tools, despite multiple practice sessions. Although staff nurses, certified nursing assistants, and adherence counsellors may have more contact with patients, certain diagnostic and treatment activities are conducted by midlevel nurses such as registered nurses or general medical doctors. Thus, these cadres may not be accustomed to tools that follow stringent processes such as those required in H-NCI screening tools.

Among this group, nurses and adherence counsellors struggled with demonstrating motor-function activities, including the finger tapping test and the alternating hand sequence test. These activities require healthcare workers to master the finger tap and hand sequences themselves, before demonstrating this to a patient. Primary healthcare workers also struggled with tasks that required simultaneous or multiple actions, such as the use of the timer or counting correct sequences. Inaccuracy in administering H-NCI screening tools may lead to high false positive and negative rates. This may in turn result in increased anxiety and poor quality of life among PWH. Since H-NCI screening tools require precision to be accurate, junior or lay healthcare workers may not be appropriate. Tools that do not rely heavily on motor-function demonstrations, such as the HIV Cognitive Symptom Questionnaire, which involves a series of questions, may be more suitable for these cadres [31]. Alternatively, these healthcare worker cadres could flag at risk patients using checklists or question-based screening tools for further investigation by general medical doctors or senior nurses who may be more appropriate to administer an H-NCI screening tool.

The appropriateness of the H-NCI training targeting primary healthcare workers was mixed. The training received a positive response from primary healthcare workers, and knowledge improved among all cadres. Healthcare workers found the training design appropriate and acceptable for use in busy clinic settings. The training was designed to reduce the impact on healthcare services by preventing healthcare workers from leaving the facility for several hours. The use of the weekly staff meeting time slot also allows for future on-going training sessions to be implemented feasibly. The on-site training design was feasible, especially in overburdened clinics with limited staff, as healthcare workers were close enough to address emergency queries. However, this is also a limitation to the design as the training session was subject to disruptions, as healthcare workers were requested to provide patient care while the training was underway. Due to the complexity of the H-NCI screening tools, the skill component of the training may require more time and mentoring to ensure that screening is mastered. Although screening may be practical, questions regarding the clinical utility and the timing of such screening remain. Further investigation into training methods for midlevel or lay healthcare workers in the administration of H-NCI screening tools is also required.

5. Limitations

This study has several limitations. The pilot sample was confined to one region, in a single district of KwaZulu-Natal, and may not be generalized to other parts of the country or other countries with limited resources. Due to the small sample size, our findings are not generalizable. Our statistical analyses were limited to descriptive statistics. Despite efforts to create a suitable in-facility learning environment, there were several challenges including postponements of the training due to healthcare workers being required to administer the COVID-19 vaccines, interruptions for urgent patient care, as well as logistical or infrastructural challenges which may have indirectly impacted learning. A final limitation of this pilot study was the single eight-week follow-up period. Repeated follow-up assessments would provide a better indication of the uptake of knowledge and whether skills were sustained over time.

6. Conclusion

H-NCI knowledge improved among primary healthcare workers and was retained after eight weeks. Skills training, however, presented differences and challenges. On-going training could be delivered in person or using hybrid platforms for various cadres of primary healthcare workers. Skill training, where direct observation, correction, and supervision are required, will need further research. Future research could explore whether alternate screening tools may be more suitable for general medical doctors and senior nurses to administer in busy primary healthcare clinics [31–36]

Data Availability

Due to privacy and ethical concerns, neither the data nor the source of the data can be made available.

Additional Points

Summary. What is already known about this topic? (i) HIV-associated neurocognitive impairment (H-NCI) remains a common comorbidity; however, there are shortages of appropriately skilled healthcare workers able to identify and manage this disorder in low-income and middle-income countries. (ii) People living with HIV receive the majority of their care at a primary healthcare level. (iii) Screening for H-NCI at a primary healthcare level in South Africa is uncommon, and the reasons for this remain unclear. This is despite most people living with HIV accessing HIV services at this level of care. What this paper adds (research findings and key new information). (i) This paper provides preliminary evidence needed to explore task-sharing of H-NCI screening in low-income and middle-income countries. (ii) This paper demonstrates that with training, general medical doctors and senior nurses can administer H-NCI screening tools. The implications of this paper are (how findings influence or can be used to change policy/practice/research/education). (i) These findings provide preliminary evidence needed to inform H-NCI training interventions targeting primary healthcare workers, including general medical doctors and senior nurses.

Conflicts of Interest

The authors declare that they have no conflicts of interests.

Authors' Contributions

All authors contributed to the development, revision, and final review of the manuscript. All listed authors meet the authorship criteria, and all authors agree with the content of the manuscript.

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Supplementary Materials

Supplementary Table S1: summary of core knowledge aptitudes and specific focus skills. Supplementary Table S2: HIV-associated NCI training knowledge, attitudes, and views pre-test and post-test training questionnaire. Please tick the response that best describes your views in the following table. (*Supplementary Materials*)

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Research Article

Attrition of Nursing Professionals in Ghana: An Effect of Burnout on Intention to Quit

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Background. Burnout among nursing professionals at the workplace and how it influences their decision to quit the profession is crucial to the delivery of quality health service. The shortage of nursing professionals has serious consequences on the healthcare system. *Aim*. To examine the effect of burnout on intention to quit the profession among nursing professionals. *Methods*. A cross-sectional study among 375 randomly selected nursing professionals in active service at a tertiary healthcare setting in Kumasi, Ghana. The Maslach Burnout Inventory was used to determine burnout, and their intention to quit the profession was assessed by asking participants whether they ever thought about quitting the profession in the past 12 months. The effect of burnout on intention to quit was analyzed using logistic regression analysis. *Results*. The overall prevalence of burnout among participants was 2.1% (8/375) with 10.1% (38/375), 24.0% (90/375), and 56.3% (211/375) experiencing high emotional exhaustion, depersonalisation, and low personal accomplishment, respectively. Nearly half (49.3%, 185/375) of the participants had intention to quit the profession. Emotional exhaustion (adjusted odds tatio, AOR = 5.46; 95% CI = 2.25–13.20), depersonalisation (AOR = 1.77 95% CI = 1.07–2.95), and personal accomplishment (AOR = 2.27; 95% CI = 1.30–3.96) were associated with intention to quit the profession. *Conclusion*. Burnout has a negative effect causing intention to quit nursing profession. It is imperative to identify strategies such as occupational health surveillance that will aim at reducing the incidence of burnout at the workplace due to its consequences, one of them being the intention to quit.

1. Background

Burnout and turnover intention among nurses and midwives are often studied phenomena in the healthcare settings and continue to be a major public health issue. Burnout, due to its severity on professionals, has been accepted as an occupational phenomenon by the World Health Organization's (WHO) International Classification of Diseases

(ICD-11) [1]. Burnout is defined by the WHO as "a syndrome conceptualized as resulting from chronic workplace stress that has not been successfully managed [1]." The Action Collaborative on Clinician Well-Being and Resilience was launched by the National Academy of Medicine (United States) to address the increasing rate of burnout among healthcare professionals by improving the understanding of challenges to clinician well-being, advocating for clinician burnout, and prefer evidence-based, multidisciplinary solutions that will improve patient care by giving care to healthcare professionals [2]. Burnout has been classified into three dimensions: emotional exhaustion, depersonalisation, and lack of personal accomplishment [3]. Burnout directly affects the health of the professional (depression, suicide, substance use etc.) and adversely affects the healthcare system [4–6]. One such group of health professionals that easily suffer burnout are the nursing professionals. Burnout lowers nurses' quality of life, performance level, and organizational commitment and increases their intention to quit the job [7, 8]. Burnout also increases turnover rates and negatively affects the quality of nursing care [9, 10].

Studies that were conducted before the coronavirus disease (COVID-19) reported a high prevalence of burnout in the nursing profession similar to other healthcare professionals [7, 11, 12]. In Sweden, a study reported that approximately 50% of new nurses experienced burnout which influenced their intention to quit the profession [13]. Studies that were conducted during the outbreak of the COVID-19 reported a high prevalence of burnout and other psychological disorders such as moral injury, insomnia, anxiety, and depression among healthcare workers (HCWs) [14, 15]. As frontline health workers that were heavily involved in the case detection and management of COVID-19 and other illnesses, they were exposed to pressure. This thus resulted in a lot of them getting infected with the COVID-19 disease. In Italy, data released by the National Health Institute on 26 February 2021 showed that about 123,025 HCWs were infected with COVID-19 which was about 4.0% of the total cases since the outbreak of the pandemic [16]. About 152,000 and 1413 COVID-19 infections and mortality, respectively, were also reported among HCWs globally as of May 8, 2020 [17]. During the COVID-19 pandemic, it was reported that predictors such as being a female and a frontline HCW were significantly associated with burnout [14].

Burnout has been linked to nurses' intention to quit the profession [18, 19]. In Ghana, moderate to high burnout has been reported among nurses and other healthcare professionals [20–22]. Individuals have several mechanisms that they adopt to cope with high workloads or stress at the workplace. One can either continue to be exposed to these conditions for a long time and end up experiencing burnout or quit the profession or organization. Several determinants of burnout among nurses and midwives in Ghana, particularly high workload, years of practice, resilience, inadequate staffing, and lack of leadership support have been identified [21, 23]. Intention to quit the profession is one's desire or contemplation to quit the current profession in the future [24]. Up to 50% of nurse respondents have indicated their intention to quit the educational course in Italy, South Africa, and Ethiopia [25–27]. Similarly in Ghana, a prevalence rate of 69.0% of nurses with intention to quit their profession has been reported [28]. The predictors to understand intention to quit the profession in the nursing profession have been explored [28, 29].

Most of the studies that have been conducted either focused on only burnout [3, 7, 20] or intention to quit the profession [27, 29, 30]. Little is known about the two phenomena (burnout and intention to quit the profession) simultaneously, especially in the nursing profession in Ghana and Africa. This study, therefore, sought to determine the prevalence of intention to quit the profession and examine the effect of burnout on intention to quit the profession among nurses and midwives. The study findings are expected to feed into future policies to reduce the rate of burnout and intention to quit the profession among the nursing professionals in Ghana and ultimately in Africa. This is deemed key against the backdrop of the current COVID-19 pandemic and beyond.

2. Methods

2.1. Study Design. This was a cross-sectional study that involved nursing professionals at Komfo Anokye Teaching Hospital (KATH), a tertiary healthcare institution located in Kumasi, Ghana.

2.2. Study Setting and Population. Komfo Anokye Teaching Hospital has a bed capacity of 1,200. It serves as a referral centre for health facilities in the northern belt of the country. Komfo Anokye Teaching Hospital has about 2000 nursing professionals with different professional backgrounds.

The target population was all nursing professionals at the facility. Nursing professionals in this study were defined as registered nurses and midwives that provide nursing care to patients. Nursing professionals at the facility that had worked for at least one year were included in the study. All nursing professionals that were on their annual leave throughout the time of the study were excluded.

2.3. Sample Size Calculation. The Charan and Biswas [31] formula (sample size $= (Z^2(P)(1-P))/(E^{\wedge 2})$ for calculating sample size was used to determine the sample size for this study. Using a 95% confidence interval (Z), 5% allowable margin of error E, and 64.9% [29] of nurses that had intention to quit (P), a sample size of 350 was obtained for the study. This was overestimated to 385 participants to cater for a nonresponse rate of 10%.

2.4. Data Collection and Sampling Procedure. Data collection took place from July 1, 2020 to September 31, 2020. This was done after the first wave of the COVID-19 pandemic in Ghana. A structured questionnaire that consisted of the Maslach Burnout Inventory (MBI) [3] was used to collect data from study participants. The MBI is a validated tool that has been adopted in several studies to assess burnout

[32, 33]. The questionnaire was pretested among 15 nursing professionals in a government hospital in a nearby district.

The MBI tool measures the three burnout components (emotional exhaustion, depersonalisation, and personal accomplishment). The MBI is made up of 22 items (emotional exhaustion = 7 items, depersonalisation = 7 items, and personal accomplishment = 8 items) with all the items evaluated on a 7-point Likert scale ranging from "never" = 0 to "every day" = 6. The first seven items measure the emotional exhaustion dimension while the second seven items measure the depersonalisation dimension. The last eight items measure the personal accomplishment dimension of burnout. The burnout scores for each of the dimensions of burnout were computed and categorized as low, moderate, and high. The emotional exhaustion dimension was categorized as low (≤17), moderate (18–29), and high (≥30). The depersonalisation dimension was categorized as low (<6), moderate (6–11), and high (≥12: high) while the personal accomplishment dimension was categorized as low (≥40), moderate (34–39), and high (≤33). The Cronbach alpha's coefficient reliability test for this study was 0.773, 0.624, and 0.788 for emotional exhaustion, depersonalisation, and personal accomplishment, respectively. The overall burnout in this study was defined as the proportion of staff with high emotional exhaustion, depersonalisation, and low personal accomplishment.

The intention to quit the profession was measured by asking study participants if they had considered leaving the profession in the past 12 months. The question elicited a "yes" or "no" response with "yes" indicating that the participant had considered quitting the profession in the past 12 months. Participants that indicated they had considered quitting the profession were asked about reasons for their intention to quit the profession.

The simple random sampling technique was used to recruit 375 study participants from six (randomly selected) out of thirteen clinical departments. The total number of active nurses in each department was retrieved, and a proportional sample was estimated. Specifically, the total number of nurses in a selected department was divided by the total number of nurses in all the selected departments. A code was assigned to each nurse and these were written on a piece of paper and put in a bowl. This was shaken to ensure that they were evenly mixed. The papers were selected one after the other until the allocated number for each department was obtained. The participants that were recruited were all those who were approached by the investigators and agreed to participate in the study. The purpose of the study, risks, benefits, and confidentiality of the study were explained to all the study participants before being recruited into the study. All study participants that consented to take part in the study signed informed consent.

2.5. Data Management and Analysis. Data were entered into an excel spreadsheet. The data were cleaned and double-checked to ensure that there were no double and wrong entries. Data were exported to Stata version 16 for analysis and presented as means, frequencies, percentages tables, and graphs. The relationship between burnout and intention to quit was analyzed using the chi-square test and logistic regression analysis. A p-value of ≤0.05 was deemed statistically significant.

3. Results

3.1. Demographic and Work-Related Characteristics of Study Participants. Table 1 indicates the demographic and work-related characteristics of study participants. This study recorded a response rate of 98.7% (375/385). The mean age of the study participants was 31.5 (SD ± 5.0) with a minimum age of 21 years and a maximum age of 57 years. More than fifty per cent (56.0%, 210/375) were between the ages 30 and 39 years. Over eighty per cent (84.5%, 317/375) were females, and 54.4% (204/375) had diploma education.

Approximately 36.8% (138/375) of the study participants were of the rank "staff nurse/midwife." The mean working hours per week was 41.8 hours with a range of 20 to 96 hours. Approximately 46.9% (176/375) of the participants worked for 31–40 hours per week. The median working experience of the study participants was 4.0 years with a range of 1 to 30 years. Approximately 56.0% (210/375) of the participants had a working experience of between 6 and 10 years. Over 82.4% (309/375) of the participants indicated their reason for working as a nurse/midwife was their passion to care for the sick.

3.2. Intention to Quit the Profession and Burnout among Study Participants. The proportion of study participants that had an intention to quit the profession was 49.3% (185/375) (Table 2). Lack of motivation and management support ($n = 44$) was the predominant reason for having intention to quit the profession by study participants (Figure 1).

The overall prevalence of burnout among study participants was 2.1% (8/375). About 10.1% (38/375) of the study participants experienced high emotional exhaustion while over 24.0% (90/375) experienced high depersonalisation. About 56.3% (211/375) experienced low personal accomplishment (Table 2).

3.3. Relationship between Burnout and Intention to Quit the Profession. Table 3 represents the relationship between burnout and intention to quit among study participants. There was a statistically significant relationship between emotional exhaustion ($p < 0.001$), depersonalisation ($p < 0.001$), personal accomplishment ($p = 0.002$), and intention to quit the profession.

Table 4 represents the multiple logistic regression analysis of the relationship between burnout and intention to quit among study participants. The odds of participants that experienced high emotional exhaustion having an intention to quit the profession was about five times (Adjusted Odds Ratio, AOR = 5.46; 95% CI = 2.25–13.20, $p < 0.001$) higher compared to those that experienced low emotional exhaustion. The odds of participants that experienced moderate depersonalisation having an intention to quit the profession was about two times (AOR = 1.77 95%

Table 1: Demographic and work-related characteristics of study participants.

Variables	Frequency	Percentage, % [range]
Age (years)		
>30	146	38.9
30–39	210	56.0
40+	19	5.1
Mean (±SD)	31.5 (±5.0)	[21–57]
Gender		
Male	58	15.5
Female	317	84.5
Marital status		
Married	212	56.5
Single	163	43.5
Religion		
Christian	355	94.7
Muslim	20	5.3
Level of education		
Diploma	204	54.4
Graduate	151	40.3
Post-graduate	20	5.3
Professional rank		
Staff nurse/midwife	138	36.8
Senior staff nurse/midwife	70	18.7
Nursing/midwifery officer	102	27.2
Senior nursing/midwifery officer	45	12.0
Principal nursing/midwifery officer	20	5.3
Reasons for working as a nurse/midwife		
Passion to care for the sick	309	82.4
To earn an income	18	4.8
The program I chanced on after school	4	1.1
Not indicated	44	11.7
Working experience (years)		
1–5	146	38.9
6–10	210	56.0
11+	19	5.1
Median (years)	4.0	[1–30]
Working hours per week (hours)		
<31	26	6.9
31–40	176	46.9
41–50	154	41.1
51+	19	5.1
Mean (±SD)	41.8 (±8.5)	[20–96]

SD: standard deviation, not indicated = missing values, post-graduate: masters holders.

CI = 1.07–2.95, $p = 0.027$) higher compared to those that experienced low depersonalisation. Similarly, the odds of participants that experienced high personal accomplishment having an intention to quit the profession was about two times (AOR = 2.27; 95% CI = 1.30–3.96, $p = 0.004$) higher compared to those that experienced low personal accomplishment.

4. Discussion

The study showed the prevelence of an overall burnout and intention to quit that is about 2.1% and 49.3%, respectively. All dimensions of burnout were found to be significantly associated with intention to quit the profession. To the best of our knowledge, this is the first study to report on the effect of all the dimensions of burnout on intention to quit the profession among nursing professionals in Ghana. The growing demand for quality healthcare services makes it essential to improve the human resource of the healthcare industry. Retention of nursing professionals is the key to sustaining and improving the health system and quality healthcare delivery. Reducing burnout among these professionals is a key step towards this goal. Identifying the effect of burnout on intention to quit the profession will help all key stakeholders of health to set up public health policies that will reduce the incidence of burnout and intention to quit the profession to the barest minimum at the workplace.

The outcome of the present study suggests that the overall prevalence of burnout among nursing professionals was low (2.1%). The prevalence of the dimensions of burnout

Table 2: Intention to quit the profession and burnout among participants.

Variables	Frequency	Percentage, % [range]
Intention to quit the profession		
Yes	185	49.3
No	190	50.7
Burnout emotional exhaustion		
Low	223	59.5
Moderate	114	30.4
High	38	10.1
Mean (±SD)	16.4 (±9.1)	[0–42]
Depersonalisation		
Low	143	38.1
Moderate	142	37.9
High	90	24.0
Mean (±SD)	8.1 (±6.1)	[0–41]
Personal accomplishment		
Low	211	56.3
Moderate	80	21.3
High	84	22.4
Mean (±SD)	38.4 (±8.5)	[2–48]
Overall burnout		
Yes	8	2.1
No	367	97.9

SD: standard deviation.

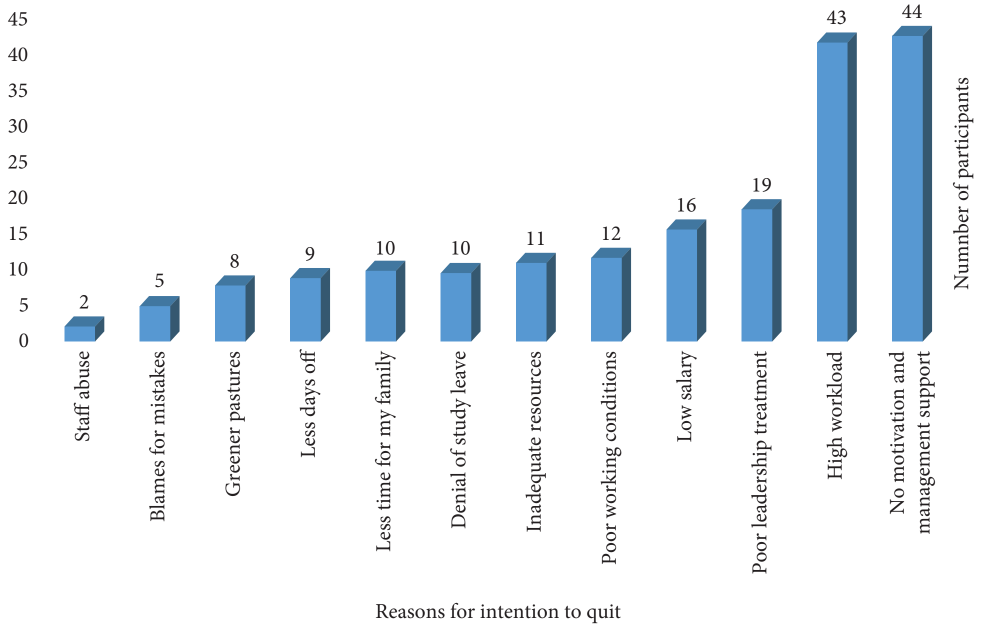

Figure 1: Reasons for intention to quit the profession among study participants.

in this study were 10.1% for high emotional exhaustion, 24.0% for high depersonalisation, and 56.3% for low personal accomplishment. Our study is similar to an earlier one that reported 10.8% high emotional exhaustion, 5.5% high depersonalisation, and 65.0% low personal accomplishment among health workers in Ghana [22]. The present study is also consistent with a similar study in China that found that about 8.02%, 15.93%, and 79.21% of nurses experienced high emotional exhaustion, depersonalisation, and low personal accomplishment, respectively, during the COVID-19 outbreak. However, our findings are at variance with those from a study that reported a pooled prevalence of high burnout of 51.0% emotional exhaustion, 52.0% depersonalisation, and 28% low personal accomplishment with about 52.0% of healthcare workers experiencing overall burnout during the COVID-19 pandemic [34]. In the United States, 65.1% high emotional exhaustion, 38.40% high depersonalisation, and 90.4% low depersonalisation have been reported among nurses working in a tertiary healthcare centre [35]. The variations in the study could be attributed to the

Table 3: Relationship between burnout and intention to quit among study participants.

Variable	Intention to quit Yes *n* (%)	 No *n* (%)	*p*-value
Emotional exhaustion			<0.001
Low	84 (37.7)	139 (62.3)	
Moderate	71 (62.3)	43 (37.7)	
High	30 (79.0)	8 (21.1)	
Depersonalisation			<0.001
Low	52 (36.4)	91 (63.6)	
Moderate	83 (58.5)	59 (41.6)	
High	50 (55.6)	40 (44.4)	
Personal accomplishment*			0.002
Low	88 (41.7)	123 (58.3)	
Moderate	44 (55.0)	36 (45.0)	
High	53 (63.1)	31 (36.9)	

Table 4: Multiple logistic regression analysis of the relationship between burnout and intention to quit among study participants.

Variables	Unadjusted OR (95% CI)	*p*-value	Adjusted OR (95% CI)	*p*-value
Emotional exhaustion				
Low	1.00		1.00	
Moderate	2.73 (1.72–4.35)	<0.001	2.49 (1.51–4.09)	<0.001
High	6.21 (2.72–14.17)	<0.001	5.46 (2.25–13.20)	<0.001
Depersonalisation				
Low	1.00		1.00	
Moderate	2.46 (1.53–3.97)	<0.001	1.77 (1.07–2.95)	0.027
High	2.19 (1.28–3.74)	0.004	1.06 (0.57–1.98)	0.843
Personal accomplishment				
Low	1.00		1.00	
Moderate	1.71 (1.02–2.87)	0.043	1.52 (0.88–2.62)	0.135
High	2.39 (1.42–4.02)	0.001	2.27 (1.30–3.96)	0.004

NB: each of the variables emotional exhaustion, depersonalisation, and personal accomplishment was adjusted for the other two ORs (odds ratio)s.

different study designs and the severity of the COVID-19 pandemic. The impact of the COVID-19 pandemic was very severe in the United States which could influence the nurses in the United States experiencing high burnout compared to the nurses in this study. The study reporting an overall burnout prevalence of 52.0% among HCWs [35] was a systematic review and meta-analysis that assessed a pooled prevalence of burnout which could increase the burnout rates compared to this study.

In this study, nearly half of the study participants had intentions to quit the profession. This is a matter of concern, especially amidst a global pandemic. This can also be very challenging for the health system as a whole where nursing professionals require optimum motivation and needed resources to deliver quality healthcare to patients. The participants harbouring an intention to quit the profession can result in high turnover among the nursing professionals which can affect quality healthcare delivery. This is because those intending to quit the profession have been in practice for at least four years and have acquired some experience which will be difficult to replace in a short time.

The proportion of participants intending to quit the profession in the present study (49.3%) is comparable to other reports of 46.1% in South Africa [25] and 44.6% in Japan [30]. However, it is higher than the findings of a multicentre European study in which a prevalence of 9.0% was reported among nurses [36] and lower than the 64.9% reported in Ethiopia [29]. The variations in the study findings may be attributed to the study population, facility type, methods, and tools for measuring intention to quit the profession. In the Ethiopian study [29], intention to quit the profession was measured using the Hand tool [37] which measures intention to quit using seven questions with a 5-point Likert scale while the present study measured intention to quit with a single question that elicited a “yes” or “no” response.

In the current study, all the dimensions of burnout were associated with intention to quit. This is in line with other studies that reported that burnout affects intention to quit the profession among nurses and midwives [38–40]. The participants that experienced high burnout for emotional exhaustion and personal accomplishment were more likely to have an intention to quit compared to those that experienced low burnout for emotional exhaustion and personal accomplishment, respectively. This is in consonance with a study that reported that a feeling of high emotional exhaustion for a prolonged time may increase the thought of intention to quit the profession [26]. The effect of high burnout for personal accomplishment on intention to quit could be that after long years of practice, they may have given up challenging the unfavourable work conditions (such as poor leadership style, inadequate personal protective equipment, high workload etc.) since previous attempts may not have yielded fruit. This can influence their decision to consider quitting their job or changing the work environment.

Moderate depersonalisation was also found to increase intention to quit the profession by 77% in the multivariate regression. This is comparable to a study that found depersonalisation as a predictor of intention to quit the profession among nurses [41]. This could be because people that experience moderate to high burnout for depersonalisation may develop a negative attitude towards patients and work which can negatively affect their involvement in the workplace [42]. Developing a negative attitude towards patients and work can lead to the HCW feeling that his or her current profession may not be good for him or her. This can result in professional detachment in him or her from the work which could induce his or her decision to quit.

The outcome of this study highlights the need to pay critical attention to all the dimensions of burnout in an attempt to reduce intention to quit the profession among nursing professionals. It also highlights the need to improve on the personal accomplishment of the nursing staff for a high retention rate. It is therefore important for organizational managers to put in place interventions (such as capacity building and rewarding hard work) that will promote the feeling of personal accomplishment of nurses and midwives at the workplace. Nurse and organizational managers should put in place strategies such as reducing workloads by employing more nurses or providing adequate resources to work with.

It is important that in formulating policies to address the retention of nursing professionals, a premium should be placed on the psychological and mental health of the professionals such as reducing the incidence of burnout at the workplace due to its consequences on intention to quit and retention. This can be mitigated through regular occupational health surveillance and workplace health promotion programs implemented with strategies combined with interventions by public and occupational health stakeholders [43, 44]. In situations where these strategies are not efficient, burnout levels could increase and lead to higher intention to quit, cause reduction in the quality of care, and result in high malpractice litigation [45].

4.1. Limitation of the Study. Due to the use of cross-sectional study design, drawing statistical associations to causal effect between burnout and intention to quit the profession is limited. In addition, the study findings are of limited generalizability as the study was conducted in only one facility. The odds ratio estimate for the association between high emotional exhaustion and intention to quit had a rather wide confidence interval suggesting low precision and should be interpreted with caution. The use of a structured questionnaire did not allow for a qualitative exploration of participants' response choices and this limits full comprehension of the dynamics underlying burnout and intention to quit. Nevertheless, the study provides useful insights into burnout and intention to quit the profession among the study participants, and this can be beneficial for nurses and organizational managers.

5. Conclusion

Moderate to high burnout for all three dimensions increases the risk of intention to quit the profession among nursing staff at a tertiary healthcare facility in Ghana. Work-based programmes and strategies such as occupational health surveillance that aim at reducing the incidence of burnout can impact positively on intention to quit the profession among nursing professionals. Future studies should therefore adopt a qualitative approach to fully explore the dynamics of burnout and its effect on intention to quit the profession among nursing professionals.

Data Availability

The datasets used for this study are available from the corresponding author upon reasonable request.

Ethical Approval

Ethical approval for the study was granted by Komfo Anokye Teaching Hospital Institutional Review Board (KATH-IRB) with reference number KATH-IRB/AP/040/20. All study participants accepted to take part in the study of their own free will and were assured of strict confidentiality.

Consent

Written informed consent was sought from the study participants.

Conflicts of Interest

Authors have no conflicts of interest to declare.

Authors' Contributions

DAO, NKAB, and AKE were involved in the conceptualization, design, and methods of the study. DAO, NKAB, AAB, AS, JO, KS, and AM were involved in the data collection, analysis, and interpretation. DAO drafted the original manuscript. All the authors read, revised, and approved the final manuscript for publication.

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Research Article

A Study of the Relationship between Professional Communication and Professional Commitment in Operating Room Nurses

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Background. Operating rooms are among the most complex clinical environments in hospitals where teamwork and professional communication play a very important part. Professional commitment is an influential factor in the personnel's professional communication and can affect the outcomes of healthcare services. *Objective*. The present study aims to investigate the relationship between professional communication and professional commitment in the operating room nurses in teaching hospitals. *Study Design*. The present study used a descriptive-correlational design. Participants were selected via census sampling from hospitals in Shiraz over a period of three months. The participants were 350 operating room nurses who met the inclusion criteria. Data were collected using professional communication and a professional commitment questionnaire. The collected data were analyzed using the descriptive and inferential statistics in SPSS *vv*. 22. *Findings*. The operating room nurses' mean scores for professional communication (136.81 ± 13.77) and professional commitment (71.42 ± 11.62) were found to be high. The results of the Pearson correlation coefficient test showed that there was a statistically significant linear relationship between professional communication and professional commitment ($p < 0.001$, $r = 0.235$). The results also showed that there was a significant relationship between professional commitment on the one hand and gender (p = 0.042), marital status (p = 0.047), and interest in work (p = 0/000) on the other hand. There was also a significant relationship between professional communication and interest in work (p = 0/000). *Conclusion*. Given the significance of professional communication and professional commitment in the operating rooms, it is recommended that healthcare administrators and policymakers take steps to improve these areas. It is suggested that measures should be taken to increase the personnel's awareness of the principles of professional communication and the significance of professional commitment through regular workshops.

1. Introduction

Because of its direct impact on human health, the healthcare system is viewed as one of the most important areas for continuing growth in all societies [1]. Operating rooms are among the most complex clinical environments in healthcare organizations [1]. All the members of a surgical team, including operating room nurses, nurse anesthesiologists, and doctors, must communicate with each other effectively to provide safe care to patients [2]. As the operating rooms are very stressful and challenging environments, satisfactory professional communication between nurses and doctors is essential for providing satisfactory care and maintaining patient safety [3].

Poor professional communication between operating room nurses and doctors results in stress, inability to concentrate, anger, lack of cooperation, distrust, decline in the quality of care, disregard for safety, and even death of patients [4, 5]. Studies show that poor communication among the operating room personnel due to verbal conflicts, interpersonal issues, unprofessional relationships, stress, and work overload can lead to patient dissatisfaction, retained surgical items, and operation on the wrong organ [6, 7]. In addition, if the members of the surgical team (the operating room personnel, nurse anesthesiologists, surgeons, and anesthesiologists) do not play their part in sharing information, the risk of death and postoperative complications increases up to four times [8].

Interpersonal communication and cooperation in hospitals are essential for achieving success. Satisfactory cooperation between the personnel improves the performance of healthcare teams and results in better patient satisfaction [9]. However, in different departments of hospitals, occasional conflicts occur between healthcare professionals. Conflicts between nurses and doctors are known to be an inevitable part of professional relationships in hospitals with potentially adverse effects on the quality of care provided to patients [10]. Effective communication correlates with job satisfaction, motivation, professional performance, productivity, organizational atmosphere, leadership strategies, and organizational commitment [11].

Professional commitment, on the other hand, is an influential factor in the personnel's professional communication and affects the outcome of healthcare services [6, 7]. Professional commitment is defined as a sense of identity and attachment to a particular profession and willingness to work at a job [12]. Professional commitment is an important predicting factor in nurses' professional performance [8] and a facilitating factor in reducing nurses' emotional fatigue due to work overload [13]. Absenteeism, job burnout, and medical errors have been reported to be more common among nurses with lower levels of professional commitment [14]. On the other hand, high professional commitment in the healthcare personnel results in better job satisfaction [11]. Professional commitment also helps healthcare organizations achieve their objectives, namely, providing adequate quality healthcare services to patients and increasing patient safety and satisfaction [15].

Despite the significance of the concepts of professional communication and professional commitment in clinical environments, an extensive review of the literature showed that no studies had specifically addressed the relationship between professional communication and professional commitment in operating room nurses. Accordingly, the present study was conducted to investigate the relationship between professional communication and professional commitment in this population.

2. Method

2.1. Study Design and Sampling. The present study is a descriptive-correlational work of research. The sample was selected via census sampling from 7 teaching hospitals located in Shiraz, the largest city in the south of Iran. After acquiring the phone numbers and email addresses of the subjects from the main office of nurses in the province, the researchers contacted them and asked them to participate in the study. In total, 350 operating room nurses who met the inclusion criteria participated in this study. The inclusion criteria were being willing to participate, having at least an associate degree in operating room nursing or anesthesia, and having a minimum of six months of experience of practice in operating rooms. The subjects who were not willing to participate or failed to complete the questionnaires fully were excluded. Because of the COVID-19 pandemic, the questionnaires were converted to online surveys using Porsline and then sent to the participants via the social networks such asWhatsApp and Telegram.

2.2. Data Collection Instruments. The data collection instruments consisted of a demographics survey (age, gender, marital status, education, work experience, specialty, interest in work, and work shift), a professional communication questionnaire, and a professional commitment questionnaire. Developed by Torabizadeh et al. in 2019, the operating room professional communication questionnaire was reported to have satisfactory psychometric properties. The questionnaire consists of 41 items in six domains: mutual respect and trust, teamwork, ethical competence, physical conditions of the work environment, workplace conflicts, and interprofessional interactions. Scoring is on a 5-point Likert scale, ranging from never to always (never = 1; rarely = 2; occasionally = 3; often = 4; always = 5). 13 items are reverse scored. The score range of the questionnaire is between 93 and 153. The respondents' professional communication scores are divided into three categories: poor (93–113), average (113–133), and strong (133–153). The validity of the questionnaire has been measured in terms of its face validity, content validity, and construct validity. Measured by the internal homogeneity and consistency methods, the reliability of the questionnaire has been calculated to be a Cronbach's alpha of 0.92. The internal homogeneity of the instrument has also been measured by calculation of its Cronbach's alpha, whose value was 0.7 to 0.8. The consistency of the questionnaire was evaluated using the test-retest method [16].

The professional commitment questionnaire was developed by Lin et al. in 2007. The questionnaire consists of 19 items that address the three domains of satisfaction with the nursing profession, involvement in the nursing profession, and staying in the nursing profession. Responses to the items are arranged on a 5-point Likert scale, ranging from "I completely disagree = 1" to "I completely agree = 5." The validity and reliability of the instrument have been assessed and verified by the creators of the instrument. The Cronbach's alpha coefficient of total scores was 0.91, implying that the instrument was internally and consistently structured. The test_retest reliability of total scores was 0.91, suggesting that the NPCS instrument was consistent over time. The score range of the questionnaire is between 19 to95. Professional commitment scores fall into three categories: poor (19–44.33), average (44.3,3–69.66), and strong (69.66–95) [17].

2.3. Data Analysis. The collected data were analyzed in the IBM SPSS *v*v. 22. The quantitative variables were reported using mean and standard deviation, and the qualitative variables were reported in frequency and percentage. The data were analyzed using the statistical tests of the Pearson correlation coefficient, Spearman correlation coefficient, independent t-test, and one-way ANOVA. The significance level was set at$p < 0.05$.

2.4. Ethical Considerations. The present study was conducted after it had been approved by the ethics committee at the Shiraz University of Medical Sciences (ethics code: IR.SUMS.REC.1400.078). To preserve the participants' anonymity and the confidentiality of their information, the questionnaires were assigned codes before being submitted to the nurses. The participants were informed about the objectives of the study and the voluntary nature of their participation. All the nurses who participated in the study had completed the informed consent form.

3. Findings

Of the 350 operating room nurses who participated, the majority were female (61.4%), were married (60%), and had a bachelor's degree (83.1%). The participants' mean age and work experience were 32.27 ± 7.17 and 8.93 ± 7.08 years, respectively (Table 1).

The results showed that the operating room nurses' mean scores for professional communication (136.81 ± 13.77) and professional commitment (71.42 ± 11.62) were high. The highest professional communication means score was related to the dimension of interprofessional interactions (32.96 ± 5.66) and the highest professional commitment mean score was related to the dimension of involvement in one's profession (37.46 ± 4.81) (Table 2).

The results of the Pearson correlation coefficient test showed that there was a statistically significant direct relationship between the operating room nurses' professional communication and professional commitment mean scores ($p < 0.001$, $r = 0.235$), meaning that an increase in their professional communication scores correlated with an increase in their professional commitment scores and vice versa. It was also found that there was a direct one-to-one relationship between many dimensions of the variables, except for the dimensions of involvement in the profession, staying in the profession, workplace conflicts, and interprofessional interactions (Table 3).

The results of the study showed that there was a statistically significant relationship between the mean scores for professional communication and interest in work. On the other hand, the relationship between the participants' professional communication mean scores and the variables of age, gender, marital status, education, academic major, work experience, and work shift was not significant ($p > 0.05$) (Table 4).

The relationship between the participants' professional commitment mean scores on the one hand and their gender (p = 0.041), marital status (p = 0.047), and interest in work on the other was found to be statistically significant. However, the relationship between the professional commitment mean scores and the variables of age, education, academic major, work experience, and work shift was not significant ($p > 0.05$) (Table 4).

Table 1: The participants' demographic characteristics.

Variable		Number (percentage)
Gender	Male	135 (38.6)
	Female	215 (61.4)
Education	Associate degree	45 (12.9)
	Bachelor's degree	291 (83.1)
	Master's degree	14 (4)
Marital status	Single	140 (40)
	Married	210 (60)
Academic major	Operating room	253 (72.3)
	Anesthesia	97 (27.7)
Work shift	Fixed	65 (18.6)
	Rotational	285 (81.4)
Interest in work	Yes	301 (86)
	No	49 (14)

Table 2: The means and standard deviations of the participants' professional communication and professional commitment scores.

Dimensions of professional communication	Mean ± SD	Dimensions of professional commitment	Mean ± SD
Mutual respect and trust	74.38 ± 2.14	Satisfaction with profession	24.06 ± 5.65
Teamwork	13.66 ± 2.71	Involvement in profession	37.46 ± 4.81
Ethical competence	31.39 ± 5.66	Staying in profession	9.89 ± 3.03
Physical conditions of the work environment	23.26 ± 3.3	Total score	71.41 ± 11.61
Workplace conflicts	21.14 ± 2.84		
Interprofessional interactions	32.96 ± 2.84		
Total score	136.80 ± 13.76		

4. Discussion

The present study investigated the relationship between professional communication and professional commitment, as well as the relationship between these two variables and demographic variables in operating room nurses. Overall, the results showed that the participants' professional communication and professional commitment mean scores were high and that there was a significant direct relationship between the two concepts.

In the present study, the operating room nurses' professional communication mean score was high. Similarly, studying professional communication between

Table 3: The relationships between the dimensions of professional communication and professional commitment.

Professional communication total score	Dimensions of professional communication Interprofessional interactions	Workplace conflicts	Physical conditions of the work environment	Ethical competence	Teamwork	Respect	Variable	Variable
136.81 ± 13.77	$r = 0.048$ $p = 0.369$	$r = 021$ $p = 0.691$	$r = 0.157$ $p = 0.03^{*}$	$r = 0.297$ $p = 0.000^{*}$	$r = 0.244$ $p = 0.000^{*}$	$r = 0.186$ $p = 0.000^{*}$	Satisfaction	Dimensions of professional commitment communication
	$r = 0.056$ $p = 0.300$	$r = 0.077$ $p = 0.151$	$r = 0.122$ $p = 0.023^{*}$	$r = 0.250$ $p = 0.000^{*}$	$r = 0.255$ $p = 0.000^{*}$	$r = 0.192$ $p = 0.000^{*}$	Involvement in profession	
	$r = 0.022$ $p = 0.676$	$r = 0.047$ $p = 0.378$	$r = 0.121$ $p = 0.024^{*}$	$r = 0.245$ $p = 0.000^{*}$	$r = 0.195$ $p = 0.000^{*}$	$r = 0.138$ $p = 0.010^{*}$	Staying in profession	
$r = 0.235$ $p = \ > 0.001^{*}$			71.42 ± 11.62				Professional commitment total score	

*The relationship is significant (p value<0.05).

Table 4: The relationship between the participants' professional communication and professional commitment mean scores and their demographic characteristics.

Demographic characteristics		Variable Professional commitment	Professional communication
Age[a]		$r = 0.016$; $p = 0.186$	$r = 0.066$; $p = 0.216$
Work experience[a]		$r = 0.056$; $p = 0.281$	$r = 0.065$; $p = 0.203$
Academic major[b]	Operating room	72.21 ± 10.37	137.05 ± 13.37
	Anesthesia	69.32 ± 14.22	136.14 ± 14.79
	p value	0.071	0.518
Gender[c]	Male	68.3481 ± 12.11	135.6 ± 130.8
	Female	73.3442 ± 10.8	137.5302 ± 13.3
	p value	0.041^{*}	0.665
Work shift[c]	Fixed	71.9 ± 11.8	140.0 ± 11.31
	Rotational	71.29 ± 11.7	141.53 ± 11.41
	p value	0.672	0.155
Marital status[c]	Single	69.8 ± 12.9	135.7786 ± 13.08
	Married	72.4 ± 10.5	137.4905 ± 14.045
	p value	0.047^{*}	0.255
Interest in work[c]	Yes	73.5 ± 9.8	137.87 ± 13.12
	No	58.3 ± 10.5	130.2 ± 14.81
	p value	0.000^{*}	0.000^{*}
Education[b]	Associate degree	73.4000 ± 10.42593	139.2 0 ± 12.31
	Bachelor's degree	71.0481 ± 11.7	140.0 ± 11.93
	Master's degree	72.7 ± 11.5	139.64 ± 13.02
	p value	0.412	0.634

*The relationship was significant ($p < 0.05$). *[a]Pearson correlation test. [b]ANOVA. [c]t-test.

doctors and nurses and its impact on the quality of patient care, Ghahramanian et al. reported that professional communication between doctors and nurses was satisfactory and that this improved the quality of care provided to patients [12]. Also, the results of a study by Song et al. showed that competence in professional communication enables special care nurses to provide better quality care to their patients [18]. These research findings are consistent with the results of the present study. On the other hand, the results of a study in South Africa showed that the nurses' satisfaction with their interprofessional communication was low [19]. The discrepancy can be attributed to the fact that the present study evaluated communication between operating room nurses and doctors, but the abovementioned study measured nurses' satisfaction with their communication with doctors and the other hospital staff. Also, the sample size of the present study was larger.

One of the dimensions of professional communication addressed in the present study was interprofessional interactions, which attracted the highest score. The results of another study shows that improvement in interprofessional interactions between nurses and doctors results in better professional performance and less errors [20]. According to another study conducted in Palestine, almost 75% of nurses and 24% of doctors have a positive perception of their interprofessional communication [21]. The results of a study by Amudha et al. shows that nurses' poor practical competence, barriers in the workplace, and doctors' characteristics are the three main factors in the communication gap between doctors and nurses. Effective communication among healthcare providers is crucial to the success of every healthcare system and can guarantee good decision-making surrounding patients' care. Communication and teamwork are the backbone of healthcare organizations and contribute to patients' safety [22]. In contrast to the findings of the present study, the results of a similar study show that operating room nurses perceive their communication with doctors to be unsatisfactory because of the latter's domineering attitude [23]. Discrepancies between the nurses' perceptions may be due to differences between cultural and religious contexts, data collection instruments, and research settings.

In the present study, the operating room nurses perceived the status of professional commitment to be strong. The highest mean score in this domain was related to the dimension of involvement in the profession. Similarly, the results of a study in Taiwan show nurses' professional commitment to be satisfactory [24]. Also, a cross-sectional study of 384 nurses conducted in Turkey shows the level of nurses' professional commitment to be high [25]. In a study by Hsu et al., nurses' professional commitment was found to be satisfactory. Also, as in the present study, the highest professional commitment mean score was for involvement in a profession [26].

Another finding of the present study is that there is a significant positive relationship between operating room nurses' professional communication and professional commitment. Thus, an increase in one index correlates with an increase in the other and vice versa. Studies in which these two variables have been explored independently show that professional communication and commitment both have a significant direct relationship with nurses' job satisfaction [27, 28]. Moreover, each index can separately contribute to nurses' self-efficacy [28].

The findings of the present study showed that the relationship between the participants' mean age, gender, academic major, work experience, education, and work shift on the one hand and their professional communication mean score on the other hand was not significant. However, the nurses who had greater interest in their academic major achieved higher scores in the domain of professional communication. The results of a cross-sectional study in Iran show that there is a significant positive relationship between nurses' professional communication and interest in work, which is consistent with the findings of the present study [29].

In the present study, the relationship between the participant's age, work experience, education, and work shift and their professional commitment mean score was not significant. However, female and married nurses who were interested in their profession achieved higher professional commitment scores. In their study, Mersin et al. report a significant positive relationship between professional commitment and interest in a profession [30]. Likewise, the results of the present study showed that the participants' professional commitment correlated positively with their interest in their profession. Also, according to a study by Hsu et al., there is a significant relationship between professional commitment on the one hand and marital status and employment status on the other hand, which finding is consistent with the results of the present study [26].

According to a cross-sectional study of nurses in Turkey, there is a significant positive relationship between professional commitment and age and work shift in nurses who work fixed shifts and are aged over 40 years, which finding is not consistent with the results of the present study [31]. The discrepancy may be due to cultural and organizational differences between the two study populations. It is suggested that future studies in this area address the possible relationship between professional commitment and cultural and social factors.

5. Conclusion

Professional communication and commitment in the personnel in operating rooms can guarantee patient safety and high-quality care. The findings of the present study show that there is a significant direct relationship between professional communication and professional commitment in the operating room personnel. Today's healthcare systems need committed personnel who are capable of effective professional communication even when complex ethical conflicts are present. Accordingly, operating room personnel's awareness of these concepts should be raised, and policymakers should take measures to improve professional communication and commitment in this population.

5.1. Study Limitations. The concurrence of the present study with the COVID-19 pandemic limited the researchers' access to the subjects of the study. Accordingly, the questionnaires were developed using Porsline and sent to the participants. Even though the questionnaires were completed virtually, some of the participants may have provided inaccurate answers, which could have affected the results of the study.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Disclosure

The present article is part of the first author's master's thesis, registration code 22500, which was approved by the Research Department of Shiraz University of Medical Sciences, ethics code: IR.SUMS.REC.1400.078.

Conflicts of Interest

The authors declare no conflicts of interest.

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Research Article

Impacts of Nursing Work Environment on Turnover Intentions: The Mediating Role of Burnout in Ghana

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Background. The nursing practice environment supports excellence and decent work and has the influence to entice and retain the quality nursing workforce. Appreciating the dynamics that affect the turnover intention of RNs offer reasonable solutions to the challenges of the nursing shortage, which directly influence the quality of nursing care. There is a paucity of information on the impacts of these concepts among RNs in Sub-Saharan African. The study therefore aimed at determining the impacts of work environment and burnout on turnover intentions among RNs in Ghana. *Methods*. A descriptive cross-sectional design using a simple random and proportionate stratified sampling with a sample of 232 RNs from Municipal and Regional Hospitals, Sunyani, West-Central part of Ghana completed validated instruments measuring work environment, burnout, and turnover intentions. Descriptive analysis was done to find out RNs' perceptions of their work environment and turnover intentions. Mediation analysis by Baron and Kenny's approach was used to determine the mediating effect of burnout on the relationship between the domains of PPE and the turnover intention of RNs. STROBE checklist was used as the reporting tool. *Results*. While most RNs had a positive perception about their work environment, greater number of them had turnover intentions. There were significant associations between some nursing work environment facets and turnover intention. The results also showed a statistically significant relationship between nurse-physician relation ($\beta = .353$, $t = 5.476$, $p \leq .001$), nurse manager leadership ($\beta = -0.485$, $t = -8.192$, $p \leq .001$), nursing foundation for quality care ($\beta = .400$, $t = 7.059$, $p \leq .001$), staffing and resource adequacy on ($\beta = 0.485$, $t = 8.183$, $p \leq .001$), and turnover intention as mediated by burnout. *Conclusion*. Burnout resulting from an unsafe work environment impact RNs' turnover intention. This phenomenon can potentially affect the human resource management and quality of nursing care. Policy strategies aimed at ensuring a professional practice environment and decreased burnout can therefore improve retention of RNs at their workplace.

1. Background

Globally, the quality of the nursing workforce and the existence of a professional practice environment (PPE) are in close association with client care satisfaction, quality of care delivery, and positive staff job outcomes [1,2]. The subject of staff turnover is an important area in every health care setting, and it needs thorough research to sustain the evidence-based nursing practice in health care organizations, especially in low-resourced countries.

It is reported that health facilities with a positive work environment and adequate nursing workforce had improved outcomes for both patients and nursing staff [3–5]. The evaluation of quality care and job satisfaction by Registered Nurses (RNs) in the high-resourced countries ranges from worst to best. It is noteworthy to know that countries using the Magnet Certification to encourage value-added practice environments such as the United States have improved in their provision of quality care to patients and other job outcomes [6].

Among the major challenges of low-and-middle-income countries (LMICs) in the work environment is an unbalanced nursing workforce mix with its corresponding negative effects on job outcomes (job dissatisfaction, higher staff turnover, and poor quality of care delivery). Studies have shown a higher incidence of turnover intentions of RNs in LMICs [7,8], though the same cannot be said about the high-resourced countries [9]. This phenomenon, if not effectively tackled, can cause a lot of challenges for health care providers in the long run globally.

Staff turnover is the process by which workers vacate their job or are transferred from the worker's employment [10]. Health labor force scarcities have consequences on global health care delivery and quality of patients' care; appreciating the challenges of turnover rate and retention of staff is essential on the discussion of policy strategies for improving the nursing workforce. Institutions where staff freely express their plans of quitting their job usually have higher turnover [11,12]. High staff turnover intentions in many organizations are attributed to factors such as poor quality of staffing and inadequacy of working material to care for the patient [13–15]. Such poor work conditions present high work demand with low RNs' autonomy over their job, inadequate group support, and increased physical and emotional work demand. Lack of support from nurse managers, unjustified workloads, and increased emotional exhaustion of RNs mostly lead to increased staff intentions of resignation [10–12]. Moreover, most RNs leave their job owing to a lack of professional/career development and poor organizational climate [12,13]. Nursing leadership consciousness of the reasons behind turnover intention can help improve the organizational culture [14,15]. It can also inform nurse managers and administrators about important pillars in health care delivery that makes the nursing workforce satisfied [10,16,17].

In high-resourced settings, though RNs' turnover intentions are low, the lack of leadership support, inadequate involvement of RNs in hospital affairs, and material and human resource constraints at the workplace are observed to be predictors of RNs' turnover intention. Again, nurses' emotional exhaustion and perception of job engagement are significant mediators of nurses' turnover intentions in an organization [18,19].

In LMICs settings such as Ghana, where turnover intention for workers is projected to be 25.9%, increased burnout, limited prospects in the area practice, and bias in career upgrade are cited as the reason for turnover intentions. Burnout among staff who remain to work in the practice environment [20–22] accounts for the high turnover of health staff in the health care settings.

The high turnover intention in any organization presents its challenges, notably is high monetary loss. Moreover, the financial costs of RNs quitting their job in organizations are projected to be higher than before [23–25]. With a very challenging nurse-patient ratio in Ghana, there is still a reportedly high rate of turnover intention and/or turnover among skilled workers [26,27]. With the health care industry depending on the few remaining RNs, the challenge of burnout also emanates.

The problem of high staff turnover rate is an important area in every health care setting, and it needs thorough discussion in the quest to sustain quality in the health care industry. Addressing this problem can fix the quality of patient care challenge in most health facilities. Anecdotally, more RNs are leaving their job either for greener pastures in high-resource countries and/or joining other professions due to the associated challenges in working in public health facilities in Ghana. Contrariwise, there is limited data on the Ghanaian nursing work environment and burnout; and its implications on turnover intentions among RNs. The study, therefore, assessed the influence of work environment and burnout on turnover intentions among RNs in Ghana. Thus, the study sought to ascertain RNs' intention to leave their job, assess the relationship between work environment and turnover intention of RNs, and determine the predictors of turnover intentions among RNs. Findings can inform policies to reduce nursing workforce turnover, thereby addressing unhealthy practice environment, burnout, and quality of patient's care challenges, especially in sub-Saharan Africa.

1.1. Theoretical Framework. The Causal Model of Professional Nursing Practice Environment and Nursing Job Outcome was proposed and used by Panunto and Guirardello [28]. The model assumes that the nature of the practice environment impacts the nursing job outcomes when mediated by burnout [29,30]. It seeks to clarify the work environment and ways to improve it. The model is composed of exogenous variables PPE (autonomy, control over work environment, nurse-physician relations) and endogenous variables (job satisfaction, quality of patient care, and intention to leave their job) as mediated by burnout (emotional exhaustion, depersonalization, personal accomplishment). Autonomy, control over the work environment, and nurse-physician relations influence each other while they individually impact the burnout dimensions and nursing job outcomes [28]. Theoretically, the three elements of the PPE were operationalized based on Lake's Practice Environment Scale on Nursing Work Index [31]. Panunto and Guirardello used these designations to replace the features of their model; nurse manager ability, leadership, and support (control over work environment) were described as the capacity to manage resources, support nurses, and the practices needed to deliver quality care. Collegial nurse-physician relationships (i.e., nurse-physician relations) reflected the total worth of the relationship between nurses and physicians. Nurse participation in hospital affairs (i.e., control over work environment) was explained as the degree by which nurses were involved in decision-making regarding healthcare management. Adequate staffing and resources (i.e., control over work environment) measure the availability of human and material resources to meet quality patient care. Nursing foundations for quality care (autonomy) reflected the professionalism of nursing in outlining the standards by which care is given to patients rather than depending on medical models to provide care. The interaction of these features was suggested to impact emotional exhaustion, depersonalization, or personal accomplishment, and in effect, results in the nursing job outcomes; thus, quality nursing care, job satisfaction, and intent to leave a job [32]. The causal model encodes appropriate knowledge about the tendency of specific occurrences to cause other event types. Thus, this model is used to determine the causes of RNs turnover, given assumptions about poor work environment and burnout. The model is, however, complex and cannot handle some situations. The weaknesses also include the issue of multiple roles elements, elements that affect more variables in the model. This is demonstrated in the interactions of the various facets of the practice environment, dimensions of burnout, and nursing job outcomes.

2. Methods

2.1. Study Design and Setting. A cross-sectional survey was adopted to assess the participant's views on the influence of work environment and burnout on turnover intentions of RNs in Sunyani Municipality, which is found in the middle belt, West-Central part of Ghana, with a population of 123,224 [33]. The population involved 550 RNs in public health facilities who agreed to take part in the research. RNs with at least one year of postqualification experience were included in the study.

2.2. Sample Size and Sampling Method. A sample of 255 RNs was used as estimated using Yamane's [34] formula for calculating sample size. The recruitment flowchart is presented in Figure 1. Participants were drawn through a multistage sampling method; thus, a simple random sampling technique was used to select two [2] hospitals from seven public facilities in Sunyani for the study. A proportionate stratified sampling approach was then used to assign a proportionate number to each facility based on the nursing workforce of the two settings to ensure unbiased representation (Sunyani Municipal Hospital – 77 and Regional Hospital –178). A convenience sampling was used in recruiting the participants throughout all three shifts run by the RNs in the two hospitals. It was ensured that questionnaires were adequately completed before collection. There was a 91.0% response rate.

2.3. Data Collection. The instruments used for the study were standard tools. The instrument comprised of four [4] subsections: sociodemographic information and three [3] other scales. The Practice Environment Scale of Nursing Work Index (PES-NWI) was adapted to measure the nursing work environment. The PES-NWI comprises 32 items divided among five subscales measured on a four Likert scale 1–4 (1 = strongly disagree; 4 = strongly agree). The sum and average of the scales score provide the PES-NWI score. Other studies that have used the PES-NWI have established reliability coefficient between 0.84 and 0.92 [29,35]. Burnout was measured using the Maslach Burnout Inventory (MBI) Scale [36]. MBI consists of 21 items on a Likert scale of 1–7 (1 = Never; 7 = Everyday). Burnout is the sum of all 21 items. Several studies have shown acceptable tool reliability and validity [27,37]. A single-item tool was used to measure the turnover intentions of RN on a Likert scale of 1–4 (1 = strongly disagree; 4 = strongly agree).

Ethical approval was sought from Noguchi Memorial Institute for Medical Research Institutional Review Board-–IRB (CPN 045/16–17) and clearance from the Ghana Health Service (GHS) Regional Health Directorate (Brong Ahafo) before the commencement of the research. Consent was obtained from the respondents before the questionnaire was given to them. The benefits and possible risks were also explained to the respondents. Additionally, respondents' anonymity and confidentiality were assured by indicating that they were not required to write their name on the questionnaire and by assuring them that their responses would not in any way be linked to them.

2.4. Data Analysis. Statistical Package for Social Sciences (SPSS), version 25.0, was used for the statistical analysis. Data were analyzed at a significance level of 0.05 and a power of 95%. Descriptive analysis was done to find out the frequencies, percentages, mean and standard deviation of RNs' perceptions of practice environment and turnover intentions. The hypothesized model was tested by mediation analysis using [38] Baron and Kenny's approach. The mediation analysis requires the conditions that: practice environment (the predictor) must be significantly associated with turnover intention (the outcome); practice environment (the predictor) must be significantly associated with burnout (the mediator); finally, the turnover intention is regressed on both practice environment (the predictor) and burnout (the mediator). If the effect of the predictor (practice environment) on the outcome (turnover intention) with the presence of the mediator (burnout) is zero, then there is full mediation. If all the conditions are satisfied except for the final condition, then there is a partial mediation. The predictor variable (practice environment), the mediator (burnout), and the outcome variables (turnover intention) were normally distributed and linear relationships existed among them.

3. Results

3.1. RNs' Perception of Work Environment. The means and standard deviations for the study variable of PPE are found in Table 1. RNs reported a relatively moderate perception of PPE (65.87). Concerning the individual subscales, there were moderate perceptions of nurse manager leadership, ability and support (mean = 21.98), collegial nurse-physician relation (mean = 15.17), staffing, and resource adequacy (mean = 15.47), nurses' participation in hospital affairs (mean = 7.03), and nursing foundation for quality of care (mean = 8.71).

The result shows the mean score for RNs' intention to leave the job to be 2.94 (SD = 1.07), which is high and indicates that RNs had turnover intention, while 39.2% of the nursing workforce had intentions to leave the job, about one-third (31.5%) were indecisive on their intentions to leave the job.

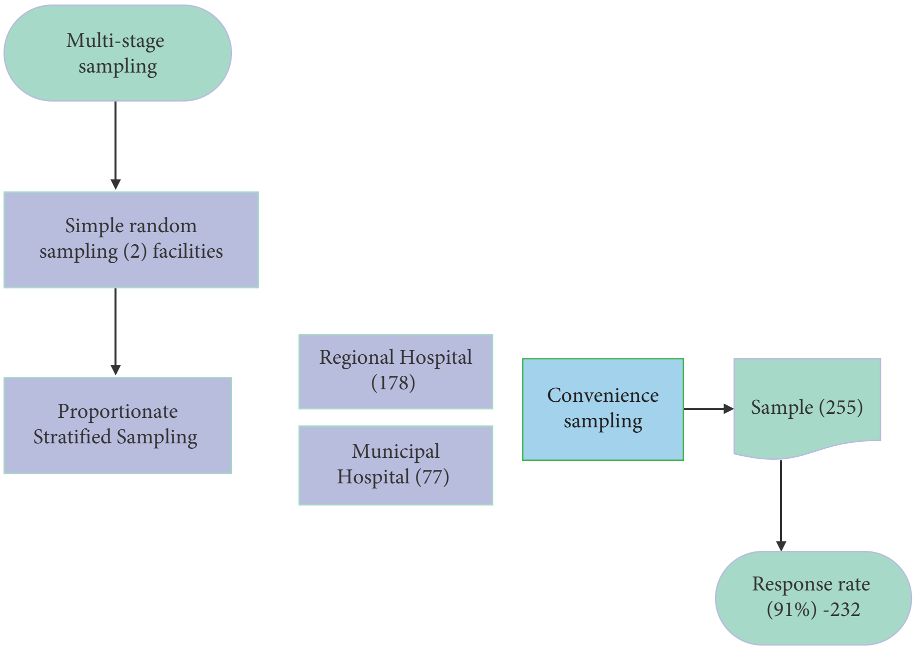

Figure 1: Recruitment flowchart.

Table 1: Nurses' perception about their professional practice environment.

PES-NWI subscales	Frequency	Percent	Min	Max	Mean	SD
Nurse manager ability, leadership, and support						
Dissatisfied	140	60.3				
Satisfied	92	39.7	11	44	21.98	3.56
Collegial nurse-physician relations						
Poor	137	59.1	7	28	15.17	4.19
Good	95	40.9				
Staffing and resource adequacy						
Inadequate	129	55.6	7	28	15.47	3.78
Adequate	103	44.4				
Nurses' participation in hospital affair						
Dissatisfied	118	50.9	3	12	7.03	1.68
Satisfied	114	49.1				
Nursing foundation for quality of care						
Availability	89	38.4	4	16	8.71	2.07
Non-availability	143	61.6				
Total PES score						
Dissatisfied	100	43.1	32	128	65.87	9.68
Satisfied	132	56.9				

(Field Data, 2017). PES: Practice Environment Scale, NWI: Nursing Work Index, SD: Standard Deviation. Turnover intention of the RN.

3.2. Mediation Effect of Burnout on the Relationship between Work Environment and Turnover Intention. Baron and Kenny (1986) proposed a four-step approach in which several regression analyses are conducted and the significance of the coefficients are examined at each step. In step one, the linear regression analysis was used to establish the relationship between the domains of the work environment (nurse manager leadership, ability and support; nurse-physician relations; nurse participation in hospital affairs; staffing and resource adequacy; nursing foundation for quality care) and turnover intention. The results showed a statistically significant relationship between all the domains of work environment and turnover intention ($p > .05$); except nurse participation in hospital affairs.

Step two sought to establish the relationship between the domains of the work environment (independent variables) and burnout (mediating variable). The results also showed a statistically significant relationship between all the domains of work environment and burnout ($p > .05$). In step three, there was a statistically significant relationship between all the domains of the work environment except one and the turnover intention of the RNs. These findings imply that all the independent variables met the assumptions for a mediation analysis as required by Baron and Kenny (1986), except for nurse participation in hospital affairs.

3.3. Mediation Effect of Burnout on the Relationship between Nurse-Physician Relation and Turnover Intention. The results in Table 2 below revealed a complete mediating effect of burnout on the relationship between nurse-physician relationship and turnover intention. The regression coefficients in model one of the mediation analyses initially revealed a significant relationship between the nurse-physician relationship and turnover intention ($\beta = -0.130$, $t = -1.993$, $p = 0.048$), indicating a significant total effect of the nurse-physician relationship on turnover intention. With the inclusion of the mediating variable (burnout) in model two of the mediation analysis, there was a significant relationship between burnout and turnover intention ($\beta = 0.353$, $t = 5.476$, $p \leq .001$). However, the indirect effect of the nurse-physician relationship on turnover intention became insignificant ($\beta = -0.026$, $t = -0.399$, $p = .690$). This implies that the influence of the nurse-physician relationship on turnover intention is completely mediated by burnout.

3.4. Mediation Effect of Burnout on the Relationship between Nurse Manager Leadership Styles and Turnover Intention. In assessing the regression coefficients of the mediation effect of burnout on the relationship between Nurse Manager's Leadership Styles and turnover intention in Figure 2, the first model revealed a significant relationship between Nurse Manager's Leadership Styles and turnover intention ($\beta = -0.553$, $t = -.10.038$, $p \leq .001$). When the mediating variable (burnout) was included in the analysis in model two, the indirect effect of Nurse Manager's Leadership Styles on turnover intention remained significant, but with a reduced effect size ($\beta = -.485$, $t = -8.192$, $p \leq .001$). This implies that the relationship between Nurse Manager's Leadership Styles on turnover intention is partially mediated by burnout.

3.5. Mediation Effect of Burnout on the Relationship between Nursing Foundation for Quality Care and turnover intention. The results of the impact of burnout on the relationship between the Nursing Foundation for Quality Care and turnover intention are presented in Table 3. In assessing the regression coefficients of Nursing Foundation for Quality Care on turnover intention in model one, the results revealed a significant relationship between Nursing Foundation for Quality Care and turnover intention ($\beta = .449$, $t = 7.630$, $p \leq .001$). When the mediating variable (burnout) was included in the analysis in model two, the indirect effect of Nursing Foundation for Quality Care on turnover intention through burnout remained significant ($\beta = .400$, $t = 7.059$, $p \leq .001$), with a reduced effect size. This implies that burnout partially mediates the relationship between Nursing Foundation for Quality Care and turnover intention.

The regression coefficients in model one of the mediation analyses as found in Figure 3 initially revealed a significant relationship between the Staffing and Resource Adequacy and turnover intention ($\beta = .552$, $t = 10.031$, $p = .048$). This indicates a significant total effect of Staffing and Resource Adequacy on turnover intention. With the inclusion of the mediating variable (burnout) in model two of the mediation analysis, the relationship between burnout and turnover intention was significant ($\beta = .164$, $t = 2.774$, $p = .006$). The indirect effect of Staffing and Resource Adequacy on turnover intention was still insignificant but with a reduced effect size ($\beta = .485$, $t = 8.183$, $p = .006$), implying the influence of Staffing and Resource Adequacy on turnover intention.

4. Discussion

The turnover intention of the RNs is influenced by the domains of the work environment, and this relationship is mediated by burnout. This finding proves that the work environment has a direct significant relationship with RNs' turnover intentions, and it is consistent with a study that concluded nurse-physician relationship, nursing leadership, staffing, and resource adequacy, and nursing foundation for quality care to be correlated with RN intention to leave [9]. Nurse Managers' leadership styles safeguard quality practice environments and, for that matter, have a greater rate of retaining staff. The findings thus support the assertion that nurse manager ability, leadership, and support impact RNs' intention to stay [29,33]. There is a significant influence of the nurse-physician relations on turnover intention of the RN when burnout mediates the relationship. This implies a likelihood of RNs requesting a transfer or may have high intentions to leave an organization when there is a poor relationship with a physician [39]. This perhaps explains why the increase in poor nurse-physician relations corresponds with the intention of RN to leave a job. The relationship between staffing and resource adequacy and turnover intention nurses is fully mediated by burnout. This result agrees with findings from previous studies [40,41]. Implementing a well-designed, effective staffing plan in the workplace will go a long way to reduce turnover in an organization.

Again, the high turnover of RNs presents many challenges in the care of patients. The study reported RNs generally having positive perceptions about their practice environment. The study agrees with what was reported by [42], indicating encouraging views on most features of their work environment. There were, however, poor perceptions on some facets of the practice environment. With the recent report of inadequate nursing staffing and material resources, it is essential to evaluate the reason behind RNs' intention to leave their profession [37,43,44]. From the current study, RNs had a higher intention of leaving their profession. This position is not different from a study on RNs in South Africa which indicated that about half of all RNs have the intention of leaving their job within two years [45]. Similar findings of a higher rate of turnover intentions have also been observed across the globe [28, 32, 46]. This, however, contradicts finding among RNs in Europe, which projected RNs having lower turnover intention [9]. The differences in the findings can be attributed to the setting of the studies. While the current study was carried out in a low-middle-income country, the previous studies were conducted in countries with more advanced economies. Indeed, practice

Table 2: Mediation effects of burnout on the relationship between Nurse-Physician Relation and Turnover Intention.

	Model variables	Unstandardized Coefficients		Standardized coefficients	t	Sig.
		B	Se	Beta		
1	(Constant)	3.350	0.431		7.774	0.000
	Nurse-physician relation	−0.028	0.014	**−130**	**−1.991**	0.048
2	(Constant)	1.072	.581		1.844	0.066
	Nurse-physician relation	−0.006	0.014	−0.026	−0.399	0.690
	Burnout	0.016	0.003	0.353	5.476	0.000

Dependent variable: Turnover Intention; Mediating variable: Burnout; Criterion level = .05.

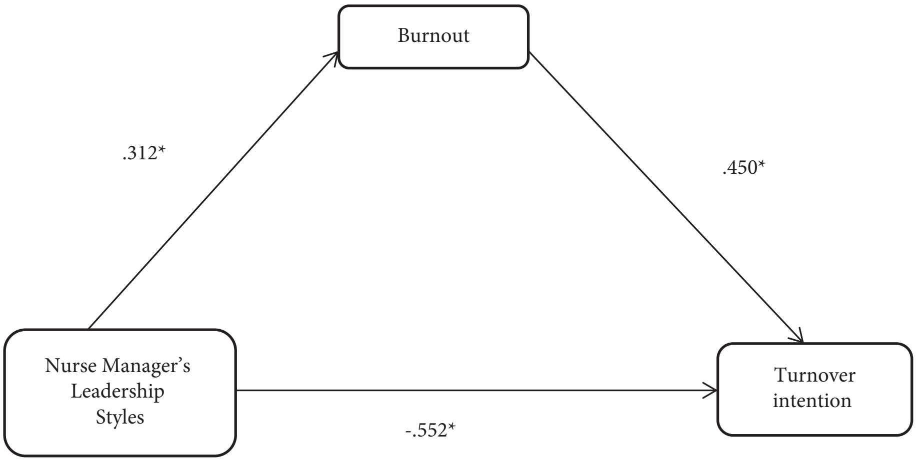

Figure 2: Standardized regression coefficients of the relationship between Nurse Manager's Leadership Styles and turnover intention as mediated by burnout.

Table 3: Mediation effects of burnout on the relationship between nursing foundation for quality care and turnover intention.

	Model variables	Unstandardized coefficients		Standardized coefficients	T	Sig.
		B	Se	Beta		
1	(Constant)	0.578	0.267		2.164	0.032
	Nursing foundation for quality care	0.212	0.028	0.449	7.630	0.000
2	(Constant)	−0.543	0.333		−1.629	0.105
	Nursing foundation for quality care	0.188	0.027	0.400	7.059	0.000
	Burnout	0.013	0.003	0.293	5.178	0.000

Dependent variable: Turnover Intention; Mediating variable: Burnout; Criterion level = .05.
3.6 Mediating Effect of Burnout on the Relationship between Staffing and Resource Adequacy and Turnover Intention.

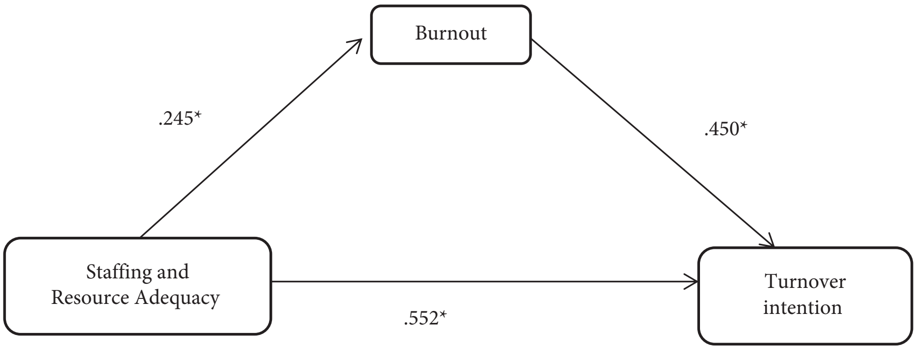

Figure 3: Standardized regression coefficients of the relationship between Staffing and Resource Adequacy and turnover intention as mediated by burnout.

environment factors in the European hospitals may be different from the sub-Saharan African health settings.

Healthcare delivery in recent times is extremely specialized, and therefore, highly experienced nurses are needed in the healthcare settings. Nursing managers should provide insightful leadership that can be useful in creating and maintaining a work environment that supports the nursing workforce. This may include focusing attention on burnout reduction strategies; thus, improving the availability of both human and material resources in the clinical settings, advocating for a healthy nurse-physician relation, and also improving RNs' participation in hospital affairs [47].

From the above discussion, it suggests that in discussing policy strategies on nursing workforce retention, the overall domains of work environment and burnout impact the turnover intention in many settings at most times. Health care administrators should, therefore, expand the discussion beyond financial incentives as a way of tackling the increased turnover of RNs [48,49]. The resultant effect will be improving nursing job outcomes through the retention of skilled and experienced RNs, which ultimately will help improve the provision of quality nursing care to the patient.

4.1. Limitations of the Study. Though the model contained the quality of care and job satisfaction constructs, the questionnaire did not capture the influence of the work environment on both constructs, which is an important aspect to investigate in future research. Moreover, as a constraint for all socially inclined studies [50], the questionnaire was not absolutely and culturally sensitive to determine the true opinions of participants. The tool was, however, made clear to obtain the needed data.

5. Conclusion

A poor work environment coupled with burnout increases RNs' turnover intentions. Though most of the RNs had a positive perception of their practice environment, they also had high turnover intentions. Ensuring a healthy workplace for nurses can significantly reduce burnout; and as such, will help keep experienced RNs. With high turnover intention among RNs in Ghana, there are potential effects on the human resource distribution within the clinical setting in particular, and it can compromise the quality of care given to patients.

Abbreviations

CHPS:	Community-based Health Planning and Services
GHS:	Ghana Health Service
LMICs:	Low-middle-income countries
MBI:	Maslach Burnout Inventory
PES-NWI:	Practice Environment Scale of Nursing Work Index
PPE:	Professional Practice Environment
RNs:	Registered Nurses
SDA:	Seventh Day Adventist.

Data Availability

All data generated or analyzed during this study are included in this published article.

Additional Points

All methods were performed following the STROBE reporting checklist.

Ethical Approval

Ethical approval was sought from Noguchi Memorial Institute for Medical Research Institutional Review Board–IRB (CPN 045/16–17) and clearance from the Ghana Health Service (GHS) Regional Health Directorate (Brong Ahafo) before the commencement of the study. All participants gave verbal consent before answering the questionnaire.

Disclosure

The document was once submitted at research square as preprint [51] but has not been published elsewhere. Part of the methodology used has also been cited as referenced [7].

Conflicts of Interest

The authors declare that they have no competing interests.

Authors' Contributions

CAP, ED, and FN conceptualized and designed the study method. CAP and FN collected, analyzed, and interpreted the data. CAP drafted the original manuscript. All authors read, revised, and approved the final manuscript for submission.

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Supplementary Materials

STROBE statement: checklist of items that should be included in reports of observational studies. (*Supplementary Materials*)

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Research Article

Living with Atrial Fibrillation: A Family Perspective

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Aim. The aim of this study was to obtain insights from patients and their family members on how families are living with atrial fibrillation. *Background*. Atrial fibrillation is the most common cardiac arrhythmia and is often described as an emerging global epidemic affecting an estimated 33.5 million people worldwide. Living with atrial fibrillation not only affects the patient but also may negatively influence family members' perceived health. The perspective of the family has previously been understudied, and more knowledge on how patients and their family members cope and adjust to life with atrial fibrillation may be helpful when developing future support for patients and their family members when coping with atrial fibrillation. *Methods*. A qualitative phenomenological study with an inductive, descriptive research approach based on Giorgi's descriptive method was used. Data were gathered through 12 dyadic family interviews. The COnsolidated criteria for REporting Qualitative research checklist was followed while conducting the study. *Results*. Three major themes emerged: *emotional differences*, *changes in family life,* and *uncertainty about the future*. Atrial fibrillation had multiple effects on the family. Frequently, several adjustments and adaptations had to be made to accommodate life with atrial fibrillation. *Conclusion*. Patients with atrial fibrillation and their family members feel a need to talk about their emotions and worries. They required support and guidance to manage the challenges of living with atrial fibrillation. These results will be used in a family-focused intervention designed to support families in adjusting and managing their everyday lives with atrial fibrillation.

1. Background

Atrial fibrillation (AF) is the most common cardiac arrhythmia and is often described as the new epidemic among heart diseases [1]. It is estimated that, in 2010, 33.5 million people had AF worldwide, with higher incidence and prevalence rates in the developed countries. This number is expected to increase [2]. AF is a complex disease, and its treatment requires a high degree of adherence to prevent complications [3, 4]. Patients may experience palpitations, dyspnoea, and chest pain, and the burden of symptoms often entails impairment of physical and mental performance and poor health-related quality of life [5]. Patients with AF may experience anxiety, feel that they receive too little support and self-management counselling, and often suffer from distress associated with unpredictable symptoms [6, 7]. Managing life with a chronic illness, such as AF, can be distressing not only for the patients but also for their family members [8–10]. In couples where AF is present, a common concern for the spouse is uncertainty related to limited knowledge about AF [11–13]. Patients with AF have also described how they struggle to regain balance, learning to live with a wide range of symptoms after having been diagnosed with AF [14]. Thus, most families need support and guidance in facilitating successful adjustments to cope with this illness [15, 16]. In addition, knowledge about how the family as a system and unit copes with AF in everyday life is lacking. Furthermore, patients and family members facing a chronic illness may have a need and a desire to talk about their beliefs. Typically, family members wish to be involved in the treatment and want information provided by health professionals [17]. Whereas earlier studies have focused mainly on treatment of patients with AF, the last decade has seen a growing interest in such patients' life trajectory after treatment for AF in general and how they experience living with AF in particular [18, 19]. The changes over time might have influenced the experiences of living with AF. Furthermore, studies focusing on the narrative of patients and their family members living with AF are sparse [20]. The present study will further our knowledge about how patients with AF and close family members view life with AF [21–24].

2. Aim

The aim of this study was to obtain insights from patients and family members about how families are living with AF.

3. Methods

3.1. Design. To explore the experiences of patients and their family members, we chose a qualitative study design using a phenomenological approach and an inductive, descriptive research method [25, 26]. Giorgi's descriptive qualitative approach is a way to approach phenomenology, and it is relevant for obtaining in-depth descriptions of lived experiences [27]. The task was to explore and describe objects of experience precisely as experienced by patients with AF and their family members [25]. Descriptive research is, following Giorgi, basic research that describes the phenomenon being focused on [27]. The family interviews were dyadic (two individuals or more), also known as joint interviews [22, 28]. This approach is used in healthcare research to produce data at a family level [22, 29]. Furthermore, dyadic interviews may be used to produce data on the effects of major disruptions caused by chronic illness, not only for the sick person but also for their family members and interpersonal relationships [26]. Interviewing a patient and a family member may produce a beneficial synergistic effect, thereby revealing essential phenomena of the lived experiences of the family unit, which would not be uncovered through individual interviews [29]. Furthermore, we were not interested in identifying the variety of experiences but wished to produce family unit narratives according to the theory of family-focused nursing [30]. The COnsolidated criteria for REporting Qualitative research (COREQ) checklist was followed through developing, performing, and reporting the study [31].

3.2. Data Collection and Setting. Data were collected from February to June 2019 through dyadic family interviews with patients with AF. Patients were asked to bring somebody whom they considered to be a close family member [16]. The concept of family was defined as "*family is who they say they are*" [16]. This definition is rooted in the framework of family nursing. Therefore, it was the patient who defined which family member they would bring to the interview, and we did not distinguish between partners and other family members. We informed the patients that it was entirely up to them whom they chose to bring to the interview; it did not necessarily have to be their partner but could be a close friend or neighbour. Furthermore, we chose to limit the interviews to one patient and one family member who had a major role in the patient's everyday life and with whom the patient felt comfortable sharing feelings and thoughts about AF [16]. Patients and families were recruited from an outpatient clinic in a university hospital department of cardiology in the Capital Region of Denmark. The estimated size of the AF population in the outpatient clinic is 400 annual patients with AF. In recruiting families, we used a purposeful sampling strategy to provide rich and varied data material, for example, differences in gender, age, and time since being diagnosed with AF in a family member with AF and the relationship between patient and family member. The inclusion criteria were Danish-speaking patients ≥18 years of age diagnosed with AF regardless of type and treatment. The exclusion criteria were chronic heart failure patients and patients with severe comorbidities. Patients were approached when they met for appointments where nurses from the clinic identified eligible patients and family members accordingly to the inclusion and exclusion criteria. During the recruitment period, 32 patients were asked to participate in the study. Twenty patients declined due to working, not having a family member, or not being interested. However, the recruited patients and the family members represented the variety of the population of the families in the outpatient clinic.

The dyadic family interviews were planned to continue until it was possible to uncover a deeper understanding of the phenomenon of interest, which often occurs with a sample of five to 20 informants [32]. A semistructured interview guide based on a literature search focused on a few broad questions guiding the family interview. The interview guide was only used as inspiration, and the interviewer was always open to any description of the phenomena that could emerge during the interview. The role of the interviewer was to facilitate a situation that would make the patients and their family members reflect upon living with AF and share their experiences through a mutual narrative in order for the researcher to obtain an in-depth understanding of the phenomenon. The family interviews were approached with open questions to stimulate descriptions: "*Can you describe how it is for you to live with one in the family having AF?*" "*How is your everyday life with AF?*" "*How are feelings about*

AF expressed in your family?" "*What is important for you to manage everyday life with AF in the family?*" During the interview, the interviewer was aware of both the patient and the family member, and the interview questions were directed towards both by phrasing the questions in a way that allowed both the patient and the family member to describe how they experienced living with AF. This strategy was adopted to obtain insights from the family as a unit by having both parties describe what living with AF was like.

As we had no prior history with the families, the interviewer made a genogram at the beginning of each interview, as recommended by Wright and Leahey [16], to obtain a sense of the family structure. No additional exploration was made as to how the genogram could have added further insights into the family since only one interview was conducted with each family.

The interviews took place according to patients and families' preferences, either in their own homes or in the hospital in a private room a few days after they consented to participate. The interviews were audiotaped and transcribed verbatim by the first author and three nursing students. All transcripts were stored and analysed in Nvivo12 PRO.

Before interviewing the families, the first author, who conducted the interviews, underwent a preunderstanding exam in a peer interview, which revealed experiences of family members with worries that were rarely in focus in the consultations with healthcare professionals, the latter being mainly focused on the medical aspects of AF. The preunderstanding interview was conducted to ensure a nonjudgemental format for conducting the interviews and to ensure trustworthiness by allowing the researcher to use what phenomenology calls "bracketing," where one's own beliefs about a phenomenon are temporarily suspended in an attempt to avoid influencing both the collection and the interpretation of the data [25]. Total bracketing is impossible in practice, but by being conscious of one's preconceptions, it is possible to keep experiences and prejudices at a distance [32].

3.3. Data Analysis. A qualitative methodological approach employing Giorgi's phenomenological method was used to analyse data following four steps [25, 26]. The first step focused on gaining an overall sense of the family unit, using the genograms and notes taken with the families during the interviews, listening to the audiotaped recordings, and reading the entire material several times. The researcher used his/her intuition about and reflection on each transcript. In the second step, "*meaning units*" were identified from the text. Meaning units are small parts of the text that are explicated where a phenomenon emerges. The third step involved regrouping and redescribing statements that were relevant for the meaning units, also focusing on the dyadic narrative of awareness, unawareness, togetherness, and separateness in living as a family with AF [22]. In the fourth and last step, an exemplary narrative was made into a single general analysis, which integrated and synthesised the common and essential aspects of the phenomenon, named themes [26, 27]. The process of analysing data was made in steps 1–3 by the first and fourth authors, who created the preliminary analysis, and disagreements were discussed until an agreement was reached. Step 4 involved the second and fourth authors, who are a senior researcher and a professor, respectively, with expertise in qualitative research. The whole team discussed the essence of the phenomenon until all agreed, thereby enhancing the credibility of the analytical process. The research team agreed to stop including participants because the interviews did not yield new data, no new themes occurred, and the phenomenon was deemed to have been captured sufficiently [33].

3.4. Ethical Considerations. All participants received written and oral information about the study, and written informed consent was obtained according to the Helsinki Declaration [34]. Participation was based on willingness, and the participants were informed that data would be safely stored on an encrypted drive and that their identities would be protected when reporting the research findings. Fictitious names were used in the transcribed data. The study was approved by the Danish Data Protection Agency (VD-2019-42) and the local ethical committee (ID: 19007769).

3.5. Findings. Four interviews were held in the patients' homes, and eight interviews were conducted in a private room at the hospital. The interviews lasted between 35 and 85 minutes (mean 55 min). Seven women and five men had AF with a mean age of 66 years (range 49–86 years). The family members included seven women and four men, with a mean age of 64 years (range 49–79 years). The family members were primarily spouses (50%). However, one was a sister, one was a daughter, two were male friends, and one was a female friend who accompanied the patient instead of the husband (Table 1). All patients were interviewed with a family member, except for one, who had to cancel the family interview the same day due to commuting issues. Data from the patient interviewed alone were included in the analysis. The point of data saturation was reached after twelve family interviews had been conducted.

The phenomena that emerged from the analysis were captured in the essence of three major themes that described how family life was affected by AF: *emotional differences*, *changes in family life*, and *uncertainty about the future*. The three themes were covered by seven subthemes that emerged from the analysis process (Table 2). The findings show that the essence of living with AF in a family had multiple facets. Still, the families' overall experiences were that despite not being an acute life-threatening disease, AF had multiple effects on emotions in the family, which often led to several adjustments and adaptations of their daily lives.

3.6. Emotional Differences. The emotional reactions that patients experienced living with AF often differed from those of their family members. Partners, in particular, appeared to be very concerned, especially in the beginning when their partner was diagnosed with AF. As time went by, the family members became more familiar with AF, the symptoms, and

Table 1: Characteristics of patients and family members.

	N	Mean (years) (range)
Patients	12	
Female	7	
Male	5	
Age		66 (49–86)
Family members	11	
Spouse	6	
Male friend	2	
Sister	1	
Female friend	1	
Daughter	1	
Without a family member	1	
Age		64 (49–79)
Years since being diagnosed with ∗ AF		3.2 (1.5 months to 22 years)

∗ Atrial fibrillation (AF).

Table 2: Analysis process from derived meaning units to final themes.

Meaning units	Subthemes	Themes
Talking about atrial fibrillation (AF) We are still two people Finding causes Why our family The first feeling Do not be a burden on the family Do not be a burden to the hospital	Family members have different worries in their everyday life with AF	Emotional differences
Using the network Encourage each other Changed mood Show or hide emotions	To see life in a new way and find meaning	
AF intervenes in family activities Care and protection of children living at home Maintain normal daily life	Everyday life activities change	Change in family life
Changed social relationships Talk about prioritising Different limits on how much you can handle	Living with AF affects social life	
Get support and motivation for new habits Changed lifestyle Family knowledge of AF Information from AF patients to children Knowledge sharing	AF changes the need for knowledge	
Family thoughts on AF Getting the right support living with AF Support and involvement of family members Relatives on alert Rituals and strategies	Fear of how AF will progress influences everyday life	Uncertainty about the future
Fear and myths Thoughts about the future Master the unpredictable Thoughts on death	AF brings fear of death into everyday life	

its treatment. There were variations between the families regarding how they talked about AF and the family members' involvement in the challenges that arose in their daily lives. Some patients and their close family members shared very little about their feelings or worries about AF, whereas others shared every single thought about AF in their everyday lives. Some patients explained that they did not share their worries about AF because they did not want to be a burden to their family members or the hospital. Instead, some patients and close family members used their social networks rather than each other to talk about AF.

Female patient: "*I avoided sharing my feelings with him [spouse]. It has to do with the fact that if you know each other very well, you also know how the other person will respond.*" (Family 3)

There was also a desire to protect family members, which occasionally meant that patients did not share all their worries about living with AF. In particular, the female patients explained how they kept their feelings to themselves, and some even preferred to go to the hospital on their own. Several women of all ages felt that talking to the doctor offered a private space for addressing their problems in living with AF. Some patients also felt that their spouses should not take time off from work to go with them to the hospital in order not to let their lives with AF interfere with their spouse's life. However, this was often despite the spouse feeling a need for more information about AF to understand the aetiology behind the arrhythmia.

Male family member: *"Sometimes I worry a lot, and then I try to find some information on the Internet, but it would be better if we had gotten the same information about AF and not... "I have heard something, and you have heard something different." I believe the personal and individual experience will always be different, whether you are a patient or a family member. Therefore, we need to be able to talk about different questions."* (Family 6)

The patients and their family members saw their lives after being confronted with AF as being offered a chance to find new meaning in life, for example, taking better care of themselves, minimizing stress, and changing negative lifestyles. Both the patients and their family members expressed that trying to find a new meaning in living with AF often challenged them because of insecurity and a lack of knowledge about symptoms and medication. The patients and their family members described how they were overcoming the challenges in their daily lives and that they felt a need for information about how to live with AF.

Male patient: "*I have had a lot of stress over the years and I have become more and more convinced that my AF is stress-related—and I can still be very busy.... But, especially after the third hospitalization, I needed to get away from it all and understand why.*"

Female partner: "*Yes, it was very hard on the family because I did not understand it all and how I could support him.*" (Family 4)

It could often be challenging for the family to adjust to the new life situation caused by AF. Confusion and lack of knowledge about AF occasionally burdened the patients and their close family members. Most of the family members expressed that they felt that they were more concerned about AF than the patient with AF. Family members experienced how this often led to anxiety and worries in everyday life situations, for example, when going to a party or on holiday. Several close family members were missing information about the causes of AF, and they were often afraid about what might ultimately happen to the patient's heart in everyday situations.

Male partner: *"I am confused about the heart... what about age and physical function... and being overweight? All these things can be a sign that it's dangerous. I'm worried that her heart can do all sort[s] of things or even stop."* (Family 6)

Patients and family members often had individual perspectives on AF, which could affect their emotions and social interaction with each other living with AF.

3.7. Changes in Family Life. Patients and family members across the represented family relationships described how AF brought several changes to their lives. The families used words like guilt if social activities, work, and the household had been downsized due to lacking energy. Some were concerned that their children might get AF, and they experienced changes in their mood if they felt that they were using much energy to find trustworthy information by themselves to understand the nature of AF. The fear of AF symptoms led to insecurity, which influenced both the patient and the family members. The family members experienced that they were dependent on their close ones to obtain information about symptoms on which they could rely to plan daily activities. This insecurity often affected family activities. For example, family members talked about how they could no longer have a meal at a restaurant if the patient with AF had little energy caused by severe palpitations and shortness of breath, forcing them to stay home. Some patients and close family members refrained from social activities and avoided travelling far from home due to fear of sudden rapid AF, which could lead to isolation, and feelings of irritation and guilt would sometimes arise. A few patients claimed to have learned to ignore their AF symptoms in some situations because they did not want the arrhythmia to change their everyday life with friends and family.

A female patient in her sixties described her relationship with her husband whom she chose not to bring to the interview: *"There are some emotions and maybe also irritation – 'why can´t he [husband] understand that I do not have the energy right now because I feel very low on energy.'"*

Her sister who took part in the interview responded: "*He is very overprotective [the husband], once he stabbed himself with a needle he passed out... he is not good at these things.*"

Female patient: "*Maybe I am not good at talking with him [husband] about it. I just go on, even if I am exhausted.*" (All quotes are from Family 8)

None of the family members had prior knowledge of the nature and symptoms of living with AF. They said that they needed knowledge to understand the many aspects of living with AF to support the patient and try to reestablish a normal everyday life without too much interruption or worry.

Daughter: "*I am thinking like this. 'Could it develop into complications for the heart? Could it suddenly trigger an infarction, or that the heart stops, or could it start an attack?'*" (Family 10)

Some families experienced that their everyday life had become more isolated because they had to limit their social relationships due to reduced energy levels. Furthermore, families described how AF forced them to choose between social activities, either because of a lack of physical and mental energy or to reduce stress to prevent symptoms. Some families felt that the need to prioritise their time and energy for social activities meant that it was very important to be understood by their network of friends.

Male patient: "*I try to be open about what I can and what I can´t do. I once had to cancel a skiing trip. I explained why, and of course my friends understood why, but it was super annoying to cancel.*" (Family 2)

Living with AF had multiple consequences for patients and family members, and patients and their close ones were confronted with the need to implement various changes in their daily lives.

3.8. Uncertainty about the Future.

The patients and their family members described how they experienced many notions and beliefs about the future living with AF, especially in the first months after being diagnosed with AF. The future that patients and family members imagined included fear of aggravation of AF with complications, such as stroke, and fear of death. The deep inner thoughts and reflections about the consequences of AF were not always discussed between the patients and their family members, and family members talked about feeling hopeless and not knowing how to support their patient.

Male partner: "*In my mind, I have all sorts of beliefs and solutions, but at the same time, it feels like being captured and sometimes you give up.*"

Interviewer: "*Do you talk with him about your AF or do you keep your feelings to yourself?*"

Female patient: "*No, I do not always talk about it [AF] because it comes and goes.*" (Family 7)

Many family members expressed that they were in a permanent state of alert due to lack of control over when and why AF starts. They were aware that this could be a potential stressor for the relationship in their everyday lives.

The female partner of a middle-aged male patient who had been living with AF for 1.5 years described a situation with her partner: "*So, I do not relax when we are together at a party, and of course I say to myself that now I do not have to monitor the other [husband] . . . But you can just get a little obsessed and wake up with a feeling of being in a state of alert. I think now, after the third time, it has affected me a lot.*" (Family 5)

Male and close one with AF responds: *"yes it has really affected our family and my wife could really need some support and some information about AF because when I come home from the meeting at the hospital, I don´t remember to give her all that information."*

Several spouses felt that thoughts of death occasionally arose at night. It was not uncommon for some to watch their partner sleep several times a week. Even though most of the patients and family members knew that AF did not cause cardiac arrest, many felt that they should be prepared for an acute situation that could suddenly occur.

Interviewer: "*Do you observe her at night [female friend]?*"

Male friend to a female patient who had been living with AF for at least two years and with daily symptoms from AF: "*Yes, I actually do. . . I cannot hear her breathing at all. . . and when she moves, I notice her pulse. . . all the time thinking when I'm going to do cardiopulmonary resuscitation. I actually think that.*" (Family 8)

Furthermore, most families expressed a need for support from health professionals that could ease their fear and prevent myths about AF. Patients and family members explained how they occasionally had read something about AF on the Internet that made them scared and nervous about what might happen. Family members also described how misinformation would sometimes cause them to be overprotective of their patient with AF in everyday situations. Both the family member and the close one wished to be informed and involved by the healthcare professionals to allow them to provide mutual support for one another in everyday life with AF.

Female friend: "*I think about how my thoughts go spiralling . . . and all of a sudden, I'm thinking. . . what can happen? And can this happen, and what about this? Then I need someone to say that I should calm down and tell me that this will not happen, and it´s not like that.*" (family 11)

Male patient and close one with AF responds: *"Yes especially in the beginning, we were thinking a lot about what could happen because you have seen all these movies with cardiac arrest and until you have tried to go to the hospital a couple of times, you are sure that you can die of this."*

This emerging theme made it apparent that patients and family members had fears and worries about AF that affected their beliefs about the future living with AF.

4. Discussion

The current work indicates that not only does AF affect patients, but also the worries and emotions caused by AF may burden close family members. This was expressed in various ways by the family members, who did not always openly share with each other their concerns about AF. Learning to live with AF created a need for the families to understand how the illness manifested itself in daily life, as they would often have to adapt to a new daily rhythm. Families viewed their lives after one of them had been diagnosed with AF as a life filled with feelings of uncertainty about the future, arising from concerns about managing the illness when and if it became worse.

Our findings are consistent with those of other studies, which also found that patients and family members have different ways of coping with AF and that their relationships are being affected by the uncertainty that can be experienced while living with AF [12, 21]. The challenges forced families to develop new strategies. However, for these strategies to be effective, patients and family members must share their emotions and worries [35]. Risom et al. also found that patients with AF could be reluctant to share AF-related psychological distress with family members but that they would often confide in the nurse in a rehabilitation program [35]. Similarly, our study showed that some patients and family members kept their concerns to themselves out of fear of being a burden to each other. Some patients even preferred to visit the doctor alone, which occasionally left family members lacking important knowledge about how to care for their patient. Our findings highlight that it is crucial for healthcare providers to recognise the emotional distress that may be experienced by both patients and their family members. Being confronted with cardiac disease can be stressful, can result in overprotection and negative feelings, and can put pressure on family relationships due to a communication deficit [8]. Furthermore, the theme of *emotional difference* was mirrored in a study that found high levels of anxiety in spouses, which were associated with low perceived health and reduced vitality in their partner and vice versa [9]. Patients and family members affect each other. Therefore, it is important to identify families who need extra support by focusing on the dyadic dynamics influenced by AF. Focusing on the positive resources in the family and the opportunities to make changes in everyday life while living with AF could be beneficial to the health of the patient with AF and the family member.

The theme *changes in family life* revealed how patients and family members were confronted with multiple consequences of AF in their daily lives, both as a family and as individuals. Changes in social activity with friends and family members, changes in mood, and a need for changes to their routine and lifestyle challenged patients and family members to reevaluate the context of their daily lives with AF [36]. Our findings are echoed in studies of patients who have diabetes, stroke, chronic obstructive pulmonary disease, myocardial ischemia, and heart failure and needed to adjust to life with a chronic illness [8, 37, 38]. The REACH-HF trial tested an intervention targeting heart failure patients and their family members [39]. The intervention was a comprehensive, evidence-informed, patient-centred, theory-based self-care support program. Compared with usual care, quantitative caregiver outcomes, like anxiety, did not differ significantly. However, the qualitative data revealed that family members who received the intervention were more likely to make positive changes in how they supported the HF patient, and they also experienced increased confidence in the caregiver role [39]. Involving family members supports the premise that future AF interventions should focus not only on the patient but also on the family members who are required to manage the daily challenges and changes in their routine and lifestyle. Therefore, future AF interventions need to focus on how patients and family members express their need to increase their confidence, knowledge, and capabilities relating to life with AF [40]. Patients in the present study described how the changes caused by AF affected their family structure and roles. Changes in family roles were also found in another study showing that a cardiac event may change family roles as a consequence of cardiac disease [8].

The theme captured in *uncertainty about the future* represents several aspects of patients' and family members' beliefs about how AF may potentially influence their lives. This ranged from a minor to a considerable feeling of uncertainty about the future. Thoughts about how AF could interfere with beliefs about the future were apparent, especially when the patient had just been diagnosed with AF and needed to learn how the manifestations of the illness developed. The theme was similar in families in which a member had a chronic illness as the family needed to familiarise itself with the situation; this is an ongoing process in which the family members cocreate a new context of living with the illness [38, 40]. One study found that being invited to tell their story in encounters with healthcare professionals arranged as family nursing interventions had a positive effect on the wellbeing of patients and family members [37]. Family nursing uses reflexive and therapeutic communication; if conducted in the right way, it can support and empower both patients and family members to be aware of their beliefs, resources, and strategies to cope with AF [36, 40]. Beliefs may be described as the lenses through which we see the world, and they are essential in understanding how families respond to and manage situations that arise from their experience with illness [36]. It is important that nurses understand the patients' and family members' beliefs about an emerging illness, like AF, to enhance wellbeing and healing. Family System Nursing (FSN) recognises that an individual's illness influences the health and wellbeing of their family members and focuses on the interaction, reciprocity, and circularity of beliefs between the patient and their family members [23, 24]. Therefore, giving patients and family members a chance to narrate their illness beliefs and thoughts serves as a way of unburdening oneself, making sense of suffering, and finding hope while living with a chronic illness [15, 16]. Thus, family members are indispensable in supporting self-management and understanding the disease [41]. To systematically involve the patient with AF and their family members would require a shift from patient-centred care to family-centred care through education and supervision of healthcare professionals [42]. A clinical trial using family-focused nursing care for patients with heart failure showed positive results regarding self-efficacy, symptom management, and social activities [43]. Having families narrating their AF stories may, therefore, also contribute to supporting coping with feelings of insecurity and have a positive impact on managing their future with AF. Communication tools to structure conversations with patients and family members and facilitate change may potentially have an effect on the health of patients and family members [16]. However, it requires competence and communication skills, and it requires attention to the family relationships and interventions directed towards the aspects in focus. Furthermore, supporting both the patient with AF and his/her close family member requires that both are willing to communicate and confront their concerns [37]. Our findings indicated that families were missing support interventions targeting both the family members and the patient in order for them to manage everyday life. Family interventions that examine when patients with AF and their family members may benefit from family nursing are warranted.

5. Methodological Considerations and Limitations

One of the limitations of this study was that half of the interviewed families consisted of patients and their spouses. Therefore, the study may have focused more on the perspective of living as a couple than on other family constellations. We ended up including patients who were able to attend with a close family member who was a partner. The results might have been different if more patients had participated with friends and family members with whom they were not sharing their everyday lives. On the other hand, this study shows that, in most cases, the patient chose their partner. Furthermore, interviewing only two family members together limits the finding to the experiences of these two family members. However, many of the challenges faced by couples appear to be similar to those of other family members, who may not be quite as close to the patient's everyday life. Another aspect is the number of patients who did not have a family member or refused to participate in the study, which could raise the question whether how these patients experience their everyday life with AF. We chose to focus on the family narrative, studying the family as a unit. Even so, we could also have focused more on analysing the interactions between the interviewed family members, which might have added a more dynamic perspective on how the family members influenced each other and coped with their life situations. Furthermore, we did not focus on coping processes in the family, which could have been a relevant aspect.

The dyadic interviews required ethical considerations to ensure that they were performed in a safe setting when the patient and family member shared their experiences [44]. Therefore, the interviewer had to navigate through the interview, being aware of the patients' and the family members' needs and dedicating them equal attention. The dyadic interview could have negatively influenced the findings if the facilitation of the interviews failed to obtain the patient and family member's experiences. However, we cannot know if some patients or family members moderated their answers even though they responded very willingly to the interview questions. Anyhow, interviews were conducted in the hospital and in the families' own homes, and the variety in contexts appeared to be a strength because we were able to unveil similarities between families regardless of the setting in which the interview was conducted.

Rigour was established by carefully following the method suggested by Giorgi [27] and by following the concepts of trustworthiness in qualitative research: credibility, transferability, dependability, and confirmability. To ensure dependability, quotations were used for transparency in showing the participants' voices [27]. Confirmability was obtained by authors discussing the interpretation of the phenomena of interest several times in an iterative process to strengthen the study's credibility [33]. Throughout the entire process of analysis, all authors aimed to remain open-minded about the phenomena of the lived experiences; they attempted to describe the data as they emerged rather than allowing personal preconceptions or theoretical concepts to navigate or explain the concepts [45]. Transferability was enhanced by revealing the interviewers' preunderstanding and by preparing a transparent description of the different significant elements and the process of study. The findings in this study may also be relevant and important in other contexts, for example, families experiencing acute illness or receiving palliative care.

6. Conclusion

The aim of this study was to use the perspectives of the patients and the family members to explore how families live with AF. Three major themes emerged: *emotional differences*, *changes in family life*, and *uncertainty about the future*. These themes captured the essence of how patients and family members experienced their lives living with AF. The study found that patients and their family members saw their life with AF as one fraught with many concerns that caused different emotions that were not always shared. Families did not always share emotions, either to protect each other or out of a lack of knowledge about AF. Furthermore, AF caused changes in how the family planned social life, work, and household activities. Patients and family members talked about their feelings of uncertainty about the future and living with the arrhythmia. In some family members' minds, AF was associated with thoughts about a heart attack or acute stroke. When patients are confronted with AF, the patient and family members should be given the opportunity to talk about issues from a family perspective. In addition to treatment, discussions should focus on concerns about AF, including the risk of severe palpitations and anxiety about the occurrence of a stroke or cardiac arrest. Knowledge about the lived experiences of how families cope with an arrhythmia, like AF, should lead to a shift in clinical practice regarding how healthcare professionals facilitate knowledge and instructions for living with AF. Future research is necessary to explore how nurses and other clinicians may engage in and communicate with patients living with AF and their families.

Data Availability

All relevant data are within the manuscript.

Conflicts of Interest

The authors have no conflicts of interest to disclose.

Authors' Contributions

Stine Rosenstrøm, Signe Stelling Risom, and Anne Brødsgaard were involved in the study design and the analysis. Stine Rosenstrøm conducted the interviews and drafted the manuscript. All authors were involved in critical revisions and important intellectual content.

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Supplementary Materials

COREQ (COnsolidated criteria for REporting Qualitative research) checklist. (*Supplementary Materials*)

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Research Article

Predictors of Suicide Attempts of Individuals with Autism and Their Siblings

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The occurrence of mood- and anxiety-related conditions among family members of individuals diagnosed with autism spectrum disorder (ASD) increases the risk of suicide attempts and has also created assessment and treatment issues for clinicians and parents. Recorded rates of mental health disorders comorbid with suicide attempts among individuals on the spectrum range from 29% to 52%. The purpose of this study was to investigate the presence of predictors of suicide attempts among sibling dyads (pairs of siblings in which one sibling is on the autism spectrum). Growing evidence in the literature indicates a link between a diagnosis of autism and mental health. A web-based survey was used to collect data from individuals on the spectrum and their siblings. A sample of 144 individuals was finalized for the analyses. Logistic regression analysis was conducted to assess the predictors of suicide attempts in the sample. Depression, anxiety, sexual orientation, and marital status were all used as predictors in the logistic regression analyses. Both levels of anxiety and sexual orientation were found to be significant predictors for suicide attempts. Recommendations for future research, assessment, and treatment are presented.

1. Introduction

The rate at which autism spectrum disorder (ASD) is diagnosed has increased over the past two decades, and today, 1 in 54 persons is diagnosed with the condition [1]. According to the Diagnostic and Statistical Manual of Mental Disorders (5th edition), ASD is a complex neurodevelopmental disorder characterized by challenges in social communication and interaction [2]. Symptoms related to ASD vary from one person to another; some individuals may have difficulty maintaining social relationships, while others may be unsuccessful in responding appropriately in social settings. These deficits affect all domains of life, including school, work, and family relationships [3].

According to family systems theory, the family as a unit includes four subsystems: marital, parental, sibling, and extended family [4]. It would be beneficial for healthcare professionals to better understand the manner in which ASD influences all four subsystems within this framework, particularly siblings. Understanding these subsystems can assist practitioners in addressing the issues they may encounter. The documented challenges individuals on the spectrum face in relation to family functioning include communication, daily life, and relationships within the family [5]. The daily lives of individuals on the spectrum also impact their siblings. These siblings have described difficulties arising from a spectrum of behaviors, ranging from obsessive rituals and repetitive behaviors to impulsiveness. Outcome studies have shown mixed results regarding how siblings respond to their family members on the spectrum [3]. Although recent evidence has suggested that siblings of individuals with ASD may be at higher risk for psychological challenges similar to those experienced by the parents of such individuals, studies have reported contradictory findings about the link between having a sibling on the spectrum and the possible risk factors associated with this relationship [6, 7]. Previous research [8] has found that sibling dyads including individuals with autism where one sibling had a second disability had more asymmetric relationships (e.g., one sibling tended to dominate the other in an emotional sense). Furthermore, interactions between such pairs of siblings tended to become more asymmetric over time.

Most studies on siblings of persons with ASD have focused on children; few have evaluated adults [9]. Some of these studies have examined the manner in which siblings adjust to relationships [10], but none have focused on suicide as a risk factor. Furthermore, most past studies concerning the siblings of individuals with ASD have focused on infant siblings [11]. Aside from friendships and marriages/partnerships, sibling relationships are often the longest lasting of an individual's bonds with their relatives; although not all sibling relationships are close, some siblings may actively dislike one another, and in some cases cousins or other familial bonds may be closer than those between siblings in the same family [12]. The presence of an individual on the spectrum within a household can impact the adjustment and mental health of all members of that family, including siblings. Although the data we gathered suggest that the siblings of individuals with ASD are at higher risk for mental health issues [13], there is no indication that this risk is clinically significant [14]. Previous data suggest that siblings of individuals on the spectrum may internalize their challenges, including depression- and anxiety-related conditions [15]. Furthermore, because some siblings may eventually become caregivers and supporters of their siblings with ASD after their parents have passed, it is important to obtain a clearer understanding of such sibling dyad's lifelong journeys and mental health needs. The aims of this study were to estimate the rate of suicide attempts among individuals on the autism spectrum and their siblings and to identify the predictors of suicide attempts among individuals on the autism spectrum and their siblings.

1.1. Autism Spectrum Disorder and Suicide Attempts. Suicide is considered a global health crisis [16], and the current rate of suicide in the United States is 12.93 per 100,000 individuals, making it the 10th leading cause of death in the country. According to the Centers for Disease Control and Prevention (CDC), among people between the ages of 10 and 34 years, suicide is the fourth leading cause of death and occurs more than two and a half times more often than homicide. Gender and racial differences are well documented: women's suicide rates are reported to be highest for individuals between the ages of 45 and 64 years, and rates of suicide are highest among Native American and non-Hispanic males [17]. Individuals with disabilities have been neglected by and omitted from the focus of research. Specifically, individuals with neurodevelopmental disabilities are considered to be at a higher risk for suicide attempts [18]. In recent years, there has been a steady increase in the exploration and reporting of suicide among individuals diagnosed with ASD [19, 20]. Nevertheless, the exploration of suicidal behavior among individuals on the spectrum has encountered challenges, particularly the definition of suicide and methodological concerns at various research stages. Similar to ASD and the spectrum of symptoms associated with it, we can examine suicidal ideation and attempts on a spectrum from mild thoughts to death by suicide or completion, and there are currently more than 19 different definitions of suicide [21]. Concerns regarding intentionality, ideation, and behaviors all play a role in designing an exhaustive definition.

While the definition and diagnosis of ASD have received significant attention in the last few decades, they have also created challenges in understanding a condition that encompasses a variety of comorbidities [22]. The presence of mood- and anxiety-related conditions concurrent with suicide has created assessment and treatment issues for clinicians and parents. Rates of comorbid disorders among individuals on the spectrum range from 29% to 52% [23]. A recent meta-analysis of data on suicide among individuals on the spectrum indicated a rate of 7%–47% for suicide attempts, while that of suicidal ideation was 72% [24]. To date, only one study has examined the prevalence and risk factors for suicide attempts by siblings of individuals on the spectrum, and one other study from Sweden has examined deaths by suicide among individuals on the spectrum [25]. Because of the wide range of risk factors for suicide in the neurotypical population, the rate of suicide attempts and the risk of suicide among individuals with siblings on the spectrum need to be examined.

1.2. Risk Factors for Suicide Attempts

1.2.1. Sociodemographic, Sexual Orientation, Employment, and Socioeconomic Status. Many studies have documented risk factors for suicide attempts in the general population; however, we still lack a consistent and accurate picture of suicide attempts among individuals on the spectrum and an even less accurate picture of their siblings. Walton [7] identified several sociodemographic factors related to the risk of externalizing behaviors among the siblings of a person diagnosed with ASD. These factors included family income, gender, and the age of the sibling diagnosed with autism. Due to the diversity of siblings of people with autism and the broad spectrum of symptom severity and methodological limitations [3], the data presented in this study should be considered alongside the framework of daily influences on development between siblings [26]. Research has found that some sociodemographic factors influence relationships between siblings, but there are no reports on the presence of psychopathology due to these variables, and lower levels of educational attainment and age have been most commonly associated with such relationships [9]. Identifying as lesbian, gay, bisexual, transgender, and queer (LGBTQ) has been shown to place an individual at higher risk for bullying and peer victimization as well as a range of mental health issues [27]. When assessing sexual orientation, a higher rate of homosexuality and bisexuality among individuals on the spectrum has been noted [28], making it an added risk factor for suicide. Mental health is influenced by a range of variables, including age, gender, race, and socioeconomic status. Individuals living in a home with a sibling on the autism spectrum may experience higher levels of stress [11]. Furthermore, these individuals may have to take over caring for a sibling on the spectrum in the event of their parents' passing or becoming unable to care for their children [29]. Reported data also indicate that the severity of autism and comorbid conditions increases the degree of concern regarding these individuals' mental health and adjustment [14], particularly with regard to depression diagnoses [15] and anxiety-related symptoms [30].

2. Methods

2.1. Study Design and Sample. This was a cross-sectional study examining suicide attempts, depression, and anxiety in individuals diagnosed with ASD and their siblings. Individuals registered with the Interactive Autism Network (IAN), an innovative online project that brings together many individuals who care for people with ASD and those impacted by it, were invited to participate in an online study based on a Qualtrics online survey. A total of 144 individuals diagnosed with ASD and their siblings completed the online survey. The eligibility criteria for the study were as follows: aged 18 or older, being diagnosed with ASD, and/or having a sibling registered with the IAN. Prospective participants were sent a letter describing the study and a link to complete the online survey. Before completing the survey, all individuals were asked to provide informed consent and were notified that the study was approved by a university institutional review board. We have created a survey and an informed consent at 8th grade level of education to ensure understanding of the language in the survey. The sample size of $n = 144$ yielded sufficient power (82%) to detect a small to medium effect size (adjusted odds ratio, AOR = 1.85) associated with a continuous predictor (depression and anxiety) in the primary analyses using logistic regression to predict history of a suicide attempt, based on a prevalence of suicide attempts of 17% and a 0.05 level of significance.

2.2. Measures

2.2.1. Mental Health. The participants' mental health was assessed using the Beck Depression Inventory (BDI) and the Beck Anxiety Scale (BAI) [31, 32]. The BDI is a 21-item scale that can be self-administered by adults. The items on the scale, which relate to sadness, pessimism, loss of pleasure, and other such experiences, are scored from 0 to 3. The response categories correspond specifically to each domain. The scores range from 0 to 63, with higher scores indicating more severe depression symptoms. Scores above 20 indicate clinical depression, a score of 0–13 indicates minimal depression, 14–19 indicates mild depression, 20–28 indicates moderate depression, and 29–63 indicates severe depression. The internal consistency of the BDI has been rated as $\alpha = 0.91$, and its one-week test–retest reliability is $r = 0.93$. In our sample, the BDI demonstrated strong interitem consistency ($\alpha = 0.93$) and reliability (McDonald's $\omega = 0.93$). The BAI is similarly structured, as it comprises 21 self-reported items and a list of anxiety-related symptoms. The participants were asked to indicate how much each symptom described had bothered them in the preceding week. Each symptom is rated on a four-point scale, ranging from 0 = not at all to 3 = severely. A score of 0–21 indicates low anxiety, 22–35 indicates moderate anxiety, and scores of 36 and above indicate potentially concerning levels of anxiety. The BAI showed high internal consistency ($\alpha = 0.92$) and test–retest reliability over one week ($r\ (81) = 0.75$). It also demonstrated strong interitem consistency ($\alpha = 0.94$) and reliability (McDonald's $\omega = 0.94$) in the current study. The participants' history of suicide attempts was measured by asking them if they had ever attempted suicide. The response categories for this assessment were "yes" and "no."

2.2.2. Sociodemographic and Social Support. Sociodemographic data were obtained from the 144 individuals who completed the survey. The questionnaire was used to gather data related to age, ethnicity and race, and levels of education and income. The participants' levels of social support were measured using the Multidimensional Scale of Perceived Social Support (MSPSS) [33]. This 12-item measure comprises three subscales (support from family, friends, and significant others) designed to assess levels of social support. The α for the total scale was 0.88; for the subscales concerning significant others, family, and friends, the αs were 0.91, 0.87, and 0.85, respectively. Higher scores indicate higher levels of support [33]. In our sample, the MSPSS total score demonstrated strong interitem consistency ($\alpha = 0.94$) and reliability (McDonald's $\omega = 0.93$). The three subscales also had strong measurement characteristics: family ($\alpha = 0.93$, McDonald's $\omega = 0.93$), friends ($\alpha = 0.97$, McDonald's $\omega = 0.97$), and significant others ($\alpha = 0.95$, McDonald's $\omega = 0.95$).

2.3. Data Analysis. A descriptive summary was generated to describe the sample and the distribution of the study variables. Multivariate logistic regression was conducted to analyze the relationship between the independent variables (sociodemographic data, mental health, and social support) and the participants' histories of suicide attempts. Sensitivity analyses were conducted to examine the consistency of the findings between the persons with ASD and their siblings. This included subgroup analysis (persons with ASD) and testing interaction terms for significant predictors (interacted by sibling status). All analyses were conducted using SPSS version 22 (IBM, Armonk, NY, USA).

3. Results

The demographic characteristics of the sample are presented in Table 1. Of the 144 individuals who completed the study, 77.8% indicated that they were diagnosed with ASD, and 21.5% identified themselves as siblings of a person on the spectrum. The mean age of the sample population was 36.03 years (SD = 15.43). Most respondents were identified as Caucasian (86.1%) and heterosexual (72.2%), while less than half (38.9%) were male. Slightly less than half of the sample had completed an undergraduate degree (48.6%), and more than half were single (56.3%). The descriptive statistics

Table 1: Demographic characteristics of the sample (N = 144).

	Variable	n (%) or M (SD)
	Person Dx with ASD	112 (77.8%)
	Sibling of person Dx with ASD	31 (21.5%)
Age		36.03 (15.43)
Gender	Male	56 (38.9%)
	Female	86 (59.7%)
	Other	2 (1.4%)
Sexual orientation	Nonheterosexual	39 (27.1%)
	Heterosexual	104 (72.2%)
Race	Non-Caucasian	19 (13.2%)
	Caucasian	124 (86.1%)
Marital status	Single	81 (56.3%)
	Married	37 (25.7%)
	Other	26 (18.1%)
Education level	Undergraduate	70 (48.6%)
	Master	35 (24.3%)
	Other	38 (26.4%)
Employment	No	59 (41%)
	Yes	85 (59%)
Personal income	$20,000 or less	77 (53.5%)
	More than $20,000	63 (43.8%)
History of suicide attempts	No	119 (82.6%)
	Yes	25 (17.4%)
Mental health conditions	Depression	13.90 (12.38)
	Anxiety	14.53 (12.51)
	Social support	59.74 (17.10)

Note. Dx: diagnosed.

related to mental health indicated that 17.4% had attempted suicide, 22.76% had experienced a high level of suicidal ideation, 13.9% had severe depression, and 14.53% had a potentially concerning level of anxiety. The individuals diagnosed with ASD reported higher rates of suicide attempts than the siblings of individuals with ASD (20.5% vs. 6.5%), but this difference was nonsignificant (χ^2 (1, 143) = 3.33, p = 0.068).

Logistic regression was conducted to examine the relationship between the independent variables and the suicide attempts in the sample. The predictors of suicide attempts were selected based on previous findings and support from the current literature. These included clinical variables such as depression and anxiety and sociodemographic characteristics such as gender, marital status, sexual orientation, and social and employment characteristics. The predictors and covariates were entered in blocks. The first block consisted of anxiety and depression, followed by a block of the participants' demographic details (age, gender, race, sexual identity, and marital status) and finally a third block of environmental variables (education, social support, and personal income). The initial model, including only depression and anxiety, was significant, with anxiety significantly associated with a history of suicide attempts. The addition of covariates in the model strengthened the association, and the association between anxiety and suicide attempts was strengthened after controlling for participants' characteristics (Model 2), followed by the factors hypothesized to be protective (i.e., education, social support, and income).

The Hosmer–Lemeshow tests for each model were nonsignificant, indicating that the models had adequate goodness of fit. The X^2 for the full model was significant (X^2 (16, 114) = 53.20; $p < 0.001$). Its Nagelkerke's pseudo-R^2 was 0.62, indicating that, as a whole, it was significant and that the combined predictors were associated with a history of suicide attempts. An examination of the regression coefficients (Table 2) indicated that the selected predictors were partially supported. Anxiety (AOR = 1.140, 95% CI 1.039–1.251, p = 0.06) and sexual orientation (AOR = 0.020, 95% CI 0.002–0.170, $p < 0.001$) were significant predictors of a history of suicide attempts. These indicated that a 1-point increase on the BAI was associated with a 14% increase in the likelihood of having attempted suicide and that the heterosexual respondents were nearly 80% less likely to have done so compared to those who identified as nonheterosexual. Depression, age, gender, being a sibling of a person with ASD, marital status, education, employment status, social support, and income were not significantly associated with having attempted suicide.

As the sample was comprised of both individuals diagnosed with ASD and siblings of individuals with ASD, we conducted two sensitivity analyses to determine whether the associations identified were consistent across groups. First, we conducted an analysis excluding the sibling subgroup and compared the results to the analysis of the full sample. All model statistics and regression coefficients were consistent in magnitude, direction, and statistical significance. A similar analysis could not be done for only the siblings, as the

Table 2: Binary regression on variables that impact suicide attempts.

Variable	Model 1		Model 2		Model 3	
	B (SE)	OR (CI)	*B* (SE)	OR (CI)	*B* (SE)	OR (CI)
Depression	0.008 (0.024)	1.008 (0.962, 1.057)	−0.048 (0.037)	0.954 (0.887, 1.025	−0.078 (0.045)	0.93 (0.847, 1.010)
Anxiety	0.078 (0.026)†	1.081 (1.028, 1.137)	0.102 (0.038)†	1.108 (1.028, 1.193)	0.131 (0.047)†	1.14 (1.039, 1.251)
Age			−0.006 (0.027)	0.994 (0.942, 1.049)	−0.028 (0.036)	0.973 (0.907, 1.043)
Sibling of person Dx with ASD (ref: person Dx with ASD)			−0.970 (1.171)	0.379 (0.038, 3.763)	−1.123 (1.213)	0.325 (0.030, 3.505)
Gender (ref: male and other)			−1.049 (0.862)	0.35 (0.065, 1.897)	−1.391 (1.021)	0.249 (0.034, 1.839)
Sexual orientation (ref: non-heterosexual)			−3.672 (0.943)‡	0.025 (0.004, 0.161)	−3.925 (1.010)‡	0.02 (0.002, 0.170)
Race (ref: non-caucasian)			0.317 (0.945)	1.374 (0.215, 8.756)	0.708 (1.066)	2.029 (0.251, 16.408)
Marital status (ref: other arrangement)						
Single			−1.966 (0.992)*	0.14 (0.020, 0.979)	−1.900 (1.205)	0.15 (0.014, 1.586)
Married			1.040 (0.961)	2.829 (0.431, 18.596)	1.802 (1.154)	6.061 (0.632, 58.172)
Education (ref: other)						
Undergraduate					−0.654 (1.129)	0.52 (0.057, 4.757)
Master					−0.742 (1.120)	0.476 (0.053, 4.280)
Employed (ref: not employed)					−0.073 (1.035)	0.929 (0.122, 7.071)
Personal income					0.622 (1.106)	1.863 (0.213, 16.298)
Social support $p < 0.001$-significant other					−0.496 (0.328)	0.609 (0.320, 1.159)
Social support-family					−0.060 (0.311)	0.941 (0.512, 1.731)
Social support-friend					0.016 (0.316)	1.016 (0.547, 1.885)

Note. $^{*}p < 0.05$; $^{\dagger}p < 0.01$; and $^{\ddagger}p < 0.001$. Reference group: gender: male; marital status: other arrangements (i.e., divorced, widowed, separated, living with partner, or single); race: non-Caucasian; sexual orientation: nonheterosexual. B: coefficient; CI: 95% confidence interval; Dx: diagnosed; OR: odds ratio; and ref: reference group.

group was too small to support the multivariate model. Second, focusing on the significant predictors of suicide attempts (anxiety and sexual orientation), we tested the interaction terms (sibling ∗ anxiety and sibling ∗ sexual orientation) in separate models. In these analyses, the interaction terms were nonsignificant, and their inclusion had no impact on the magnitude, direction, or significance of the predictors, indicating that the associations of anxiety and sexual orientation with suicide attempts do not differ between individuals with ASD and siblings of those with ASD.

4. Discussion

We examined the predictors of suicide attempts in a sample of sibling dyads, of whom one of each pair was an individual diagnosed with ASD. Specifically, we were interested in how sociodemographic variables such as age and gender, clinical variables such as depression and anxiety, and social variables such as employment status and social support can predict suicide attempts among sibling dyads, including individuals on the spectrum. Of the sample population evaluated in this study, approximately 77.8% indicated that they had been diagnosed with autism, and the average age of the participants was 36.03 years. Less than half of the sample identified as male, and the majority were Caucasian (72.2%). Similar to a previous study [20] in this field, this study indicated that approximately 14% of the sample reported a severe level of depression, 14.53% indicated that they had severe anxiety, and 22.76% indicated that they had attempted suicide at least once. These data are consistent with reports from the general population suggesting that Caucasian males are at higher risk: over 1.4 million individuals attempt suicide yearly, and there are 3.9 male deaths by suicide for each female death by suicide [34]. The presence and reports of mental health issues among sibling dyads that include individuals on the autism spectrum are important for screening and assessing family members (specifically siblings) who may present with mental health symptoms or diagnoses and are thus at high risk of suicide. The specific findings presented above indicate that, aside from certain sociodemographic characteristics that may place individuals at risk for suicide attempts, one of a pair of siblings being diagnosed with ASD can increase the risk of the other sibling developing a mental health condition and/or of attempting suicide [35]. In examining the risk factors for suicide attempts in sibling dyads that included individuals with autism, we identified two major predictors: anxiety and sexual orientation (specifically, identifying as nonheterosexual). We found that the individuals we surveyed were at a 12% higher risk for every added point on the BAI. This is an important outcome and is supported by previous studies on the general population, which have indicated that individuals with anxiety-related conditions are at a higher risk of suicide attempts [36]. The lack of predictability of life while living with a person on the spectrum and the potential of one day having to take over their care as parents age can cause or exacerbate anxiety and increase the risk of attempting suicide. With regard to those respondents who identified as nonheterosexual, our results are not consistent with previous reports related to the LGBTQ population in general. According to Peters et al. [37], individuals who are identified as nonheterosexual may present with more frequent or severe suicidal ideation, but this is not necessarily accompanied by higher rates of suicide attempts. This finding can be explained by the fact that services and support for autism may vary greatly from one person to another over a lifetime, which can add stressors and put individuals at risk of attempting suicide. Overall, the other variables included in the study were not significantly associated with a history of suicide attempts. This can be explained by several factors. First, our sample population was not evenly divided between individuals on the spectrum and their siblings, and our results may have been different if the two populations had been equally represented. Second, the individuals in our sample may have had protective variables that decreased their risk of attempting suicide. Protective factors for an individual could be social support, family support, or services received for a condition, to name a few. The multiple and vast presence of risk and protective factors for suicide can present a methodological challenge in accurately predicting a history of suicide attempts in sibling dyads that include individuals on the spectrum. Individuals' mental health and previous attempts should be assessed by anyone who provides professional care for families with these attributes to ensure that such risk factors are identified early and treated expeditiously.

4.1. Clinical Implications. A constant challenge for mental health clinicians and practitioners from various backgrounds is the need to determine whether an individual is at risk for suicide attempts early and to implement appropriate interventions. To date, no one particular model can predict with full accuracy the potential for a suicide attempt. Practitioners in a variety of settings can benefit from the data presented in this study, as they can provide points of reference and consideration for the further assessment of sibling dyads of individuals on the autism spectrum. The ability to identify symptoms related and potentially linked to suicide attempts early will benefit all practitioners. Supporting the comprehensive assessment and early identification of at-risk groups may make it easier to address the mental health needs of siblings of individuals on the spectrum. Moreover, the data reported in this study provide a framework to consider subunits within the family system (i.e., siblings), who should also be evaluated when individuals are seeking support services.

4.2. Research Implications. The increase in the number of studies that include family members of individuals on the spectrum provides a hopeful picture for many subgroups in this population, including parents, siblings, and community members. Engaging in further research on the impact autism has on family members can support families and healthcare professionals in providing person-focused services and treatment. A comprehensive examination of the mental health risks faced by siblings and other close family members of individuals with ASD can be used to design more effective support and treatment techniques. Perhaps more importantly, such an assessment could lead to a greater variety of more tailored services appropriate to this population, given their unique situation. Further investigations should consider multiple and varied assessment measures to exhaustively investigate the siblings of individuals on the spectrum and their challenges [38].

5. Limitations and Strengths

This particular survey was subject to recall bias, as the participants were asked about their thoughts over the preceding few weeks. Furthermore, the study did not include a control group of individuals with siblings who were not diagnosed with ASD. The lack of a control group may impact the manner in which we can respond to the needs of the siblings of individuals on the autism spectrum. Some methodological aspects of this study may impact its generalizability, including the use of an online survey and nonprobability sampling, as well as the utilization of the IAN as a tool to recruit individuals with the requisite eligibility criteria. The smaller subsample of siblings may also constitute a limitation, since the group of siblings and the group of individuals with a diagnosis of ASD was not equal. Despite these limitations, however, the study has multiple strengths. The participants were assessed for multiple risk factors for suicide attempts, and this study is one of the few to examine individuals on the autism spectrum and their siblings as a family unit. The use of the IAN also assisted us in reaching out to prospective participants across a larger geographical area.

Data Availability

The data that support the findings of this study can be obtained from the corresponding author upon request. The data are not publicly available due to privacy or ethical restrictions.

Conflicts of Interest

The authors declare that they have no conflicts of interest regarding the publication of this paper.

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Research Article

Factors Affecting Nonadherence to WHO's Recommended Antenatal Care Visits among Women in Pastoral Community, Northeastern Ethiopia: A Community-Based Cross-Sectional Study

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Introduction. More than half of the pregnant women in Ethiopia do not receive the recommended number of antenatal care visits. In the Afar region, where women have limited access to healthcare services due to pastoral livelihood, evidence on noncompliance to the adequate number of antenatal care visits is scarce. Therefore, this study was intended to examine the level of nonadherence to the recommended antenatal care visits and its associated factors in the pastoral community of Northeast Ethiopia. *Methods*. A community-based cross-sectional study was conducted from 04 February to 22 March 2020 among randomly selected 703 women who gave birth within 24 months preceding the survey in the Transform HDR districts of the Afar region. Data were collected using a pretested structured interviewer-administered questionnaire. Data were entered into Epi-data version 4.2 and finally exported to Stata version 16 for further analysis. Bivariable and multivariable binary logistic regression analyses were done to identify factors affecting the nonadherence to the recommended antenatal care visits. Odds ratio with the corresponding 95% confidence interval were computed and the statistical significance of the explanatory variables was declared at a p-value <0.05. *Results*. Nonadherence to the recommended antenatal care visits was 57.0% (95% CI: 53.3%–60.7%). Attending primary (AOR (95% CI): 0.39 (0.22–0.72)) and secondary education and above (AOR (95% CI): 0.25 (0.08–0.77)), being married at the age of 18 years or older (AOR (95% CI): 0.48 (0.36–0.71)), and attending antenatal care at a health center (AOR (95% CI): 0.46 (0.26–0.81)) were associated decreased odds of nonadherence to the recommend visits. Moreover, a higher likelihood of nonadherence was found among women from households not possessing communication media (AOR (95% CI): 1.85 (1.18–2.88)) and those who initiated antenatal care attendance during the second (AOR (95% CI): 5.23 (3.54–7.72)) and third trimesters (AOR (95% CI): 8.81 (1.88–41.20)). *Conclusions*. Nearly six in ten women do not receive the recommended antenatal care visits, consistent with the national prevalence. Women's education, age at marriage, type of health facility, possession of mass media, and timing of antenatal care attendance were associated with nonadherence to the recommended antenatal care visits. Thus, improving women's literacy, dissemination of information regarding antenatal care through mass media, and strengthening interventions targeted to end child marriage are important in scaling up the level of adherence. Moreover, supporting community-based health education through health extension programs is crucial in reaching women with limited access to mass media.

1. Introduction

Worldwide, about 303,000 maternal deaths occur each year due to pregnancy and childbirth complications, of which 99% and 66% occur in resource-limited settings and Sub-Saharan Africa (SSA), respectively [1]. Ethiopia, which contributes 60% of the global maternal mortality burden with the other nine countries [1, 2], has a maternal mortality ratio of 412 per 100,000 live births [3].

Proper use of antenatal care (ANC) service remains a cost-effective intervention in the reduction of maternal and child mortality and morbidities due to pregnancy and childbirth complications [4, 5]. Complete adherence to the World Health Organization's (WHO) ANC recommendations was also linked with decreased risk of neonatal complications [6]. Although ANC alone contributes to a 20% reduction in maternal mortality [7], adherence to timing and number of visits in developing countries is low [8–10].

Globally, about 80% of women receive at least one ANC, and 64% attend the recommended four visits [2]. In Africa, about three-fourths of pregnant women receive at least one ANC [2], and the prevalence of adequate ANC utilization was 58.5% in SSA countries and 53.4% in the Eastern African region [10]. In Ethiopia, noncompliance to the recommended ANC visits ranges from 36.3% to 63.4% [11–15].

Studies in specific settings found that attendance of less than four ANC visits was 75.6% in Amhara [16], 50.1% in Tigray [17], 23% in Wolaita [18], and 44% in rural Southern Ethiopia [19]. Previous studies showed that factors like maternal education, place of residence, wealth, exposure to mass media, pregnancy intention, and history of abortion had a significant effect on women's compliance to the recommended ANC visits [9, 12, 14, 20–22].

In Ethiopia, various interventions have been implemented to improve maternal health in the last two decades. Expansion and upgrading of health facilities [23, 24] and the launching of the Health Extension Program have resulted in increased health service coverage [23]. Besides, women empowerment through educational opportunities and dissemination of health information through different approaches were taken as the strategies for improving the uptake of maternal health services [23]. The role of behavioral, mobile health, and home-visit interventions on maternal compliance to ANC was also explored in some parts of the country [25, 26].

However, despite these efforts, noncompliance to the recommended number of ANC visits at the national level is relatively high. Moreover, there has only been one study on antenatal care utilization in the Afar region. However, this study only included one district and did not examine the level of maternal compliance to the recommended antenatal care and its predictors [27]. In such pastoral areas, where access to health care services is problematic, there is a dearth of evidence on nonadherence to the recommended ANC visits and its associated factors. Thus, this study aimed to assess nonadherence to the recommended ANC visits and associated factors among women in the pastoral community of Northeast Ethiopia.

2. Methods

2.1. Study Area, Period, and Design. A community-based cross-sectional study was conducted in Afar Regional State from 04 February to 22 March 2020. Afar region is one of the eleven regional states that constitute the Federal Democratic Republic of Ethiopia. It has five zones, thirty-two districts, and three hundred seventy-nine kebeles (the smallest administrative units in Ethiopia). According to the 2007 national census, the total population of the region is estimated to be 1,805,688 with a rural population share of 91.9% and 90% of people live as pastoralists [50]. There is one referral hospital, six zonal hospitals, 74 health centers, and around 400 health posts in the region.

2.2. Population, Sample Size, and Sampling Procedure. `All mothers who gave birth within the last 24 months preceding the survey in the project intervention districts of the region were the source population. The study population was all randomly selected mothers in the randomly selected kebeles of the Transform Health in Developing Regions (THDR) intervention districts. Mothers with children aged 24 months and below and those who resided in the study area for at least six months were included in the study. Mothers who were unable to give the required information due to disability and other conditions were excluded from the study.

A sample size of 746 was estimated by Epi-Info version 7.1.1.14 using a single population proportion formula and by assuming the level of nonadherence to the recommended ANC visits to be 36.3% [11], 5% of margin of error (d), 95% confidence level, 10% nonresponse rate, and a design effect of 2. A multistage sampling technique was used to get the required samples from representative kebeles (clusters). In the first stage, nine districts were randomly selected from 15 THDR intervention districts. In the second stage, three kebeles were selected by lottery method from each of the randomly selected districts (with a total of 27 kebeles). Then, the total number of mothers with children aged 0–24 months in each kebele was identified and a complete listing of eligible mothers was done in the selected kebeles. Based on the number of eligible mothers in the selected kebeles, population proportion to size allocation of the sample was undertaken to determine the number of mothers from each kebele. Finally, a simple random sampling technique was used to select mothers from each kebele.

2.3. Data Collection Tool and Procedures. Data were collected using a structured questionnaire through face-to-face interviews adapted from the Ethiopian Demographic and Health Survey 2016 and literature [10, 12, 17, 28–30]. The questionnaire was prepared in English and then translated into the local language, Afar'af. Then, the Afar'af version questionnaire was translated back to the English version by another language expert, and both versions were finally checked for consistency. The data collectors were health professionals (diploma nurses) who have previous data collection experience and were fluent in speaking the local language.

2.4. Variables and Definitions. The outcome variable for this study was "nonadherence to the recommended ANC visit," which was measured by asking the study participants for the number of ANC visits attended during their index pregnancy. Thus, women who attended less than the recommended four visits were considered as having "nonadherence," coded as "1" and those who attended four or more visits were categorized as having "adhered to the recommendation," coded as "0." Independent variables included sociodemographic (women's age, education, and occupation, husband's education and occupation, possession of TV/radio, number of under-five children, decision maker on health care use, family size, and income), obstetrics (age at marriage, age at first pregnancy, gravidity, parity, history of abortion and stillbirth, birth order, gestational age (GA) at 1st ANC visit, and husband/family support for ANC), and health facility-related (time taken to reach the nearest health facility and type of health facility for ANC) characteristics.

2.5. Data Quality Control. Data collectors were trained by principal investigators for three days on data collection tools and procedures (sampling and interviewing techniques). Supervision of the data collection activities was undertaken by principal investigators and the collected data were checked for completeness, accuracy, and consistency by supervisors on daily basis. The tool was pretested on 5% (37 mothers) of the sample size in another community (Dubti district) of similar characteristics for some modifications before the commencement of the actual data collection. Data were cleaned and cross-checked before entry and analysis.

2.6. Data Management and Statistical Analysis. Data were entered into Epi-data version 4.2 and exported to Stata version 16 for further analysis. Descriptive statistics were used to analyze the descriptive data, and the results were presented in text form, frequency tables, and figures. Bivariable binary logistic regression analysis was done, and variables with *P*-value less than 0.25 were considered as the candidate variables for the final model [31].

Finally, a multivariable binary logistic regression analysis was carried out to identify factors associated with nonadherence to the WHO's recommended ANC visits. Adjusted odds ratio (AOR) with the corresponding 95% confidence interval (CI) was computed, and the statistical significance of the explanatory variables was declared at a *P*-value less than 0.05. Multicollinearity between the independent variables was checked using the variance inflation factor (VIF), and the VIF values for the variables included in the final model were less than 10, indicating there was no collinearity between variables [32]. The model fitness test was checked using the Hosmer and Lemeshow goodness of fit test, and the *P*-value of this test was 0.62 suggesting that the model best fits the data [33].

2.7. Ethical Approval and Consent. Ethical approval was obtained from the Research Ethical Review Committee (ERC) of Samara University dated 9th January 2020 and numbered ERC 0003/2020. The letter of the permission was received from Samara University and Afar Regional Health Bureau. Written informed consent was obtained from each study participant before the interview. Confidentiality was maintained by excluding personal identifiers of the study participants from the data, and the collected data were not shared with anybody other than the authors mentioned in this work.

3. Results

3.1. Sociodemographic Characteristics. From the desired sample size of 746, 703 women participated in the study giving a response rate of 94.2%. Nearly, half (350 (49.8%)) of them were between the age of 25 and 35 years, and 134 (19.2%) had a polygamy type of relationship. Concerning education, 613 (87.2%) women and husbands of 510 (73.3%) women in this study had no formal schooling. Besides, more than ninety percent of women were housewives, and 331 (47.6%) of their husbands were pastoralists. More than half (374 (53.2%)) of the women walk for less than 30 minutes to reach the nearest health facility, and the decision on healthcare use for 261 (37.1%) women was made jointly with their husbands. Moreover, sixty-two (15.5%) women lived in households possessing television and/or radio (Table 1).

3.2. Obstetric Characteristics. In this study, the mean ages (±SD) at first marriage and first pregnancy were 16.4 ± 1.9 and 17.9 ± 2.1 years old, respectively. It was found that 330 (46.9%) and 496 (70.6%) women got married and had their first pregnancy before the age of 18 years, of which 418 (59.5%) had been pregnant two to three times.

Regarding adverse pregnancy outcomes, 25 (3.6%) and 45 (6.4%) women had a previous history of abortion and stillbirth, respectively. Nearly half, 351 (49.9%) of respondents attended two to three ANC visits, of which 433 (61.6%) initiated ANC during the first trimester. It was also revealed that 588 (83.8%) women attended ANC at health centers, and 597 (84.9%) had a partner and/or family support for ANC attendance (Table 2).

3.3. Nonadherence to WHO's recommended ANC visits. In this study, 50 (7.1%) and 351 (49.9%) women attended one and two to three ANC visits during their index pregnancy, respectively. Overall, the prevalence of nonadherence to the recommended ANC visits was 57.0% (95% CI: 53.3%–60.7%). Variation in the level of noncompliance to the recommended visit was observed across women's educational status and age at first pregnancy. For instance, 365 (91.0%) women with no formal education and 312 (77.8%) women who had their first pregnancy before the age of 18 years did not attend the recommended four or more ANC visits.

3.4. Factors affecting Nonadherence to WHO's recommended ANC visits. The result of multivariable logistic regression analysis showed that women's education, possession of communication media, age at first marriage, GA at first ANC

Table 1: Sociodemographic characteristics of women who gave birth in the past two years in the pastoral community, Northeast Ethiopia, 2020 ($n = 703$).

Characteristics	Less than 4 ANC visits	At least 4 ANC visits	Total (%)
Women’s age			
15–24 years	167 (41.7)	110 (36.4)	277 (39.4)
25–34 years	187 (46.6)	163 (54.0)	350 (49.8)
35–49 years	47 (11.72)	29 (9.6)	76 (10.8)
Marital relation (n = 696)			
Monogamy	322 (81.5)	240 (79.7)	562 (80.8)
Polygamy	73 (18.5)	61 (20.3)	134 (19.2)
Women’s education			
No formal education	365 (91.0)	248 (82.1)	613 (87.2)
Primary	28 (7.0)	43 (14.3)	71 (10.1)
Secondary and above	8 (2.0)	11 (3.6)	19 (2.7)
Husband education (n = 696)			
No formal education	303 (76.7)	207 (68.8)	510 (73.3)
Primary	42 (10.6)	55 (18.3)	97 (13.9)
Secondary and above	50 (12.7)	39 (12.9)	89 (12.8)
Women’s occupation			
Housewife	62 (15.5)	66 (21.9)	645 (91.8)
Working*	339 (84.5)	236 (78.1)	58 (8.2)
Husband occupation (n = 696)			
Unemployed	32 (8.1)	97 (32,2)	129 (18.5)
Pastoralist	229 (58.0)	102 (33.9)	331 (47.6)
Agro pastoralist	33 (8.4)	21 (7.0)	54 (7.8)
Gov’t/private employee	67 (16.9)	71 (23.6)	138 (19.8)
Others*	34 (8.6)	10 (3.3)	44 (6.3)
Possession of radio/TV			
Yes	62 (15.5)	66 (21.9)	128 (18.2)
No	339 (84.5)	236 (78.1)	575 (81.8)
Number of U5 children			
1	113 (28.2)	91 (30.1)	204 (29.0)
2	217 (54.1)	157 (52.0)	374 (53.2)
≥3	71 (17.7)	54 (17.9)	125 (17.8)
Family size			
2–4	133 (33.2)	100 (33.1)	233 (33.1)
5–7	178 (44.4)	141 (46.7)	319 (45.4)
≥8	90 (22.4)	61 (20.2)	151 (21.5)
Time taken to reach the nearest health facility			
≥30 minutes	191 (47.8)	138 (45.7)	329 (46.8)
<30 minutes	210 (52.4)	164 (54.3)	374 (53.2)
Decision-makers on healthcare use			
Women only	148 (36.9)	106 (35.1)	254 (36.1)
Husbands only	44 (11.0)	33 (10.9)	77 (11.0)
Joint	143 (35.7)	118 (39.1)	261 (37.1)
Other family members	66 (16.4)	45 (14.9)	111 (15.8)
Family income (birr)			
<500	80 (19.9)	35 (11.6)	115 (16.4)
500–1000	110 (27.4)	104 (34.4)	214 (30.4)
1001–2000	130 (32.4)	109 (36.1)	239 (34.0)
>2000	81 (20.2)	54 (17.9)	135 (19.2)

Working* = herding, gov’t employee, and merchant; others* = **g**ov’t employee, merchant, and farmer; U5 children = **u**nder-five children.

visit, and place of ANC attendance were significantly associated with nonadherence to the recommended ANC visits. In this regard, women with primary (AOR (95% CI) = 0.39 (0.22–0.72)) and secondary education and above (AOR (95% CI) = 0.25 (0.08–0.77)), those who married at the age of 18 year or older (AOR(95% CI) = 0.48 (0.36–0.71)), and women who attended ANC at health center (AOR (95% CI) = 0.46 (0.26–0.81)) had lower odds of having nonadherence to the recommend ANC visits. On the other hand, women from the households not possessing radio and/or television (AOR (95% CI) = 1.85 (1.18–2.88)) and those who started ANC attendance during second (AOR (95% CI) = 5.23 (3.54–7.72)) and third trimester (AOR (95% CI) = 8.81 (1.88–41.20)) had an increased likelihood of nonadherence (Table 3).

Table 2: Obstetric characteristics of women who gave birth in the past two years in the pastoral community, Northeast Ethiopia, 2020 ($n = 703$).

Characteristics	Less than 4 ANC visits	At least 4 ANC visits	Total (%)
Age at first marriage			
<18 year	215 (53.6)	115 (38.1)	330 (46.9)
≥18 year	186 (46.4)	187 (61.9)	373 (53.1)
Age at first pregnancy			
<18 year	312 (77.8)	184 (60.9)	496 (70.6)
≥18 year	89 (22.2)	118 (39.1)	207 (29.4)
Gravidity			
1	47 (11.7)	42 (13.9)	89 (12.7)
2-3	238 (59.4)	180 (59.6)	418 (59.5)
≥4	116 (28.9)	80 (26.5)	196 (22.9)
Parity			
1	50 (12.5)	45 (14.9)	95 (13.5)
2-3	243 (60.6)	197 (65.2)	440 (62.6)
≥4	108 (26.9	60 (19.9)	168 (23.9)
History of abortion			
No	389 (97.0)	289 (95.7)	678 (96.4)
Yes	12 (3.0)	13 (4.3)	25 (3.6)
History of stillbirth			
No	378 (94.3)	280 (92.7)	658 (93.6)
Yes	23 (5.7)	22 (7.3)	45 (6.4)
Birth order			
1	56 (14.0)	48 (15.9)	104 (14.8)
2	72 (17.9)	51 (16.9)	123 (17.5)
≥3	273 (68.1)	203 (67.2)	476 (67.7)
GA 1st ANC			
1st trimester	186 (46.4)	247 (81.8)	433 (61.6)
2nd trimester	201 (50.1)	53 (17.6)	254 (36.1)
3rd trimester	14 (3.5)	2 (0.7)	16 (2.28)
Place of ANC attendance			
Health post	47 (11.7)	25 (8.3)	72 (10.2)
Health center	324 (80.8)	264 (87.4)	588 (83.6)
Hospital	30 (7.5)	13 (4.3)	43 (6.1)
Husband/family support for ANC attendance			
Yes	332 (82.8)	265 (87.7)	597 (84.9)
No	69 (17.2)	37 (12.3)	106 (15.1)

4. Discussions

The current study aimed to assess the level of noncompliance to WHO's recommended antenatal care visits and associated factors among mothers in the Afar Region, Northeastern Ethiopia. Accordingly, the overall level of nonadherence to the recommended ANC visits in this study was 57.1% (95% CI: 53.3%–60.7%), which is consistent with the study conducted in five regions of Ethiopia (56.7%) [13]. However, this finding was slightly higher than the results of the studies done in Tigray, Northern Ethiopia (50.1%) [17], and Egypt (51.3%) [30]. Moreover, this finding was greatly higher than the level of noncompliance to recommended ANC reported in the studies done in Ghana (15.2%) [20], Ethiopia (36.3%) [11], Malaysia (37%) [34], Zambia (40%) [28], Sub-Saharan Africa (41.5%) [10], Myanmar (42%) [35], East African (43.6%) [9], and India (47%) [36]. On the contrary, the level of nonadherence to the recommended ANC visits in this study was lower than that reported in the studies done in Ethiopia (63.4%) [12], Bangladesh (68.7%) [29], Rwanda (86.6%) [37], and Sub-Saharan Africa (92.3%) [8]. This discrepancy might be attributable to the methodological and sample size differences and variations in the study time and setting and background characteristics of the study population.

The result of regression analysis revealed significant differences in the likelihood of nonadherence to the recommended ANC visits among women with different sociodemographic and obstetric characteristics. For instance, women who attended primary education and secondary education and above, respectively, had 41% and 75% decreased odds of being nonadherent to the recommended ANC visits compared to women who did not have formal education. This finding was in agreement with the results of the studies in Ethiopia [12, 14, 18], Ghana [20], East Africa [9], and Sub-Saharan Africa [10, 38] that reported women's education as an enabling factor for attending four or more ANC visits. This finding was also supported by other previous studies [9, 13, 28, 39, 40]. This could be explained by the fact that educated women might have a better awareness

Table 3: Factors associated with nonadherence to the recommended antenatal care visits among women in the pastoral community, Northeast Ethiopia, 2020 ($n = 703$).

Characteristics	Less than 4 ANC visits	At least 4 ANC visits	Corollary (95% CI	AOR (95% CI)
Women's age				
15–24 years	167 (41.7)	110 (36.4)	1.00	1.00
25–34 years	187 (46.6)	163 (54.0)	0.76 (0.55, 1.04)	0.68 (0.46, 1.02)
35–49 years	47 (11.72)	29 (9.6)	1.07 (0.63, 1.80)	0.97 (0.51, 1.86)
Women's education				
No formal education	365 (91.0)	248 (82.1)	1.00	1.00
Primary	28 (7.0)	43 (14.3)	0.44 (0.27, 0.73)*	0.39 (0.22 0.72)*
Secondary and above	8 (2.0)	11 (3.6)	0.49 (0.19, 1.24)	0.25 (0.08 0.77)*
Husband education ($n = 696$)				
No formal education	303 (76.7)	207 (68.8)	1.00	1.00
Primary	42 (10.6)	55 (18.3)	0.52 (0.34, 0.81)*	0.84 (0.51, 1.38)
Secondary and above	50 (12.7)	39 (12.9)	0.88 (0.56, 1.38)	1.51 (0.88, 2.60)
Possession of radio/TV				
Yes	62 (15.5)	66 (21.9)	1.00	1.00
No	339 (84.5)	236 (78.1)	1.53 (1.04, 2.25)*	1.85 (1.18, 2.88)*
Walking distance to the nearest health facility				
≥30 minutes	191 (47.8)	138 (45.7)	1.00	1.00
<30 minutes	210 (52.4)	164 (54.3)	0.93 (0.69, 1.25)	0.94 (0.66, 1.33)
Age at first marriage				
<18 years	215 (53.6)	115 (38.1)	1.00	1.00
≥18 years	186 (46.4)	187 (61.9)	0.53 (0.39, 0.72)*	0.48 (0.36, 0.71)*
Age at first pregnancy				
<18 years	312 (77.8)	184 (60.9)	1.00	1.00
≥18 years	89 (22.2)	118 (39.1)	0.44 (0.32, 0.62)*	0.77(0.48, 1.21)
Parity				
1	50 (12.5)	45 (14.9)	1.00	1.00
2-3	243 (60.6)	197 (65.2)	1.11 (0.71, 1.73)	0.98 (0.56, 1.71)
≥4	108 (26.9	60 (19.9)	1.62 (0.97, 2.70)	1.29 (0.65, 2.55)
GA 1st ANC				
1st trimester	186 (46.4)	247 (81.8)	1.00	1.00
2nd trimester	201 (50.1)	53 (17.6)	5.04 (3.52, 7.20)*	5.23 (3.54, 7.72)*
3rd trimester	14 (3.5)	2 (0.7)	9.29 (2.09, 41.40)*	8.81 (1.88, 41.20)*
Place of ANC attendance				
Health post	47 (11.7)	25 (8.3)	1.00	1.00
Health center	324 (80.8)	264 (87.4)	0.65 (0.39, 1.09)	0.46 (0.26, 0.81)*
Hospital	30 (7.5)	13 (4.3)	1.23 (0.55, 2.76)	0.94 (0.38, 2.30)
Family support for ANC attendance				
Yes	332 (82.8)	265 (87.7)	1.00	1.00
No	69 (17.2)	37 (12.3)	1.49 (0.97, 2.29)	1.03 (0.62, 1.69)

*Significant at $P < 0.05$; ANC = antenatal care; COR = crude odds ratio; AOR = adjusted odds ratio; CI = confidence interval.

of the benefits of adequate ANC attendance [41] and thus more likely to adhere to the recommended visits. Moreover, the negative effect of literacy on healthcare-seeking behavior [42, 43] might also contribute to a lower likelihood of noncompliance to the recommended ANC visits among women with formal education.

Age at first marriage was also identified as a significant factor affecting compliance to the recommended ANC visits. In this regard, the odds of receiving less than four visits were decreased by 52% for women who got married at the age of 18 years or older compared with those married before the age of 18 years. This finding was consistent with the result of the study done in twenty Sub-Saharan African countries, which revealed a 25% decrease in the likelihood of adequate antenatal care attendance among this group [44]. Similar association was also reported in the studies conducted in Nepal [22] and India [45]. This might be attributable to the negative consequence of child marriage on women's empowerment [46] which in turn limits their opportunity in accessing healthcare services.

Place of ANC attendance was found to have a statistically significant effect on the recipient of adequate visits. Women who received ANC at health centers were more than 50% less likely to have nonadherence to the recommended visits compared with women who attended ANC at health posts. This might be due to variations in the quality of antenatal care services provided at different levels of facilities. Thus, women who received a good quality service might be satisfied with the service received and thus likely attend the follow-up visits.

Consistent with the finding of previous studies in Ethiopia [11, 13], women from households not possessing radio and/or television were 1.85 times more likely to receive ANC visits below the recommendation compared with those from households owning these communication media. This finding was also consistent with the result of the studies in India [47], Bangladesh [29], and East Africa [9]. This might be because women with exposure to sources of information, mass media in particular, had better access to health information and, therefore, more likely to use the health service [21, 48].

In this study, the timing of ANC attendance was also found as a significant predictor of noncompliance to the recommended visits. For instance, the odds of nonadherence for women who commenced ANC attendance during the second and third trimesters was increased by more than five and eight folds, respectively, compared with those who had their first visit during the first trimester. This result was consistent with the finding of the studies conducted in Ethiopia [13], seven countdown countries [49], and Ghana [20], which revealed a decreased likelihood of completing the recommended visits with an increase in GA at the first visit. This might be because women who had late ANC booking might have infrequent follow-up visits and thus less likely to receive the recommended four or more visits.

4.1. Strengths and Limitations. Since a representative sample of districts was included in this community-based study, its findings can be generalized to the entire Afar region. However, there are certain limitations that should be considered when interpreting the results. First, due to the cross-sectional nature of the study design, evidence of the temporal relationship between explanatory and outcome variables cannot be established. Second, the study mainly relied on self-reported information; therefore, interviewer and social desirability bias may have influenced the participant's responses.

5. Conclusions

In this study, nearly six in ten women do not receive the recommended ANC visits. Women's education, possession of communication media, age at marriage, place of antenatal care attendance, and the timing of the first visits were the significant factors affecting nonadherence to the recommended visits. Thus, improving women's literacy, dissemination of information regarding antenatal care through mass media, and strengthening interventions targeted to end child marriage are important in scaling up the level of adherence. Moreover, supporting community-based health education activities through health extension programs is also crucial in reaching women with limited access to mass media.

Abbreviations

ANC:	Antenatal care
AOR:	Adjusted odds ratio
CI:	Confidence interval
COR:	Crude odds ratio
ERC:	Ethical review committee
GA:	Gestational age
THDR:	Transform health in developing regions
WHO:	World health organization.

Data Availability

The raw datasets' data used to support the findings of this study are freely available from the corresponding author and can be shared upon reasonable request.

Conflicts of Interest

The authors declare that there are no conflict of interest.

Authors' Contributions

KUM, AGW, MSA, MAI, MKH, SBA, OAM, and KGS were involved in the conception and design of the study, acquisition and analysis of data, interpretation of the results, and drafting of the manuscript. KUM substantially revised the manuscript. All authors read and approved the final manuscript and agreed to take responsibility for the contents of this work.

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Research Article

Opportunities for Interactive Communication in Mechanically Ventilated Critically Ill Patients: A Video-Based Observational Study

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Background. Mechanically ventilated critically ill patients need the opportunity to communicate their physical and psychosocial concerns to nurses. However, these patients face the unique problem of lacking even the opportunity to communicate. *Aims*. The study aimed to describe the characteristics of communication opportunities for critically ill mechanically ventilated patients. *Methods*. The study was designed as a video-based descriptive observational study. Participants included seven mechanically ventilated critically ill patients at the intensive care unit, coronary care unit, or high care unit who were conscious and seven registered nurses (seven pairs). Videos were recorded continuously from 8 am to 4 pm, and the footage was then descriptively analyzed. Data collection took place between July 2019 and June 2020. *Results*. The total recording time was 668.0 minutes. Of these 668.0 minutes, nurses stayed in the Conversation Area of the Patient for 279.6 minutes, and of these 279.6 minutes, two-way face-to-face communication between nurse and patient occurred for 78.0 minutes. Of these 78.0 minutes, communications were started by nurses for 47.2 minutes (174 scenes) and by patients for 24.2 minutes (36 scenes). The patient-started two-way communication scenes included 37 instances of Patient-Intentional-Action that triggered the start of communication. Actions using the upper limbs were observed in 20 instances and represented the most frequently used body part. The head/face, lower limbs, or trunk were also used in some of the actions. Gestures were the most commonly used action type (14 instances). Other types included lip movement, grimace, leg flex/extension, and cough. *Conclusions*. We found that nurses tended to start communication more frequently than patients did and that patients demonstrated Patient-Intentional-Action with a variety of actions using various body parts. Communication opportunities for patients were created when nurses took the initiative to start communication or when they noticed and responded to the Patient-Intentional-Action. Our findings demonstrate that nurses need to recognize and always respond to Patient-Intentional-Action and to take the initiative in communicating rather than waiting for the patient to do so.

1. Introduction

Communication is one of the most pressing challenges when it comes to mechanically ventilated critically ill patients. Communication in clinical settings is essential [1] and improves patient outcomes [2], but patients with mechanical ventilation face unique problems with communication, such as not being understood by the nurse [3–5] or lacking even the opportunity to communicate.

Our focus in this study is on the lack of communication opportunities. Critically ill patients with mechanical ventilation typically have physical problems such as pain, dyspnea, thirst, or sleeplessness that need to be communicated [6–8], and they also experience psychosocial problems such as anxiety or fear triggered by receiving invasive treatment in critical care settings [8, 9]. It is essential that patients have the chance to communicate these physical and psychosocial concerns to nurses, but they may not have access to such opportunities. The lack of opportunities to communicate is therefore a serious issue that needs to be resolved.

Prior research has indicated that patients experience a lack of opportunities to communicate with nurses. Noguchi and Inoue [10] showed that patients had no chance to communicate because nurses were not aware that they wanted to, even though the patients were signaling. Yamaguchi et al. [11] reported that patients experienced being left alone without nurses being aware of their communication cues. Karlsson et al. [12] found that patients experienced feelings of neglect and of the nurses being absent, as nurses did not speak to them or stay close enough to notice their signals. Wallander Karlsen et al. [13] identified attention-seeking actions performed by patients and noted that while nurses responded immediately to such cues, the responses were sometimes too late. These studies clearly indicate that patients want to communicate with nurses but lack the opportunities to do so.

Previous studies [10–13] have also identified the lack of communication opportunities as a typical experience when wearing a mechanical ventilator. However, there have been very few studies [10–13] that focus on communication opportunities themselves for patients and describe them in detail. As such, it remains unclear whether the patients have communication opportunities, what kind of opportunities these may be, and how long these opportunities may last. It is also not clear what actions patients use as cues to indicate the desire for communication with nurses and how often these actions are performed. To answer these questions accurately, it is necessary to obtain continuous observational data over a long period of time, rather than partial observational data for just a few hours while the patient is on the ventilator, and to analyze this data and describe it in detail. Such effort would enable us to examine nursing practices more thoroughly to ensure that patients have the opportunity to communicate.

In this study, we aimed to describe the characteristics of communication opportunities for critically ill mechanically ventilated patients with respect to the following research questions: (1) What is the frequency and duration of communication between patient and nurse? (2) What actions do patients take to signal a desire to start communication? Communication opportunity is defined here as a two-way face-to-face interaction in which a person verbally or nonverbally conveys their thoughts and feelings to another.

2. Methods

2.1. Study Design. The study was designed as a video-based descriptive observational study.

2.2. Setting. We collected the data from three units of two hospitals in cities located in western Japan. One hospital was a 240-bed general hospital, where four of the beds were located in the high care unit (HCU). The other hospital was a 150-bed cardiovascular hospital, where eight of the beds were in the intensive care unit (ICU), and four were in the coronary care unit (CCU).

Patient beds were located on an open floor, on a semiopen floor, or in a single-occupancy room. On the open and semiopen floors, the beds were separated by curtains or walls, respectively. The single-occupancy room was a separate private room. The HCU had an open floor and one single-occupancy room, the ICU had an open floor and a semiopen floor, and the CCU had an open floor.

The patient-to-nurse staffing ratios per 24-hour day were 2 : 1 in the ICU and CCU and 4 : 1 in the HCU. The number of patients assigned to each nurse was typically small during the day shift and larger during the evening and night shifts. Nurses were responsible for handling various aspects of the patients' care, such as performing physical examinations, administering medications, assisting in medical care, collecting blood for blood tests, giving sponge baths, performing oral care, helping with family care, transporting the patient, and keeping records.

2.3. Participants. Mechanically ventilated critically ill patients and the registered nurses assigned to them participated in the study. Patients were considered eligible if they were mechanically ventilated with intubation or tracheostomy, were being treated at the ICU, CCU, or HCU, had a Glasgow Coma Scale (GCS) score of E3VTM6 or higher, and (in the case of sedation) had a Richmond Agitation Sedation Scale (RASS) score within the range of −1 to 1. Eligibility for the nurses was restricted to registered nurses on the day shift assigned to the patients who consented to participate in this study.

2.4. Data Collection. Data collection took place between July 2019 and June 2020. We utilized video recording for the data collection because it enabled us to observe all the actions taken by patients and nurses and to access the data repeatedly. Observing using video recording is known to be a useful and powerful data acquisition tool [14, 15]. Video recordings can accurately record the complex nature of nursing phenomena [14] and allow multiple researchers to scrutinize the data during the process of analysis [15].

Fixed-point video cameras were placed at the head and foot of each patient's bed. The video cameras were GoPro HERO6 Black edition (GoPro, Inc.), and the records stored 2.4 K and 30 frames per second. We recorded videos from 8 am to 4 pm for only one day during the mechanical ventilation period. We planned the video recording during the day shift because we wanted to capture as many communication opportunities as possible. Shift schedules at the hospitals were organized as two-shift or three-shift rotations. The day shift began at around 8 am in both rotations. Night shifts in the two-shift rotation and evening shifts in the three-shift rotation began at around 4 pm. In consideration of the shift schedules, we decided on the recording time of 8 am to 4 pm and kept recording continuously over this span except for physical examinations of the chest or abdomen, excretion care, sponge baths, family visits, and nurse break times. If the endotracheal tube was extubated before 4 pm, we ended recording at the time of extubation. The researcher was always at the units where the data were collected so that the recording could be stopped at any time if requested. However, the researcher stayed at a distance from the participants and did not speak to them at any time during the recording.

Prior to starting, we collected information about the patients and nurses, as shown in Tables 1 and 2. The patient information was gleaned from electronic medical records and included age, diagnosis, treatment, days on mechanical ventilation, airway, and any sedatives. We evaluated the GCS status and RASS status by observing patient-nurse interactions at the beginning of data collection. Information on the nurses included age and years of experience as a nurse and as a critical care nurse obtained through interviews.

Seven mechanically ventilated critically ill patients in the ICU, CCU, or HCU who were conscious and seven registered nurses on the day shift assigned to the patients participated in the study (seven pairs). Each patient and nurse participated in the study for only one day. Figure 1 shows the flow of recruiting participants. Patients who were already equipped with mechanical ventilation or planned to use mechanical ventilation postoperatively were asked in advance to participate in the study, and consent was obtained. However, if the patients had already been weaned off the ventilator on the date of data collection, they were excluded from the study even if consent had been obtained. The Verbal Response, one element of GCS, was not testable in all patients because of intubation or tracheostomy (Table 1). However, they could respond to queries such as those containing their name. Five patients were on the open floor, and two were on the semiopen floor. Of the seven nurses, six were assigned to one patient on the day of data collection, and one was assigned to two patients.

TABLE 1: Characteristics of patients ($n = 7$).

Characteristic	Value
Age (years)	
Mean	71.3
Range	43–88
Sex	
Male	4
Female	3
Diagnosis/treatment	
Surgical	6
Medical	1
Airway	
Intubation	6
Tracheostomy	1
Unit	
ICU	5
CCU	1
HCU	1
Days on mechanical ventilation	
Mean	5.9
Range	1–23
GCS*	
E3VTM6	4
E4VTM6	3
Sedation	
No sedation	4
Propofol	2
Dexmedetomidine	1
RASS**	
Score 0	2
Score −1	1

Note. *GCS: Verbal Response, one of the elements of the GCS, could not be tested in all patients because of intubation or tracheostomy. Therefore, Verbal Response was denoted as VT: Verbal Tube. **RASS: the RASS status was evaluated only in three sedated patients.

TABLE 2: Characteristics of nurses ($n = 7$).

Characteristic	Value
Age (years)	
Mean	31.0
Range	24–40
Sex	
Male	3
Female	4
Years of experience	
As a nurse	
Mean	5.5
Range	1.3–11.0
As a critical care nurse	
Mean	3.0
Range	0.9–6.0

2.5. Ethical Considerations.

The ethics committee of the Graduate School of Health Sciences, Kobe University, approved this study (approval number: 682), as did the ethics committees of Higashi Takarazuka Satoh Hospital (approval numbers: 1–6) and Kawasaki Hospital (approval number: 1-4-1).

We contacted patients who planned to use mechanical ventilation and those who were already mechanically ventilated to recruit study participants. All patients who planned to use mechanical ventilation provided written informed consent. All who were already mechanically ventilated gave oral informed consent, and their family provided written informed consent. We explained the study outline to unit nurses in advance. On the day of data collection, we contacted the eligible nurses again to explain the study and obtain written informed consent, which all of the nurses gave. Healthcare professionals included medical doctors, physiotherapists, or nurses who provided care in conjunction with the assigned nurses. They were excluded from the analysis if they did not participate in communication with patients and nurses who consented to participate in this study; hence, only oral informed consent for video

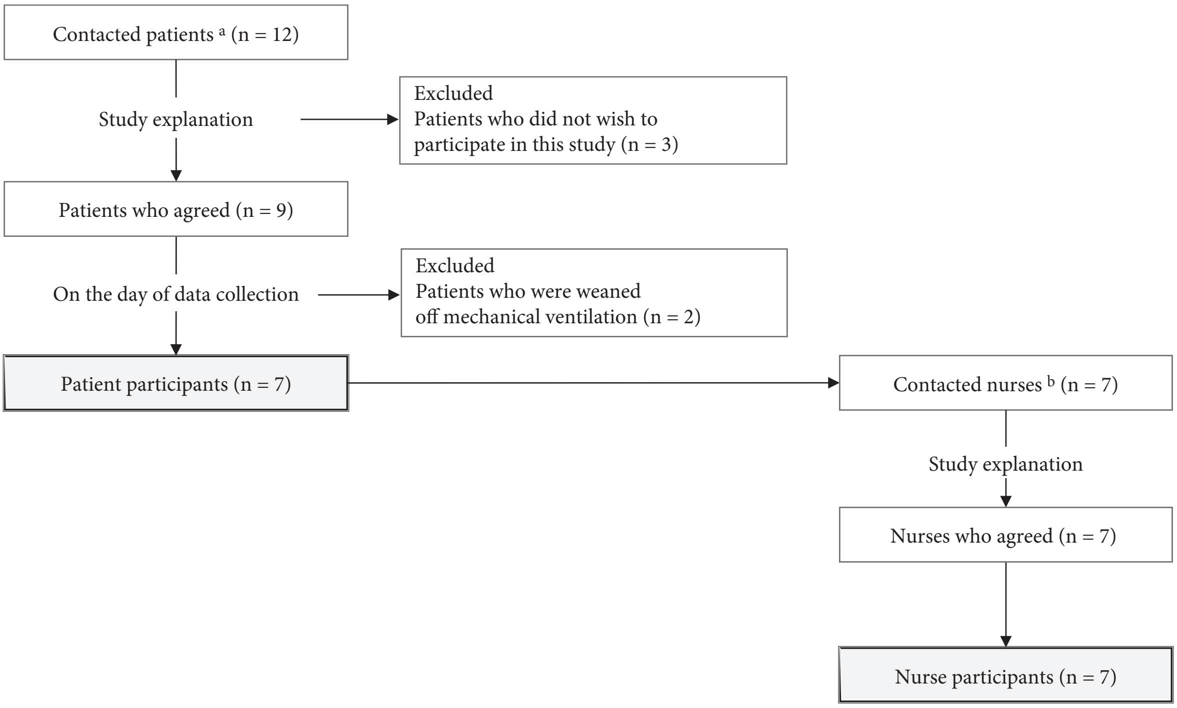

Figure 1: Flowchart of participant recruitment. (a) Contacted patients: patients were already equipped with mechanical ventilation or planned to use mechanical ventilation postoperatively. (b) Contacted nurses: day shift nurses assigned to patients who participated in the study.

recording was obtained on the day of data collection. However, in cases where healthcare professionals were participating in communication between the patients and the nurses, written informed consent was also obtained.

The recorded data were stored on external media in a password-protected file and kept in a locked locker. Only researchers involved in the analysis were allowed to access the data, and we used a dedicated research computer that was not connected to them through the Internet.

2.6. Data Analysis. We first classified the recorded data (see Section 2.6.1) and then analyzed it to identify the frequency and duration of communication between patients and nurses (see Section 2.6.2). We also investigated what types of actions patients took to signal a desire to start communication and how many times the patients performed those actions (see Section 2.6.3). The analysis results were reported and discussed at regular meetings attended by multiple researchers who were licensed registered nurses with clinical experience. ELAN version 5.9 was used for annotating the video.

2.6.1. Classification of Recorded Data. As shown in Figure 2, we performed three steps (Steps 1, 2, and 3) to classify the recorded data.

Step 1. Who stayed in the Conversation Area of the Patient?

We classified data into three types based on who was in the Conversation Area of the Patient (CAP). Hashimoto et al. [16] reported that an interpersonal distance of 150 cm or less without conversation is uncomfortable, so we defined CAP here as a space approximately 150 cm to the left and right from the center of the bed on which a patient was lying and approximately 50 cm above the headboard (Figure 3). We set the space above the headboard to 50 cm because there was a shelf at the back of the headboard, leaving only approximately 50 cm of space.

First, we extracted data in which the assigned nurses were in the CAP and classified them as Patient-Nurse scenes. Patient-Nurse scenes always included the patients and their assigned nurses. Moreover, the medical doctors, physiotherapists, medical engineers, or nurses who provided care in conjunction with the assigned nurses were included in some Patient-Nurse scenes.

Second, we extracted data in which healthcare professionals were in the CAP and classified them as Patient-Staff scenes. Patient-Staff scenes always included patients and healthcare professionals such as medical doctors or physiotherapists but did not include the assigned nurses. We classified scenes with no one in the CAP except the patient as Patient-Only scenes.

One Patient-Nurse scene was extracted as a single continuous scene from the time when a part of a nurse's body entered the CAP to when the entire nurse's body left the CAP. The Patient-Staff scenes were extracted in the same way.

Step 2. Did senders receive feedback from receivers?

We classified the Patient-Nurse scenes into three categories based on whether senders received feedback from receivers.

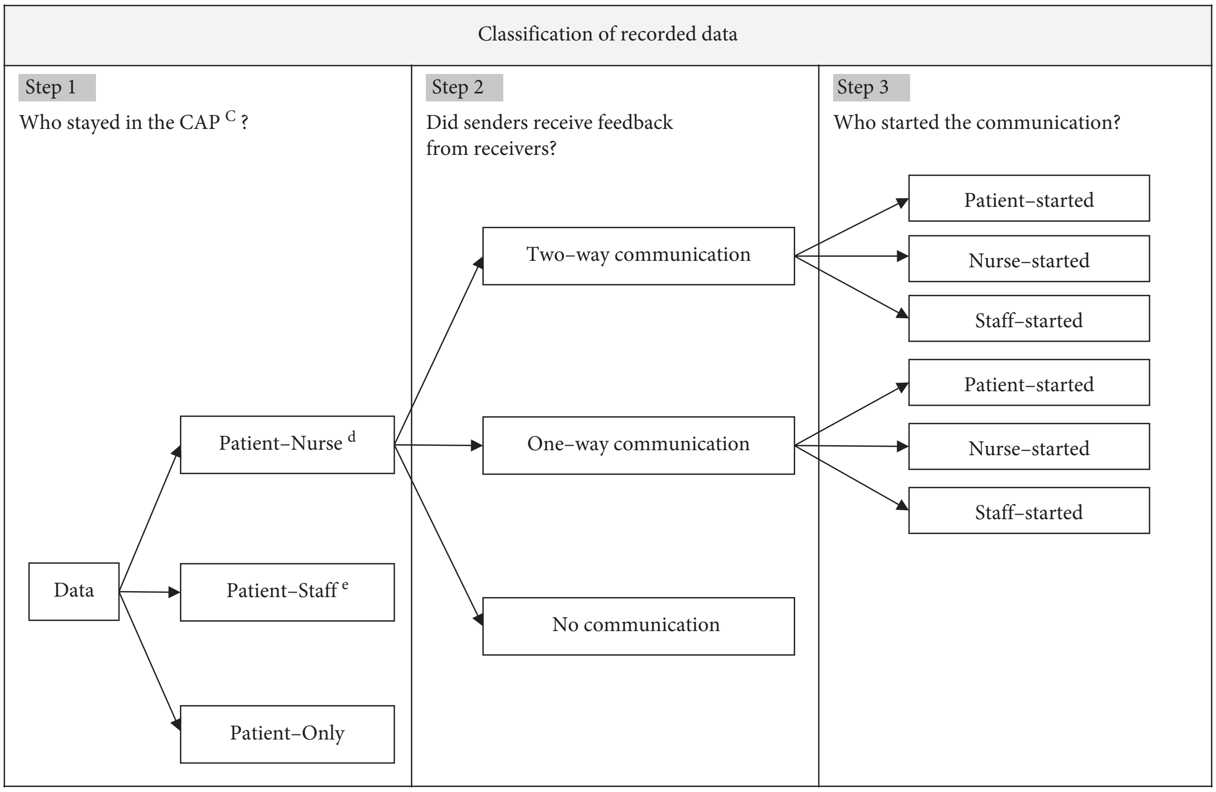

Figure 2: Flow diagram for classification of recorded data. (c) CAP: Conversation Area of the Patient. A space approximately 150 cm to the left and right from the center of the bed on which a patient is lying and approximately 50 cm above the headboard. (d) The nurse in Patient-Nurse refers to nurses assigned to the patients who participated in the study. Some Patient-Nurse scenes included additional healthcare professionals such as medical doctors, physiotherapists, medical engineers, or nurses who provided care in conjunction with the assigned nurses. (e) The staff in Patient-Staff refers to healthcare professionals and does not include nurses assigned to the patients who participated in the study.

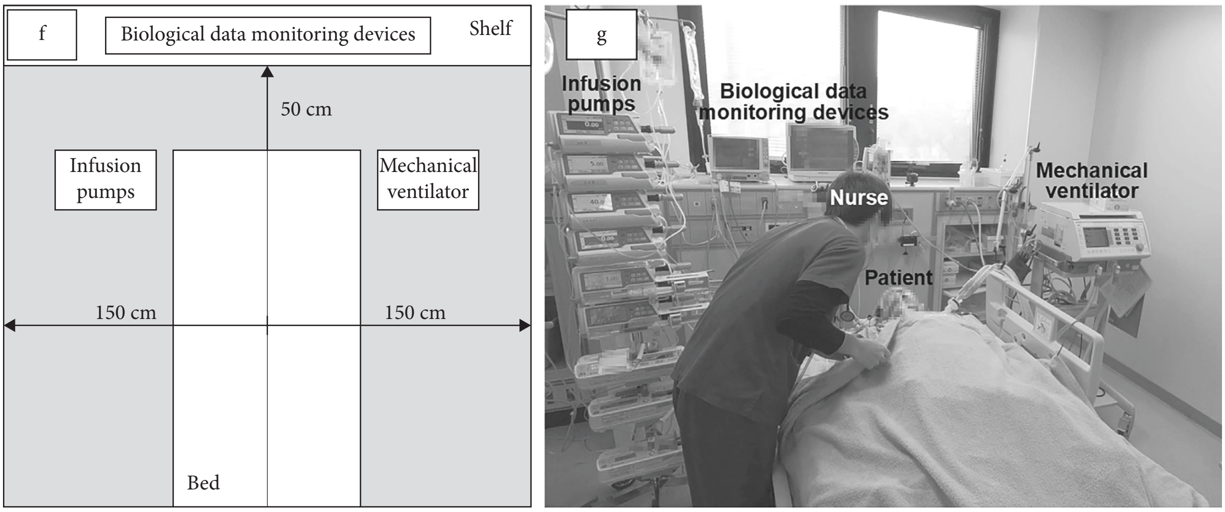

Figure 3: Conversation Area of the Patient (CAP). (f) Schematic of CAP. (g) Photograph of CAP.

First, we extracted the communication-related actions of patients, nurses, and healthcare professionals. Communication-related actions in patients were all head, upper limb, lower limb, trunk, and facial movements, without considering the intention of communication. However, we excluded eye movements (opening/closing eyes and gazing). The participants in this study included postoperative patients, some of whom had eyelid edema and were unable to open their eyes, which meant that gazing could not be observed. Therefore, eye movements were excluded because it was not possible to extract eye movements under identical conditions from all participating patients. Communication-related actions in nurses and healthcare professionals were utterances to patients. In this study, we dealt only with utterances to examine the times that nurses or healthcare professionals communicated with patients using vocal language.

Second, we identified two-way or one-way communication by comparing the communication-related actions of patients, nurses, and healthcare professionals. Two-way communication was a single continuous scene that started when the sender performed the first action and received feedback on it and ended when the receiver understood the sender's thought or feeling. Regarding the understanding of thoughts or feelings, we repeatedly observed communication-related actions of patients, nurses, and healthcare professionals on the video footage that demonstrated the thoughts and feelings of receivers were understood. However, there were also scenes where the receivers did not ultimately understand. For example, in one scene, a nurse eventually said to a patient, "I am sorry, but I can't understand what you're telling me." Examples of two-way communication scenes are presented in Figure 4.

One-way communication was a single continuous scene that started when the sender began the action and ended when the action finished. There was no feedback on that action. In these scenes, we did not consider whether the actions were intentional or not. Examples of one-way communication scenes are provided in Figure 4.

We classified any scenes that did not correspond to either two-way or one-way communication scenes as "no-communication." In no-communication scenes, patients, nurses, and healthcare professionals did not perform any communication-related actions.

Step 3. Who started communication?

We classified each two-way and one-way communication scene into one of three categories based on who started the communication: when a patient took the first action, when a nurse took the first action, and when a healthcare professional took the first action.

2.6.2. Frequency and Duration of Communication between Patients and Nurses. We calculated the total duration of each of the scenes classified in Section 2.6.1, namely, Patient-Nurse scene, Patient-Staff scene, and Patient-Only scene; two-way communication scene, one-way communication scene, and no-communication scene; and patient-started, nurse-started, and staff-started two-way and one-way communication scene. We also counted the number of two-way communication scenes started by patients or nurses. Note that all scenes were calculated on the order of milliseconds, but we use minutes for the discussions in this paper.

2.6.3. Types and Frequency of Actions and the Body Parts Used for Those Actions. Patient-Intentional-Action, which is an intentional action taken by the patient to signal a desire to start communication in a patient-started two-way communication scene, was identified as follows.

First, from the two-way communication scenes started by patients, we extracted the first actions performed by patients in each scene as the Patient-Intentional-Action.

Second, we classified Patient-Intentional-Action into four categories: (1) head/face, (2) upper limbs, (3) lower limbs, and (4) trunk, depending on which body part was used to perform the action. We then calculated the frequency of actions that were performed using each part of the body.

Finally, we identified Patient-Intentional-Action types inductively by comparing the actions performed using each part of the body and classifying similar actions into the same category. We repeatedly reviewed the video to classify the actions and then counted the number of action types and the number of actions for each type.

3. Findings

3.1. Frequency and Duration of Communication Opportunities between Patients and Nurses. The total recording time was 668.0 minutes (see Table 3). The longest record was 194.8 minutes, and the shortest was 38.0 minutes.

Of the 668.0 minutes of footage, Patient-Nurse scenes accounted for 279.6 minutes and Patient-Only scenes for 345.7 minutes (Figure 5).

Of the 279.6 minutes of Patient-Nurse scenes, two-way communication scenes accounted for 78.0 minutes and one-way communication scenes for 28.7 minutes (Figure 5). There was also a total of 172.9 minutes of no-communication scenes (Figure 5).

Of the 78.0 minutes of two-way communication scenes, those started by patients accounted for 24.2 minutes (36 scenes) and those by nurses for 47.2 minutes (174 scenes) (Figure 5). Of the 28.7 minutes of one-way communication scenes, those started by patients accounted for 24.7 minutes and those by nurses for 2.5 minutes (Figure 5).

3.2. Types and Frequency of Patient-Intentional-Actions and the Body Part Used for Those Actions. We extracted 37 Patient-Intentional-Actions from the 36 two-way communication scenes started by patients (there was one extra action because one patient performed two actions at the same time). Of the 37 actions, patients performed 20 using the upper limbs and ten using the head or face (Figure 6).

We categorized the 37 Patient-Intentional-Actions into 12 action types (lip movement, grimace, gesture, write in the air, flex or extension of lower limbs, cough, etc.). The most common action was gesture, which we observed 14 times. Examples of gestures in our study include the patient pointing to the intubation tube, the patient beckoning to a nurse, and the patient miming the action to drink water. Lip movement to imitate speech was observed five times and was only used by the tracheostomy patient. Ten types of action other than gesture and lip movement were observed one to three times each (Figure 6). Pushing the nurse-call button, searching for the nurse-call button, adjusting the position of the lower limb, and adjusting the position of the trunk were observed once each.

"Two-way communication" started by Patient	
Patient:	Moves lips.
Nurse:	"Um what?"
Patient:	Moves lips.
Nurse:	"Are you hot?"
Patient:	Nods.
Nurse:	"All right. I'll take off the blanket."
Patient:	Nods.

The patient performed the action of "moving lips" and received "Um, what?" feedback from the nurse. The nurse understood that the patient was hot.

"Two-way communication" started by Nurse	
Nurse:	"Mr. A, today, I plan to give you a head bath."
Patient:	Nods.
Nurse:	"Refreshing."
Patient:	Smiles.
Nurse:	"Fu-fu-fu." (Nurse laughs a smile.)

The nurse uttered "Mr. A, today I plan to give you a head bath" and received "Nods" feedback from the patient. The patient understood that the nurse planned to give him a head bath.

"One-way communication" started by Patient	
Patient:	Scratches nose.

The patient performed the action of "scratches nose", but there was no feedback from anyone.

"One-way communication" started by Nurse	
Nurse:	"I will touch your hand."

The nurse said to the patient, "I will touch your hand" before checking the IV line, but the patient did not respond.

Figure 4: Examples of two-way and one-way communication scenes. The second row of each box shows the actual communication between the patient and the nurse. In the boxes showing one-way communication, only the actions of the patient or the nurse are displayed. The third row of each box shows the explanation of scenes.

4. Discussion

Our analysis clarified the frequency and duration of communication between patients and nurses and the types and frequency of Patient-Intentional-Actions. To date, few studies have described in detail the frequency and duration of communication between patients and nurses based on data obtained from video recordings. In addition, while previous studies [17–19] have shown which communication methods patients use and how much they use them between the beginning and end of communication, none have examined Patient-Intentional-Actions as a trigger to start communication, which was the focus of our study. To our knowledge, the results of our study represent key findings that provide suggestions for nursing practices to secure better communication opportunities for patients. Our main findings are as follows.

Nurses tended to start two-way communication more frequently than patients did, which suggests that nurses take the initiative and create opportunities for communication with patients. This finding is consistent with reports that communication exchanges are most often started by nurses [17]. Patients have recently been mechanically ventilated without sedation or with light sedation, as recommended by "Clinical practice guidelines for the prevention and management of pain, agitation/sedation, delirium, immobility, and sleep disruption in adult patients in the ICU" [20], which has enabled nurses to communicate with them more interactively than ever before. Laerkner et al. [21] reported that mechanically ventilated patients can initiate, direct, and participate in communication from the first days of critical illness. On the other hand, Wallander Karlsen et al. [13] found that patients struggle to perform the actions required to initiate communication. These patients are often seriously ill and attached to many devices, which makes it difficult for them to take actions that show their intention to communicate, that is, Patient-Intentional-Action. Therefore, nurses should take the lead and initiate communication rather than waiting for Patient-Intentional-Action from patients who have difficulty performing such actions. These practices would ideally reduce the physical burden on patients and enable their communication needs to be met in advance.

However, one-way communication in which the patients did not respond to the nurses' utterances was also identified. The reasons for which patients did not respond to the nurses' utterances were unclear, but it might be that patients were not free to move their bodies due to pain, fatigue, edema, sedation, or medical equipment, they could not hear the nurses, or they were resting. Alasad and Ahmad [22] reported that nurses sometimes forget to communicate with patients when the patients are unconscious and unresponsive. However, Lawrence [23] indicated that patients listen, understand, and respond emotionally to what nurses have said, even when they appear to be unconscious. The patients may not be able to respond visibly for whatever reason but might hear and understand the nurses' words and respond in their own way. Nurses are responsible for communicating with patients whether they respond or not, so it is important for them to keep up their communication effort.

Patient-Intentional-Actions were performed the most frequently using patients' upper limbs. This suggests that even patients who are critically ill, fit with many devices, or have difficulty moving their bodies can still use their upper limbs to perform actions that indicate their intent to communicate. Therefore, nurses should consider ways of making it easier for patients to use the upper limbs as a means of

Table 3: Characteristics of video footage ($n = 7$).

Characteristic	Value
Total	668.0
Mean	95.4
Range	38.0–194.8

Note. Unit: minutes.

communication. For example, medical devices should be placed on the nondominant hand if possible so that the dominant hand can be used freely as a means of communication. We also found that some Patient-Intentional-Actions were performed using either the head/face, lower limbs, or trunk in addition to upper limbs. These results are similar to those of Wallander Karlsen et al. [13], who reported that patients mostly used their lips, hands, or legs to initiate the first contact with nurses. Patients naturally take actions using their body parts to demonstrate their communication intent when they cannot use their voice. It is essential that nurses carefully observe the upper limbs, but they must also observe the head, face, lower limbs, or trunk so as not to miss any actions that are cues to start communication and to get the patients to the starting line of communication with nurses.

While it is important to carefully observe actions that indicate a patient's desire to communicate, this study contributed insight into why attention to the patients' actions may be lacking. Specifically, it might be because nurses are not within adequate observation distance of patients' actions. In fact, we found that "Patient-Nurse" scenes were shorter than "patient-only" scenes. This is not to say that nurses spent too little time in the CAP, as they were often performing a variety of tasks for patients (e.g., IV preparation, consulting with other healthcare professionals, and writing nursing record entries) that could not be performed within the CAP. However, paying attention to patients' actions logically requires that nurses be in a position to observe these actions. Another finding in this study is that there were many one-way communications in which the nurses did not respond to the patients' actions. This implies that nurses missed several chances to pick up on actions as communication cues even though they were in the CAP. Although there are times when the operation of infusion pumps, mechanical ventilators, or biological data monitoring devices demands careful attention to those devices, which might prevent the nurses from paying attention to the patients, the nurses should still be required to constantly observe the patient's actions when in the CAP. For example, they should stand in a place where they can see the patients' actions and must be careful not to turn their backs on patients. We believe that if nurses perform more tasks in the CAP and devise ways to observe patients' actions, it may make it easier for them to notice Patient-Intentional-Actions and thus be less likely to miss patient behavior. However, we have not yet been able to verify whether the patient's action during one-way communication actually indicates a willingness to communicate. Further verification is required to determine whether there are any specific actions that nurses should respond to. Such verification will reveal patient actions that nurses often overlook and suggest nursing practices for creating communication opportunities without missing those actions.

In this study, we focused on Patient-Intentional-Actions taken by patients to inform nurses of the intention to start communication. However, from a different perspective, these Patient-Intentional-Actions could be considered as actions in which the nurses recognized that the patients' actions were made with the intention to start communication, and it was the nurses' responses that created the opportunities to communicate. In other words, whether or not an opportunity for communication occurs depends on how the recipient of an action handles that action.

In our study, we found that nurses recognized gesture, lip movement, grimace, adjusting the position of the lower limb, or adjusting the position of the trunk as Patient-Intentional-Actions showing the intention to initiate communication. We clarified that the nurses noticed the intention to start communication in a variety of actions and created communication opportunities for patients accordingly. It has been reported that nurses must interpret the patient's facial expressions and body language to determine what action to take [12], but it is also true that nurses may perceive the patient's physical movements not as an initiative to communicate but as restlessness or agitation, both of which are common in the ICU [13]. It is thus necessary for nurses to interpret whether or not the patients' actions are signals to start communication. However, this might prove difficult when, for example, the patient simply moves their body. In such cases, it is recommended that nurses speak to the patients to confirm. If the nurses call out and the patients have no intention of initiating communication, the patients will say that everything is fine. Sometimes, the patients might tell nurses something they were planning to tell them later. In any case, it is important for nurses to always respond to Patient-Intentional-Actions to determine what they are.

Interestingly, we found that patients used the nurse-call button just once, even though this was the easiest way to signal nurses. Actions with sound are more noticeable to nurses than actions without sound, such as beckon and grimace, which suggests that actions with sounds should be utilized to make the nurses more aware of the patients' intentions and thereby create opportunities for communication. An earlier study pointed out that patients in the ICU needed to have some kind of sound-activating device nearby so that they could get the attention of a healthcare professional quickly [13]. We recommend preparing a nurse-call device that patients can always hold in the hand and press when needed, such as a palm-sized device with a call button at the end of a cord. Nurses should encourage patients to utilize these devices because doing so can create easier communication opportunities for both patients and nurses. It is also necessary to develop new equipment that can give a signal when the patients want to talk to the nurses without much effort.

Finally, in terms of future research that would address the lack of communication opportunities for critically ill patients on mechanical ventilators, intervention and experimental studies should be conducted to build evidence of nursing practice. Prior studies [10–13] have confirmed that

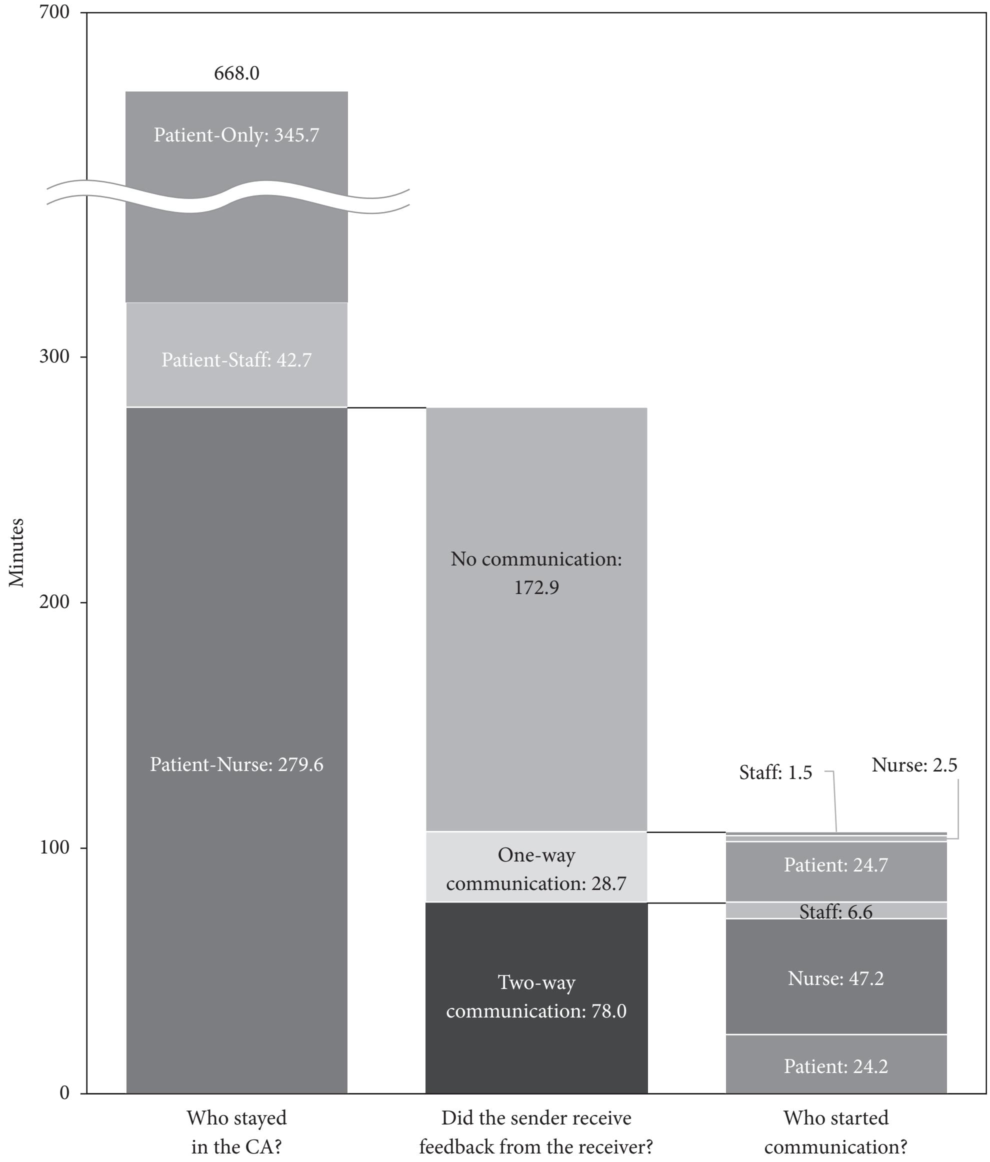

Figure 5: Communication opportunities between patients and nurses and their durations.

patients experience a lack of communication opportunities and have proposed nursing practices to address the problem. The present study similarly suggests several nursing practices that can be implemented and evaluates the nursing practices indicated in these studies in clinical settings. For example, it would be helpful to conduct an intervention study to examine whether having nurses spend more time in CAP increases their awareness of patient communication cues and the time they spend communicating with them.

5. Strengths and Limitations

We think that video recording is one of the best techniques for observational study, as this approach makes it possible to collect data that is difficult to capture or that would otherwise be missed in the field. For example, we were able to capture even the smallest actions, such as movements of a patient's fingertips. In addition, researchers could repeatedly reexamine the same scenes during the analysis process. For example, in situations where it was difficult to determine how to classify a certain patient action, multiple researchers viewed the video footage, held discussions, and finally decided on it. Haidet et al. [24] reported that video recordings can be replayed any number of times and provide a high degree of reproducibility when measuring observations. In this way, utilizing the video recording technique enabled us to ensure reliable data collection and analysis.

One of the unique contributions of this work is our observation and classification of Patient-Intentional-Actions, which will be useful for the construction of a monitoring system that automatically detects these actions. Moreover, as these Patient-Intentional-Actions pertain to the actions that nurses sensed and responded to, they can also be utilized for a system equipped with a program that

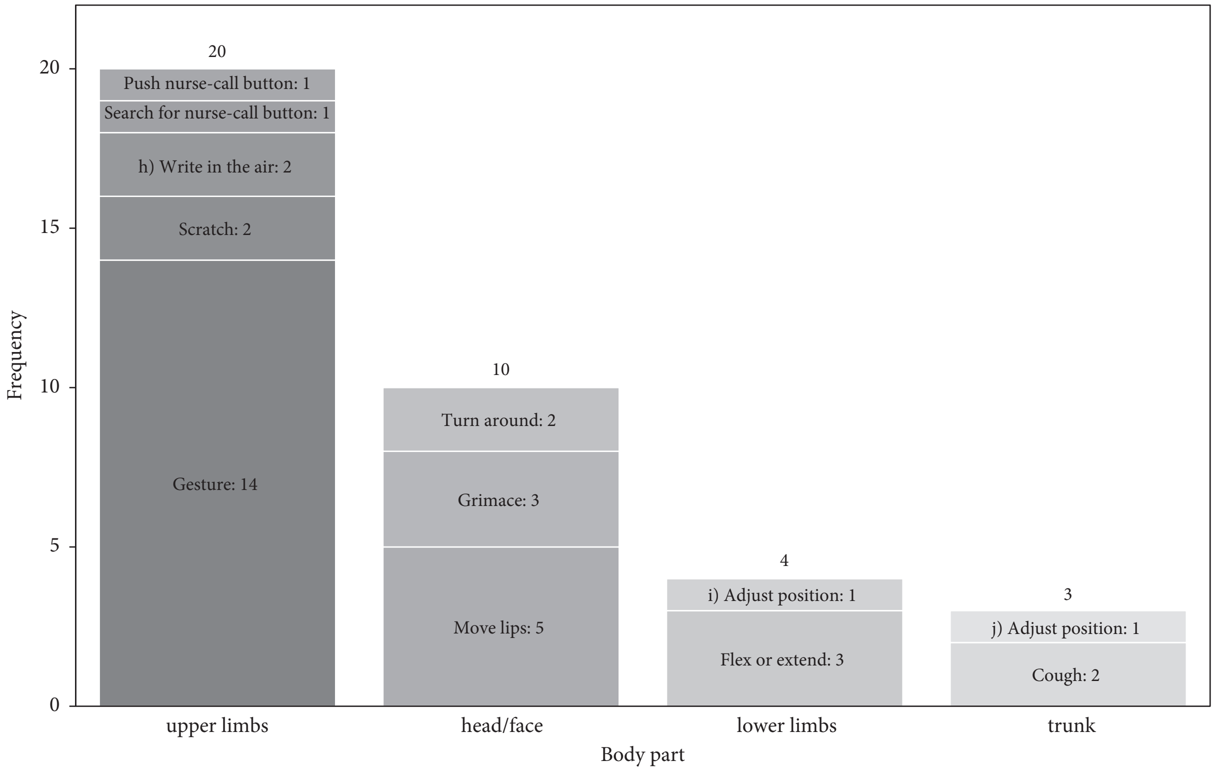

FIGURE 6: The types of actions patients take to make nurses aware of communication intent ($n = 37$). (h) Write in the air with a finger. (i) Adjust the position by abduction, adduction, lateral rotation, or medial rotation of lower limbs. (j) Adjust the position by lifting back or shoulder.

mechanically monitors Patient-Intentional-Actions and signals the nurses when those actions occur.

However, our study has some limitations.

First, we collected only seven cases at two hospitals, and more cases at multiple hospitals should be collected in the future. More cases would provide further suggestions and allow for the transfer of knowledge and methods of communication with mechanically ventilated patients to clinical and educational settings.

Second, we only considered utterances as communication-related actions of the nurses, as the time nurses communicated with patients was determined on the basis of their usage of vocal language. However, communication can include many actions other than utterances, for example, watching and touching. In this study, if watching and touching occurred without the nurses making any utterances, they were classified as no-communication scenes, but they could be considered as communication scenes depending on the focus of the study. Examples would include research on how often nurses use touch during communication or what part of the patient the nurse sees and speaks to during communication. Future work should extract and analyze such communication-related actions in accordance with the research focus. However, it is difficult to measure watching and touching by video recording alone, so data collection using devices that can trace the nurses' line of sight or sense of touch should be used in combination with video recording. In addition, the effects of seeing and touching during communication with patients should be analyzed from both quantitative and qualitative points of view.

Finally, our study was limited to a quantitative examination of patients' communication opportunities. Haidet et al. [24] have pointed out that video recording data can show what happens in real time but may lack important contextual data. Future research should utilize qualitative methods (e.g., patient interviews in combination with video recording) to analyze the interactions between patients and nurses and clarify what the opportunities would mean to patients.

6. Conclusion

The results of our video-based descriptive observational study of the communication opportunities for mechanically ventilated critically ill patients showed that nurses created communication opportunities more frequently than patients did, that patients performed various types of Patient-Intentional-Action using either the upper limbs, head/face, lower limbs, or trunk, and that the nurses responded to these actions. Our findings suggest that communication opportunities are created when nurses take the initiative to talk to patients or recognize and always respond to Patient-Intentional-Actions. We recommend that nurses take the initiative to talk to patients rather than waiting for them to initiate, carefully observe Patient-Intentional-Action so as not to miss it, and respond to Patient-Intentional-Action whenever it is observed.

Data Availability

The data are not publicly available due to privacy or ethical restrictions.

Conflicts of Interest

The authors have no conflicts of interest directly relevant to the content of this paper.

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Research Article

Incidence and Associated Factors of Failed First Peripheral Intravenous Catheters among Adult Patients at Medical Surgical Wards in Public Referral Hospitals of West Amhara, Ethiopia, 2021

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Background. Complications of peripheral intravenous catheters cause problems in clinical practice and bring high costs in terms of morbidity and mortality of patients. Therefore, this study aimed to assess the incidence and associated factors of failed first peripheral intravenous catheters among adult patients in selected Public Referral Hospitals of West Amhara Regional State, Ethiopia, 2021. *Materials and Methods*. An institution-based prospective observational study was conducted among 423 adult patients from January to February 2021. Patients were selected using systematic random sampling techniques. The data were collected using interviewer-based, structured questionnaires and observational checklists. EPI-DATA 3.1 and SPSS version-23 were used for data entry and analysis, respectively. Frequency, percentages, and means were calculated. The outcome variable was determined and graded based on phlebitis and infiltration scales. Binary and multivariable logistics regressions were computed. *Results*. Four hundred and seventeen first peripheral cannula sites from 418 patients were followed for 2,565 peripheral catheter hours. A failed first peripheral intravenous catheter was observed in 124 (29.7%, CI: 25.6–34) adult patients. Patients who were female (AOR = 0.4, 95% CI: 0.22–0.74) had cannula duration of 49–72 hours (AOR = 0.31, 95% CI: 0.14–0.7) and 73–96 hours (AOR = 0.39, 95% CI: 0.17–0.9), and patients who had been given electrolytes (AOR = 0.31, 95% CI: 0.11–0.86) were more likely to have failed first peripheral intravenous cannula. *Conclusions*. Failed first peripheral intravenous cannula is much higher as compared to the acceptable rate of ≤5% by the Infusion Nurses Society. Hence, all patients with peripheral intravenous catheters are screened for catheter failure at least once a day. Providing appropriate nursing care and patient education is also required to reduce the risks.

1. Background

A peripheral intravenous catheter (PIVCs) is a short catheter inserted into the vein on the peripheral areas of the patients [1]. It is the most frequently used invasive clinical/hospital procedure for the patients admitted to the hospital [2–5]. Around 33%–67% of patients have a PIVC inserted during their hospitalization with the cannula remaining in place for considerable duration [6, 7]. It provides access to the administration of intravenous fluids, medications, blood products, and nutrients to the patient [4].

However, the procedure is not free of risks as it puts the patient susceptible to local and systemic complications [4, 8]. It has unacceptably high failure rates [9, 10], and the failure rate lies between 35% and 50% [5]. PIVCs usually fail prematurely before the end of the treatment because of complications [11]. Failures take in the form of phlebitis, infiltration, occlusion/mechanical failure, dislodgment, and infection, any of which alone or in combination leads to removal of the catheter before the end of its intended dwell time [5, 6]. These complications are serious yet preventable adverse events to the patients [12]. They lead to problems in clinical practice and cause patient discomfort/pain, catheter replacement, increased medical treatment and length of hospital stay, with high cost in terms of morbidity and mortality [4, 6, 12], and increases the workload for replacement and follow-up of the devices [11].

In a prospective study on the incidence of PIVC failure at Manacor hospital, Spain was 41.8% [12]. In developing countries, due to scarcity of resources, and economic problems, the incidence of PIVC complications including phlebitis is high [7]. The phlebitis rate ranges from 2.3%–67% [13] and becomes one of the most attention-drawn complications [1, 14]. In another prospective study among adult patients, the incidence of phlebitis was 31.4% [15].

Many factors influenced the development of PIVC complications such as the use of irritant drugs and fluids, size of cannula, anatomical location/site of insertion, large gauge catheter size, duration of cannulation/catheter used for longer than 48 hours, age, gender, and associated diseases [3, 4, 9, 13, 15].

Previous observational studies have recommended interventions namely regular assessment [11] and routine replacement of the catheter as an intervention to reduce the incidence [8, 16]. In addition, the association for Vascular Access (AVA) developed guidelines to ensure a higher level of safety for the patient and promote complication-free device longevity [2]. Jackson recommended points to reduce the incidence of infusion-related complications. These recommendations are observing the site at least daily, securing cannula with a proven dressing, replacing loose, removing contaminated dressings, inserted away from the joints whenever possible, using aseptic technique, considering policy position on re-siting of the cannula, plan, and document continuing care, using the smallest and suitable gauge cannula, and replacing the cannula at the first indication of complications [17].

To date, the issue of PIVC remains unresolved and a public health challenge [18], and the incidence of complications is still higher. There is certainly a pressing need for credible research and forwarding suggestions on this area. However, in Ethiopia, there is no published scientific research describing the incidence of peripheral intravenous catheters' complications among adult patients. The primary aim of this study is to assess the incidence and factors of failed first peripheral intravenous catheters among adult patients in Public Referral Hospitals of Amhara regional state, Ethiopia. The finding would provide directions for the prevention of peripheral catheter failure, improvement of patient outcomes, and reduction of hospital care costs. It would also help operational-level hospitals' managers, Amhara National Regional State Health Bureau, and Federal Ministry of Health Ethiopia to plan such interventions and policy-making, aiming improvement of PIVC.

2. Materials and Methods

2.1. Study Settings and Period. This study was conducted in Public Referral Hospitals of West Amhara Regional State, Ethiopia from January to February 2021. The regional state contains 28 million population in mid-2018 and it has 14 zones, three city administrations, and 180 woredas (139 rural and 41 urban [19]. It also has 80 hospitals (8 referrals, 2 general, and 73 primaries), 847 health centers, and 3,342 health posts [20, 21]. Despite the increased number of health facilities, shortages of skilled health personnel, medical equipment, drugs, and medical supplies, and inefficient and inequitable use of health resources are the challenges of the region [21, 22]. Five referral hospitals (Debre Markos referral hospital, Tibebe Gion referral hospital, Felege Hiwot referral Hospital, Debre Tabor Referral Hospital, and University of Gondar referral Hospital) were included in the study [21].

2.2. Study Design and Population. An institution-based prospective multi-center observational study was conducted among adult patients who were admitted to medical and surgical wards. The source population was all adult patients admitted to medical and surgical wards in each hospital. All adult patients with age greater than or equal to 18 years, who had peripheral intravenous catheter cannula insertions during the time of the study, and agreed to participate in the study were included. Patients with preexisting skin rashes, lacerations, and trauma at insertion sites, unconscious, psychiatric illness, patients who had a history of allergy to any medications, burn at PIVC insertion sites, patients who refused to give written informed consent, and those with previously inserted peripheral intravenous catheter cannula from outside hospitals were excluded [21].

2.3. Sample Size, Sampling Technique, and Procedures. To calculate the sample size, we considered the incidence of the first PIVC complication as 50% and with an alpha error of 5% and a power of 95%. Then, 423 sample sizes were required for the study. There are five referral hospitals in West Amhara regional state from which the samples were taken. The total sample size was allocated to each hospital proportionally based on the number of patients they have. Then, patients were selected using systematic random from each hospital [21].

2.4. Study Variables. In this study, the dependent variable was failed the first intravenous catheter. Patient-related characteristics such as age, sex; comorbidities such as diabetes, renal problems, liver dysfunctions, surgery, and others; and peripheral intravenous cannula characteristics such as the size of catheter, type of dressing, site of insertion (upper arm, cubital fossa, forearm, wrist, hand), and nature of peripheral intravenous cannula infusate, antibiotics, blood products, and electrolytes were the explanatory variables.

2.5. Operational Definition.

PIVC failure is defined as unplanned PIVC removal with mechanical complications (phlebitis and infiltration) or infection before the completion of any scheduled intravenous therapy [12].

Failed first intravenous catheter: A composite measure of first intravenous catheter failure outcomes from phlebitis and infiltration.

(i) **Phlebitis** is defined as the presence of two or more signs of pain, tenderness, warmth, erythema, swelling, or a palpable cord with or without purulent drainage from the catheter insertion site. The severity of phlebitis was graded using the Visual Inspection Phlebitis (VIP) scale. The scale can range from 0, indicating no symptoms of phlebitis, to 5, with signs of purulent drainage, redness, and a palpable cord greater than 3 inches. According to the standards of the Infusion Nurses Society (INS), the accepted phlebitis rate is 5% or less [13].

(ii) **Infiltration** is defined as the permeation of IV fluid into the interstitial compartment, causing swelling of the tissue around the site of the catheter. All PIVCs were changed for a score of 2 or more, determined by the presence of a cold or warm skin region around the insertion site, pain, redness, and/or edema extending from 1 inch to 2 inches from the PIVC site/beyond the tip of the catheter.

2.6. Data Collection Tools, Measurements, and Procedures. Interviewer-based structured questionnaires were adapted from validated and standardized existing tools to measure peripheral intravenous catheter-induced complications. The PIVC insertion technique at hospitals is standardized based on the hospital policy and infection control protocol for procedures. But the recommended changing and replacing peripheral intravenous cannula is after 72–96 hours [8]. Observational checklists were used to collect patient-related and peripheral intravenous cannula-related characteristics. The Visual Inspection Phlebitis (VIP) scale [17] from the third edition of the standards for infusion therapy was used to assess phlebitis. The Infusion Nurses Society Infiltration Scale was used to assess infiltration. Only the first insertions of PIVCs were included in the study (21).

2.7. Follow-Up of Patients. Recruitment of patients took place at medical and surgical wards immediately at admission. Primarily, data collectors invited the participants to participate in the study. Those who accepted the invitation were asked for their consent. Then identification code was given for records of enrolled participants and follow-up was carried out until the intravenous cannula was discontinued. Data collectors assessed the PIVC site every 12 hours.

2.8. Peripheral Intravenous Catheter Care in the Hospitals. PIVCs were usually inserted, and maintained by ward nurses using an aseptic technique. There is no firm policy of scheduled replacement of peripheral catheters during the study period. As a result, most of the peripheral catheters were left in place beyond 72 hours unless a complication is seen. PIVCs that had to be discontinued before 72 hours were because of complications, early discontinuation of IV infusions, and patients' discharge. But the recommended optimal replacement time of an intravenous catheter ranges from when "only clinically indicated" to three days [16, 18].

2.9. Data Management and Analysis. EPI- DATA 3.1 and SPSS version-23 software were for data entry and analysis, respectively. Descriptive statistics such as frequency, percentages, means, and standard deviations were calculated. The outcome variable was categorized as having and not having complications (Yes/No) and graded based on phlebitis and infiltration scales. Binary and multivariable logistics regressions analyses were computed. Finally, texts, tables, and graphs were used to report findings.

2.10. Quality Assurance Mechanisms. Before collecting the data, the face and content validity of the data collection tool was assured and checked by inviting experts in the field. The data collectors and supervisors were trained about the study purpose and protocol. The research data collection tool was piloted (pre-tested) to check the fitness of the tool for the study settings and necessary correction was made. The investigators exchanged all the necessary information regarding the data collection procedures with the supervisors on a daily basis. Furthermore, the respondents had been given brief orientation (information sheet was read) before the interview, and supervision was also done at the spot by the supervisors. In addition, detailed feedback was provided to the data collectors. The collected data were coded per operational definitions of the study variables and cheeked-rechecked by the principal investigators for its completeness [21].

2.11. Ethical Considerations. The overall study protocol was approved by the Institutional Ethical Review Board of the University of Gondar (**December 15th, RNo: V/P/RCS/05/SAS/2020**). Supportive letters were obtained from Amhara Regional state health bureau and then their copies were delivered to each hospital. Oral consent was obtained from each conscious participant and assent from the unconscious, disoriented, and intubated patients after clearly informing the purpose of the study. Name and other personal identifiers were not to be recorded to maintain the privacy and confidentiality of the data. The chance to ask anything about the study as well as the right to refuse or stop respond at any moment was given to participants (21).

3. Results and Discussion

3.1. Results

3.1.1. Sociodemographic Characteristics of Patients. Of 423 study participants, 418 patients responded to the questions fully, which gave a response rate of 98.8%. A higher proportion of the study participants, 199 (47.6%), were from the University of Gondar Comprehensive Referral Hospital. The age of the patients ranged from 18–90 years (mean 42.85 ± 16.64). In terms of sex and marital status, most of the participants were males (249—59.6%) and married (271—64.8%), respectively. The higher proportion of the participants (105–25.1%) were not able to read and write, and 112 (26.8%) were farmers in occupation (Table 1).

3.1.2. Peripheral Intravenous Cannula-Related Features. Four hundred and seventeen peripheral cannula sites from 418 patients were followed for 2,565 catheter hours. One hundred and twenty-five (29.9%) of patients had associated disease in addition to the main admission diagnosis.

Majority of peripheral catheter sizes were G-18 in 218 (52.2%) and G-20 in 183 (43.8%), respectively. Plaster-based dressing was applied for the majority of catheter sites, 415 (99.3%). 166 PIVCs were frequently inserted in forearms (39.7%) followed by wrists in 107 (25.6%). Antibiotics were the major infusate, 376 (90%) administered through the peripheral cannula followed by glucose, 183 (43.3%). The duration of the peripheral cannula on the patients ranged from an hour to 168 hours. A larger proportion (224—53.6%) of the cannula stayed with the patient for less than 48 hours and 49 (11.7%) of the cannula stayed for more than 96 hours. (Table 2).

3.1.3. The Incidence and Severity of Peripheral Cannula-Related Complications. Complication related to the peripheral catheter was observed in 124 (29.7%, CI: 25.6–34) patients. Phlebitis accounted for the majority, 100 (23.9%) of the complications. Regarding the severity of the complications, the majority of the complication was grade 1 in both phlebitis and infiltration (Table 3).

3.1.4. Factors Associated with Peripheral Cannula Complications. Bivariate and multivariable logistic regression analysis was carried out to see the effect of independent variables on the dependent variable. In the bivariate analysis age category from 34–50 years, being female sex, presence of comorbidity, peripheral cannula duration more than 24 hours, and administering electrolytes were significant factors for the incidence of PIVC complications. The patients who were in the age group of 34–50-year-old were 0.56 times more likely to have PIVC complications as compared to the age group ≥50 years old (COR = 0.56, 95% CI: 0.33–0.96). The patients who had comorbidity were 0.56 times more likely to have PIVC complications as compared to those who had not (COR = 0.56, 95% CI: 0.36–0.88).

Being female sex, peripheral cannula duration of 48–96 hours, and administering electrolytes were significant factors for the incidence of PIVC complications in the multivariable logistic regression analysis. Being female patients were 0.4 more likely to have PIVC complications as compared to male patients (AOR = 0.4, 95% CI: 0.22–0.74). Patients who had peripheral cannula duration from 49–72 hours were 0.31 more likely to have PIVC complications as compared to patients who had less than 24 hours duration (AOR = 0.31, 95% CI: 0.14–0.7). Patients who had peripheral cannula duration from 73–96 hours were 0.39 more likely to have PIVC complications as compared to patients who had less than 24 hours duration (AOR = 0.39, 95% CI:0.17–0.9). Patients who had been given electrolytes through the PIVC were 0.31 more likely to have PIVC complications than their counterparts (AOR = 0.31, 95% CI: 0.11–0.86) (Table 4).

3.2. Discussion. In this study, a complication related to the peripheral catheter was observed in one-third of the patients, and phlebitis accounted for the majority of the complications. The majority of the complication was grade −1 in both phlebitis and infiltration. Age category from 34–50 years old, being female sex, presence of comorbidities, peripheral cannula duration more than 24 hours, and administering electrolytes were significant factors for the incidence of a failed first peripheral intravenous catheter.

This study revealed that one-third of the first peripheral intravenous cannula had catheter failure outcomes either in the form of phlebitis or infiltration. This rate is consistent with the study conducted in Air Force Hospital Kalaikunda [15], and the University of Tokyo in Japan (29.2%) [23]. But it is much higher than the expected rate (≤5%) of PIVC complications recommended by the Infusion Nurses Society [13]. This might be due to scarcity of resources and economic problems to change the PIVC as per the recommendations [7]. It is also higher than in another study conducted in Japan (7.5%) ([14]. This might be because study participants were from intensive care units in Japan where serious follow-up of the patients had taken place. It is lower than a study finding at King Abdulaziz Medical City, Riyadh, Saudi Arabia (39.3%) [24]. The difference might be since, in this study, the incidence of failed PIVC was calculated from the first inserted peripheral cannula and composited from phlebitis and infiltration, but it was calculated from the whole inserted peripheral cannula and other complications were added in Saudi Arabia.

The current study indicated that the majority of the complications were grade −1 in both phlebitis and infiltration. This finding is in line with the study finding in China where most of the complications in phlebitis (88.4%) and infiltration (93.7%) were grade −1(10). It is also supported by a study conducted in Japan where 72.6% of phlebitis was Grade −1 [14].

The patients' characteristics and condition are also risk factors for phlebitis that should be considered in an individual's care [24]. The current study indicated that the odds

Table 1: Sociodemographic characteristics of participants to assess the incidence and associated factors of failed first intravenous catheter among adult inpatients at medical-surgical wards in Public Referral Hospitals of West Amhara Regional State, Ethiopia, 2021 ($N = 418$).

Variable category		Frequency	Percentage
Study hospitals	University of Gondar comprehensive referral hospital	199	47.6
	Tebebe Gion referral hospital	60	14.4
	Felegehiwot referral hospital	55	13.2
	Debretabor referral hospital	54	12.9
	Debremarkos referral hospital	50	12.0
Patient unit category	Medical ward	197	47.1
	Surgical ward	221	52.9
Age category	18–33	147	35.2
	34–50	146	34.9
	>50	125	29.9
Sex	Male	249	59.6
	Female	169	40.4
Marital status	Single	86	20.6
	Married	271	64.8
	Divorced	38	9.1
	Widowed	23	5.5
Educational level of patient	Not able to read and write	105	25.1
	Able to read and write	82	19.6
	Grade 1–4	20	4.8
	Grade 5–8	50	12.0
	Grade 9–12	80	19.1
	Colleague and above	81	19.4
Occupation of patients	Housewife	55	13.2
	Student	41	9.8
	Merchant	69	16.5
	Farmer	112	26.8
	Government employee	78	18.7
	Private employee	37	8.9
	Daily borer	21	5.0
	Other specify*	5	1.2

*No job = 1, priest = 1, and retired = 3.

Table 2: Peripheral intravenous cannula-related features to assess the incidence and associated factors of failed first intravenous catheter among adult inpatients at medical-surgical wards in Public Referral Hospitals of West Amhara Regional State, Ethiopia, 2021 ($N = 418$).

Variable category		Frequency	Percentage
Presence of comorbidity	Yes	125	29.9
	No	293	70.1
Types of comorbidities	Diabetes	26	6.2
	Renal problems	19	4.5
	Liver dysfunctions	5	1.2
	Surgery	5	1.2
	Others****	67	16.0
Peripheral intravenous cannula-related characteristics			
Size of cannula	G16	9	2.2
	G18	218	52.2
	G20	183	43.8
	G22	8	1.9
Type of dressing	Plaster	415	99.3
	Transparent	2	0.5
	Gauze	1	0.2

Table 2: Continued.

Variable category		Frequency	Percentage
Site of insertion	Upper arm	22	5.3
	Cubital fossa	31	7.4
	Forearm	166	39.7
	Wrist	107	25.6
	Hand	90	21.5
	Others**	2	0.5
Duration of the peripheral cannula	<24 hours	122	29.2
	24–48 hours	102	24.4
	49–72 hours	83	19.9
	73–96 hours	61	14.6
	>96 hours	49	11.7
Nature of peripheral intravenous cannula infusate	Glucose (0.09%/0.45% NaCl, Dextro/NaCl)	183	43.3
	Antibiotics	376	90
	Glucose (D30 water)	59	14.1
	Blood products	31	7.4
	Electrolytes	32	7.7
	Others ***	56	

**: Jugular vien-1, Leg = 1. ***Antihypertensive, antimalaria, antipain, diuretics, atropine, PUD medications. ****Anemia, aspirational pneumonia, asthma, bed sore, BPH, CAP, dermatitis, disseminated TB, fracture, gastric cancer, HAP, hemorrhoid, PCP, RVI, pancytopenia, paraplegia, PTB, seizure, and leishmania.

Table 3: The incidence and severity of peripheral cannula-related complications to assess the incidence and associated factors of failed first intravenous catheter among adult inpatients at medical-surgical wards in Public Referral Hospitals of West Amhara Regional State, Ethiopia, 2021 ($N = 418$).

Variable category		Frequency	Percentage
Presences of complication related to the cannula	Yes	124	29.7
	No	294	70.3
	Types of complication		
Phlebitis	Yes	100	23.9
	No	318	76.1
Grading of phlebitis	Grade 1	69	16.5
	Grade 2	29	6.9
	Grade 3	2	.5
Infiltration	Yes	25	6
	No	393	94
Grading of infiltration	Grade 1	19	4.5
	Grade 2	4	1.0
	Grade 3	2	.5

of having failed PIVC are higher among female patients as compared to male patients. This finding is supported by a study conducted at Queensland, Australia where female sex was a non-modifiable factor associated with an increased risk of PIVC failure [6]. This finding was in agreement with the conclusion of a study finding at King Abdulaziz Medical City, Riyadh, Saudi Arabia where phlebitis was predicted with female sex [24].

This study reported that patients who had peripheral cannula duration of 48–96 hours were more likely to have PIVC complications as compared to patients who had less than 24 hours duration. According to the Infusion Nurses Society (INS) guidelines, there is no need to change the peripheral intravenous cannula for adult patients after 72 hours unless clinically indicated [16].

The Centers for Disease Control and Prevention advocate replacing catheters every 72–96 hours in the adult patients in order to reduce complications [8, 24]. However, in the present study peripheral catheters left in for over 96 hours did not show a higher incidence of complications. This finding was in line with a study's findings in China and King Abdulaziz Medical City, Riyadh, Saudi Arabia where duration for PIVCs insertion was not a significant predictor of the complications [10]. This was in agreement with the notion that routine replacement of PIVCs does not affect on the incidence of catheter failures [24] and the catheter for adult patients should be changed when clinically indicated only [16]. But, breaching the recommendation of routine removal of catheters at 72–96 hours is up to the decision to the clinical judgment of nurses [12].

3.2.1. Strength and Limitation of the Study. A prospective follow-up study was employed to see the development of the outcome variable, and all efforts were made to avoid sources of bias related to patient follow-up during the study. As a

Table 4: Factors associated with the incidence of failed first intravenous catheter among adult inpatients at medical-surgical wards in Public Referral Hospitals of West Amhara Regional State, Ethiopia, 2021 ($N = 418$).

Variable		Is there a complication related to the peripheral cannula		COR (95% CI)	AOR (95% CI)
		Yes	No		
Patient unit category	Medical ward	64	133	**1**	1
	Surgical ward	60	161	1.29(0.85–2)	0.99(0.53–1.86)
Age category	18–33	44	103	0.71(0.41–1.22)	1.05(0.47–3.36)
	34–50	51	95	**0.56(0.33–0.96)***	0.79(0.39–1.62)
	>50	29	96	**1**	**1**
Sex	Male	56	193	**1**	**1**
	Female	68	101	**2.32(1.51–3.56)****	**0.4(0.22–0.74)****
Marital Status	Single	22	64	1.87(0.71–4.92)	2.5(0.0.65–9.76)
	Married	80	191	1.54(0.64–3.69)	1.35(0.43–4.23)
	Divorced	13	25	1.24(0.42–3.61)	1.9(0.46–7.8)
	Widowed	9	14	**1**	**1**
Educational level of patient	Not able to read and write	26	79	1.6(0.85–3.04)	1.4(0.45–4.47)
	Able to read and write	21	61	1.54(0.78–3.01)	0.96(0.33–2.85)
	Grade 1–4	4	16	2.11(0.64–6.93)	1.86(0.36–9.5)
	Grade 5–8	13	37	1.5(0.69–3.28)	1.38(0.49–3.89)
	Grade 9–12	32	48	0.79(0.42–1.5)	0.6(0.25–1.52)
	Colleague and above	28	53	**1**	**1**
Occupation of patients	House wife	17	38	**1**	
	Student	14	27	0.56(0.06–5.38)	0.37(0.1–1.4)
	Merchant	18	51	0.48(0.05–4.74)	1(0.35–2.86)
	Farmer	28	84	0.71(0.07–6.76)	0.92(0.36–2.32)
	Government employee	25	53	0.75(0.08–6.99)	0.433(0.13–1.48)
	Private employee	15	22	0.53(0.06–4.99)	0.53(0.16–1.75)
	Daily borer	6	15	0.37(0.04–3.6)	0.48(0.13–1.74)
	Other specify*	1	4	0.63(0.06–6.8)	0.85(0.07–9.6)
Presence of comorbidity	Yes	48	77	**0.56(0.36-0.88)***	0.87(0.48–1.59)
	No	76	217	1	**1**
Size of cannula	G16-G18	59	168	0.68(0.45–1.04)	1.74(0.92–3.13)
	G20-G22	65	126	1	**1**
Site of insertion	Upper arm	7	15	**1**	**1**
	Cubital fossa	10	21	0.98(0.3–3.2)	2.27(0.46–11.3)
	Forearm	51	115	1.1(0.41–2.74)	1.78(0.47–6.64)
	Wrist	31	76	1.14(0.43–3.1)	2(0.52–7.78)
	Hand	23	67	1.4(0.5–3.75)	1.35(0.35–5.27)
	Others**	2	0		
Peripheral cannula duration	<24 hours	21	101	1	**1**
	24–48 hours	34	68	**0.42(0.22–0.78***	0.58(0.28–1.2)
	49–72 hours	35	48	**0.29(0.15–0.54)****	**0.31(0.14–0.7)****
	73–96 hours	21	40	**0.4(0.2–0.8)** *	**0.39(0.17–0.9)***
	>96 hours	13	36	0.58(0.26–1.27)	0.57(0.23–1.4
	Nature of peripheral intravenous cannula infusate				
Glucose (0.09%/0.45% NaCl, Dextro/NaCl)	Yes	14	23	0.8(0.53–1.23)	0.89(0.51–1.54)
	No	22	51	1	1
Antibiotics	Yes	34	70	0.83 (0.4–1.7)	1.16(0.49–2.75)
	No	2	4	1	1
Glucose (D30 water)	Yes	6	13	0.82(0.45–1.5)	1.79(0.68–4.7)
	No	30	61	1	1
Blood products	Yes	5	6	0.52(0.25–1.1)	0.6(0.23–1.54)
	No	31	68	1	1
Electrolytes	Yes	3	4	**0.37(0.18–0.76)***	**0.31(0.11–0.86)***
	No	33	70	1	

*Significant at $P < 0.05$; **highly significant at $P < 0.01$. The bold variables are significantly associated in both bi-variable and multivariate analyses.

result, the finding of this study can be reasonably generalized to a larger group of population and institutions.

The interpretation of this finding should account for the following limitations. First, the follow-up time of the study was short. Second, the outcome occurrence after removal of PIVCs and discharging of the patient was not followed.

4. Conclusions

The incidence of the failed first peripheral intravenous catheter was much higher than the acceptable rates. A large proportion of first intravenous catheter failure occurred in the form of Phlebitis. Comorbidity, being female, cannula duration of more than 48 hours, and type of infusate, electrolytes were the factors associated with PIVC failure.

Hence, all patients with peripheral intravenous catheters should be screened for complications of the PIVC at least once daily as recommended by the CDC guideline [25]. It is also important to have appropriate nursing care and patient education to reduce the risk factors. An observation chart to document the development of signs of PIVC complications may be developed in hospitals. This would help detect PIVC complications much earlier.

4.1. Clinical Implication of the Study. As shown in the result section of this study and the literature reviewed, understanding the rate and factors of failed peripheral intravenous catheters is important to fill the gap and strengthen the quality of patient care. The result of the current study reflects the finding may help to guide health care workers working in institutions with facilities equal to the center in which the study was conducted.

Abbreviations

AOR:	Adjusted odds ratio
AVA:	Vascular access
BPH:	Benign prostate hyperplasia
CAP:	Community-acquired pneumonia
CI:	Confidence interval
COR:	Crude odds ratio
HAP:	Hospital-acquired pneumonia
INS:	Infusion Nurses Society
IV:	Intravenous
PCP:	Pneumocystis cairn pneumonia
PIVC:	Peripheral intravenous catheter
PTB:	Pulmonary tuberculosis
PUD:	Peptic ulcer disease
RVI:	Retroviral infection
SPSS:	Statistical Package for Social Sciences
TB:	Tuberculosis.

Data Availability

The data set generated in this study will be available upon reasonable request from the corresponding author.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

Authors' Contributions

All the authors conceived and designed the study, analyzed and interpreted the data, wrote the manuscript, and read and approved the final version of the manuscript.

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