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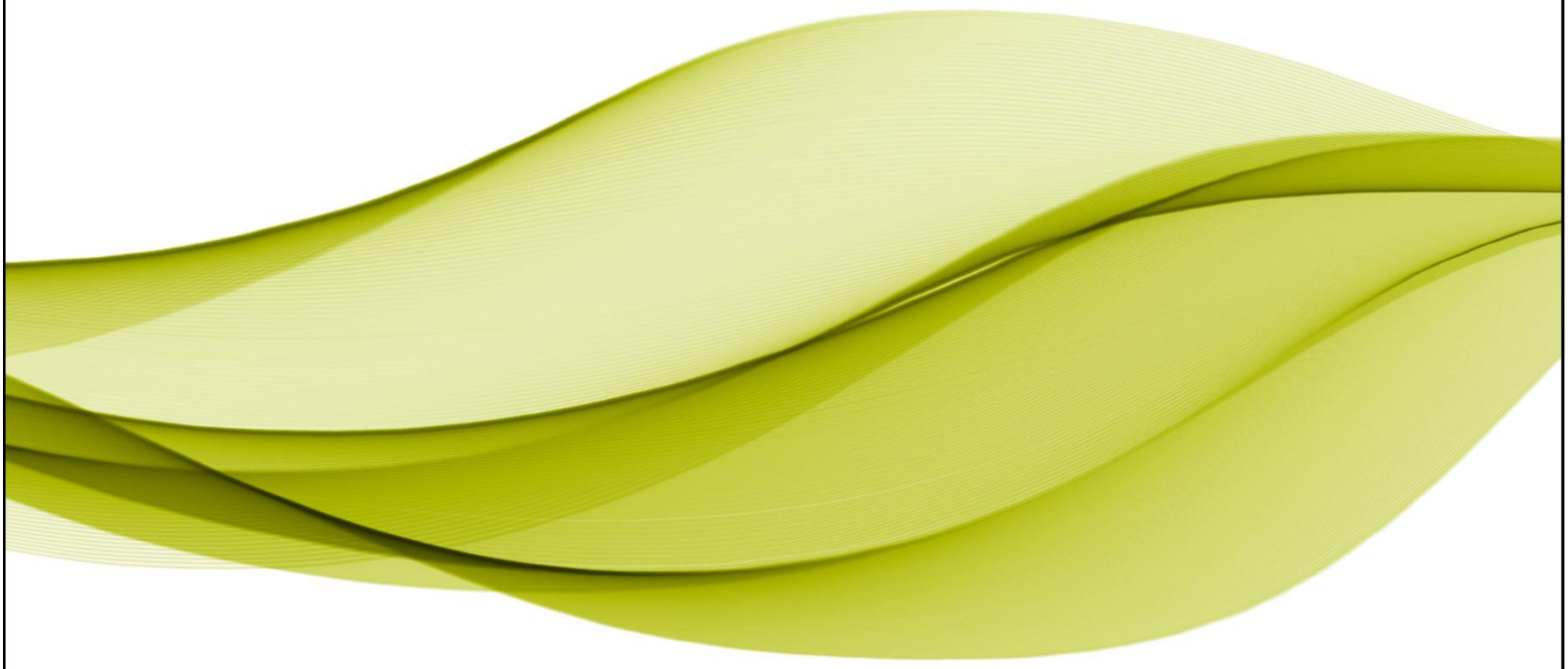

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Associated Factors Related to Self-Management Behaviors among People with Type 2 Diabetes in Myanmar

Aye Nyein Oo
Ramathibodi School of Nursing, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Bangkok 10400, Thailand, ayenyeinoo9291@gmail.com

Jiraporn Lininger
Ramathibodi School of Nursing, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Bangkok 10400, Thailand, jiraporn.cho@mahidol.edu

Sirirat Leelacharas
Ramathibodi School of Nursing, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Bangkok 10400, Thailand

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Associated Factors Related to Self-Management Behaviors among People with Type 2 Diabetes in Myanmar

Aye Nyein Oo, Jiraporn Lininger*, Sirirat Leelacharas

Ramathibodi School of Nursing, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Bangkok 10400, Thailand

Abstract

Background: Diabetes is a global health concern that affects individuals and the healthcare system. This study aimed to describe the relationships between personal and environmental factors and self-management behaviors in individuals with type 2 diabetes mellitus (T2DM).

Methods: This research included 100 individuals with T2DM who were recruited through convenient sampling from three government hospitals in Myanmar. Data collection was fulfilled using a standardized interviewer-administered questionnaire consisting of demographic information, the Diabetes Management Self-Efficacy Scale, the New Short-Form Health Literacy Instrument, the 24-item version of the Diabetes Knowledge Questionnaire, the Social Support Questionnaire, and the Summary of Diabetes Self-care Activity. Data analysis was conducted using descriptive statistics, Chi-square, Pearson's correlation, and Spearman's rho correlation coefficient.

Results: Self-efficacy (r = 0.375, $p < 0.01$), health literacy (r = 0.43, $p < 0.01$), diabetes knowledge (r = 0.461, $p < 0.01$), and social support (r = 0.337, $p < 0.01$) were significantly related to self-management behavior.

Conclusions: This study indicates the importance of enhancing self-management behaviors, self-efficacy, health literacy, diabetes knowledge, and social support for individuals diagnosed with type 2 diabetes. Future studies should focus on the prediction or interventions to explore the relationship between personal and environmental factors and self-management behaviors among T2DM individuals in Myanmar.

Keywords: Myanmar, self-management, type 2 diabetes

INTRODUCTION

Diabetes is a pressing global health issue, according to the World Health Organization.[1] The International Diabetes Federation estimated 422 million individuals worldwide to be affected by diabetes mellitus.[1] This number is expected to rise to 578 million by 2030 and a staggering 700 million by 2045.[2] Moreover, diabetes accounts for 11.3% of global deaths, with nearly half being attributed to elevated blood glucose levels, especially in individuals under the age of 70.[3] These findings underscore the grave risk posed by diabetes regarding premature mortality.[4]

In addition, diabetes mellitus belongs to the top 10 leading causes of death in Myanmar.[5] Moreover, a number of people with diabetes lack proper self-care.[5] A study conducted in Myanmar reported the lack of self-management behavior among individuals with diabetes.[5] Thus, effective self-management practices play an important role in diabetes management and the improvement of overall health outcomes. Self-management encompasses various activities, such as maintenance of a healthy diet, engagement in regular physical activities, adherence to medication regimens, monitoring of blood glucose levels, and foot care practices.[6] Patients with diabetes must engage in daily self-management routines to preserve their health and improve their quality of life.[6]

This study has shown the association of decreased self-management practices with an increased mortality rate in individuals with type 2 diabetes mellitus (T2DM). However, many factors are related to self-management behavior in patients with diabetes. Previous studies showed the relation of self-efficacy,[7] health literacy,[8] diabetes knowledge,[9] and social support[10] to self-management behavior in various populations of other countries.

Self-efficacy, defined as an individual's confidence in their ability to implement diabetes self-management behaviors and overcome associated barriers,[7] is a beneficial factor that improves self-management.[11] This concept effectively applies to individuals requiring chronic disease self-management.[11] Moreover, high self-efficacy levels enable the successful engagement of individuals in diabetes self-management practices, contributing to improved health outcomes.[7]

Thereafter, health literacy refers to an individual's capacity to obtain, understand, and apply essential health

***Corresponding author:**
Jiraporn Lininger
Ramathibodi School of Nursing, Faculty of Medicine,
Ramathibodi Hospital, Mahidol University, Bangkok, Thailand
E-mail: jiraporn.cho@mahidol.edu

information and services in the management of their well-being and in making informed decisions.[8] Hashim *et al*. mentioned that health literacy is crucial to supporting appropriate treatments and management of individuals with T2DM.[12] In addition, with adequate health literacy, patients with T2DM can actively participate in self-management, which leads to better health outcomes, compared with those lacking in health literacy.[8]

Effective self-management and the attainment of positive health outcomes require a comprehensive understanding of diabetes, including knowledge of dietary choices, physical activity, and medication management.[9] Knowledge of diabetes empowers patients to make informed decisions and adhere to recommended medical guidance.[13]

Social support also plays a crucial role in fostering self-management behaviors among individuals with chronic diseases, including diabetes.[10] Furthermore, this form of support may encompass active assistance and emotional encouragement related to medication adherence, blood glucose monitoring, increased physical activity, adherence to diabetic meal plans, and foot and eye care.[14]

However, although previous studies in other countries reported the relationships between these factors and self-management behaviors, no report regarding their relationships with T2DM in Myanmar has been published. Moreover, T2DM patients in Myanmar show poor self-management behaviors.[22] Therefore, this study aimed to explore the association between personal and environmental factors and self-management behaviors related to T2DM. The results will benefit healthcare professionals and policymakers in terms of promoting improved self-management behaviors in Myanmar.

METHODS

Ethical approval was granted by the Ethical Review Committee on Human Research, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Thailand, and the Institutional Review Board from Medical (ID 2839) and Alliance Universities, Ministry of Education, Myanmar (MOE-IRB-2021/Research/No.089). Healthcare providers facilitated data collection in clinical settings after explaining the study's objectives, procedures, confidentiality, and the right to withdraw. Informed consent was obtained, and data collection through completion of the questionnaire lasted approximately 30–45 min.

A descriptive cross-sectional study involving individuals with T2DM was conducted at three government hospitals in Magway Division, Myanmar, from October 2021 to December 2021.

The inclusion criteria were diagnosis of T2DM for at least 6 months, age over 25 years, proficiency in the Myanmar language, and willingness to participate in the study. The exclusion criteria were acute or chronic infectious conditions or severe illnesses affecting the ability of participants to answer questions. A total of 91 eligible participants were calculated from a G*Power with 10% added up[15] for the refusal rate. Thus, the total number of participants was 100.

The researcher developed a questionnaire for gathering information on age, gender, marital status, religion, education, occupation, income, diabetes duration, comorbidities, and health habits.

The 15-item Diabetes Management Self-Efficacy Scale (DMSES UK) developed by Sturt *et al*.[16] was used to assess the self-efficacy related to various aspects of diabetes management. The scores ranged from 0 to 60, with high scores indicating high self-efficacy. The instrument exhibited good reliability in this study (Cronbach's alpha = 0.84).

The New Short-Form Health Literacy Instrument (HLS-SF 12) was developed by Duong *et al*.[17] The questionnaire comprises 12 items. The scores ranged from 1 to 12. High scores indicate high health literacy. The instrument demonstrated good reliability in this study (Cronbach's alpha = 0.85).

The 24-item version of the diabetes knowledge questionnaire which was adapted from the work of Garcia *et al*.,[18] was used to assess diabetes knowledge with 24 questions. High scores indicate great knowledge. The instrument demonstrated an acceptable reliability (Cronbach's alpha = 0.73) in this study.

Social Support Questionnaire (SSQ) was developed by Kyi Thant Swe.[19] This questionnaire was used to assess social support across various domains. The scores ranged from 25 to 75, with scores <50 indicating poor support and ≥50 implying good support. In this study, SSQ exhibited good reliability (Cronbach's alpha = 0.83).

Summary of Diabetes Self-Care Activities (SDSCA) was developed by Toobert *et al*.[20] The SDSCA was used to assess self-management in six domains. The scores range from 17 to 119, with high scores indicating good self-management. The SDSCA showed good reliability (Cronbach's alpha = 0.91) in this study.

All questionnaires were translated to their Burmese version and used in other studies: DMSES UK and the 24-item version of the Diabetes Knowledge Questionnaire were translated by Lwe Say Paw Hla,[22] HLS-SF 12 by Duong *et al*.,[17] SSQ by Kyi Thant Swe,[18] and SDSCA by Sandhi Wynn Nyunt[21] in Myanmar. All these studies attained good Cronbach's alpha of > 0.83.

Data analysis was accomplished using SPSS. The data were checked for accuracy, completeness, and consistency. Descriptive statistics included frequency, percentage, mean (M), median, and standard deviation (SD), and they were used to describe demographic characteristics, independent variables (age, gender, marital status, education, diabetes duration, self-efficacy, health literacy, diabetes knowledge, and social support), and the dependent variable (self-management behaviors). The relationship between social support and self-management was determined using Pearson's correlation coefficient. Spearman correlation analysis was used to define the relationship among age, diabetes duration, self-efficacy, health literacy, diabetes knowledge, and self-management. A statistical level of 0.05 was applied in this study.

RESULTS

After the data were cleaned by checking for completeness and outliers, 100 participants with T2DM were recruited to participate in this study. The participants were aged 29–65 years, with an average of 56 ± 8.51 years. Table 1 showed that all participants were Buddhists, 82% were females, 78% were married, 67% had primary education, 42% had an income of 150,000–300,000 Myanmar Kyat (MMK) per month (approximately 72–144 USD; USD = 2000 MMK), 76% had comorbidities including hypertension (61.8%), and 64% liked sweet foods.

In addition, the participants in the study presented moderate levels of self-efficacy, health literacy, and diabetes knowledge (27.83 ± 11.19, 26.35 ± 7.54, and 24.84 ± 7.28, respectively). By contrast, they showed a low level of social support (44.33 ± 7.41). Finally, the participants were concluded to have moderate self-management behaviors (73.23 ± 17.81) (Table 2).

Age and diabetes duration showed no relation to self-management behaviors. However, positive associations were observed among self-efficacy, health literacy, diabetes knowledge, social support, and self-management behaviors at the 0.01 level (Table 3).

DISCUSSION

This study aimed to explore the factors associated with self-management behaviors of a T2DM population. The results revealed the moderate self-management behavior levels of the participants. In addition, no relation was observed between age or diabetes duration and self-management behaviors. However, positive correlations were detected between self-management behaviors and self-efficacy, health literacy, diabetes knowledge, and social support.

In this study, age exhibited no significant relationship with self-management behavior, consistent with those of previous studies on patients with T2DM in China,[9,21] Turkey,[22,23] Saudi Arabia,[24] and Indonesia.[25] Although no significant relationship was observed between age and diabetes self-management in this study, the relationship was negative, which indicates that old people had poor self-management. Previous studies reported that younger participants with diabetes had better self-management than older ones.[26,27] Older people may face difficulty in applying self-management due to changes in their health status, support system, physical and mental abilities, and nutritional diabetes self-care.[28] In addition, with aging,

TABLE 1. Sociodemographic characteristics of people with T2DM (N = 100)

Characteristics	N (%)
Age (years)	
<60	58 (58.0)
≥60	42 (42.0)
Gender	
Male	18 (18.0)
Female	82 (82.0)
Marital Status	
Single/Divorced/Widowed	22 (22.0)
Married	78 (78.0)
Education	
No Education	7 (7.0)
Primary School	67 (67.0)
Middle School	11 (11.0)
High School	7 (7.0)
Bachelor's Degree	8 (8.0)
Occupation	
Government Employee	2 (2.0)
Self-Employee	8 (8.0)
Agriculturist	49 (49.0)
Coolie	41 (41.0)
Monthly Income	
<150,000 MMK	32 (32.0)
150,000–300,000 MMK	42 (42.0)
>300,000 MMK	26 (26.0)
Comorbidity (answer more than one)	
No	24 (24.0)
Yes	76 (76.0)
Hypertension	47 (61.8)
Heart Disease	9 (11.8)
Stroke	7 (9.2)
Renal Disease	5 (6.6)
Others	8 (10.5)
Exercise	
No	88 (88.0)
Sometimes	4 (4.0)
Always/Often	8 (8.0)
Food	
Sweet Food	64 (64.0)
Salty Food	36 (36.0)

TABLE 2. Self-efficacy, health literacy, diabetes knowledge, social support, and self-management behaviors of participants (N=100)

Variables	Possible score	Range	Mean ± SD	Interpretation
Self-efficacy	0–60	0–53	27.83 ± 11.19	Moderate
Health literacy	12–48	12–45	26.35 ± 7.54	Moderate
Diabetes knowledge	0–48	6–40	24.84 ± 7.28	Moderate
Social support	25–75	25–67	44.33 ± 7.41	Poor
Self-management	17–119	26–100	73.23 ± 17.81	Moderate

TABLE 3. Relationships among age, diabetes duration, self-efficacy, health literacy, diabetes knowledge, social support, and self-management behaviors in individuals with T2DM (N = 100) obtained using Pearson's correlation and Spearman correlation

Variables	1	2	3	4	5	6	7
1. Age	1						
2. Diabetes Duration	0.128	1					
3. Self-efficacy	−0.086	0.162	1				
4. Health Literacy	−0.112	−0.023	0.447**	1			
5. Diabetes Knowledge	−0.212*	0.262**	0.438**	0.382**	1		
6. Social Support	−0.089	−0.061	0.246*	0.188	0.370**	1	
7. Self-management	−0.189	0.001	0.375**	0.430**	0.461**	0.337**	1

*$p < 0.05$, **$p < 0.01$

individuals experience difficulty performing their daily life activities, including self-management, which leads to decreased self-management.[29]

This study revealed that diabetes duration was not related to self-management behaviors. Similarly, previous research revealed that the duration of diabetes was not significantly associated with the self-management behaviors of patients with diabetes.[30,31] However, the result observed in this study was different from a Gagliardino[32] finding indicating a positive diabetes duration and high level of self-management behaviors. In addition, patients show more self-care over the years of diabetes duration.[30] Research design and data analysis of previous studies may differ from those of the current study. In addition, cultural impact may influence individual self-management behaviors.

In this study, a positive significant relationship was observed between self-efficacy and diabetes self-management. Therefore, Burmese patients with T2DM who presented a high self-efficacy had desirable diabetes self-management. A moderate relationship was found between self-efficacy and self-management behaviors in this study. However, other studies reported relationships ranging from weak to strong.[35,36] Individuals with high self-efficacy have disease-related knowledge to maintain self-management behaviors[37] and low hemoglobin A1c levels have been detected in patients with diabetes.[38]

The findings of this study revealed a positive relationship between health literacy and diabetes self-management behaviors, consistent with those of previous studies.[39,40] Poor health literacy proved to be a barrier to implementing disease management among individuals with T2DM.[41] A study in England also reported that individuals with limited health literacy had a few healthy lifestyle behaviors.[42]

In this study, diabetes knowledge showed a significant association with self-management behaviors, similar to previous findings.[43,44] Low levels of diabetes knowledge were associated with less participation in the decision-making process and poor communication with health providers.[42] However, no significant relationship was observed between diabetes knowledge and diabetes self-management among individuals with T2DM in Malang city.[44]

Moreover, social support in this study revealed a significant positive relationship with self-management behaviors. Participants who had high social support presented desirable self-management behaviors, consistent with the findings of previous studies.[37,45] Support from family, peers, and healthcare providers shows a positive influence on diabetes self-management through the provision of cues to action, direct assistance, reinforcement, and knowledge.[37] Meanwhile, inadequate social support has been associated with poor well-being and diabetes outcomes.

However, this study encountered some limitations. First, the study population was recruited through a convenience sampling method in a rural area in Myanmar. Therefore, the findings may not be generalizable to all type 2 diabetes populations in Myanmar. Second, the researcher interviewed the participants using structured questionnaires. Some participants experienced difficulty

understanding some questions in the questionnaires (DMSES UK). In addition, most participants did not remember their conditions in the last seven days. Finally, the instruments used in the present study included a number of items, which caused the participants to spend around 45 min in finishing the questionnaire. Therefore, the participants might have been bored and hurried to answer the questions, which possibly affected the study findings.

CONCLUSIONS

This study provided evidence of the relationships between personal factors, environmental factors, and diabetes self-management among people with T2DM in Myanmar. The findings of this research fill a gap in the knowledge of self-management behaviors of individuals with T2DM in Myanmar. Nurses can help patients with T2DM to maintain diabetes self-management behaviors, apply the findings from this study, and provide them with health information. Nurses can also offer diabetes education programs or plans for interventions to improve the self-management behaviors of T2DM patients in the future. Predictive or interventional investigations should be conducted in the future to explore the relationship among self-efficacy, health literacy, diabetes knowledge, social support, and self-management behaviors among T2DM individuals in Myanmar.

CONFLICT OF INTEREST

None declared.

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Article 2

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Contraceptive Methods in Diabetic Women Referring to Government Diabetes Clinics in Northern Iran

Roya Mansour-Ghanaei
Gastrointestinal and Liver Diseases Research Center, Guilan University of Medical Sciences, Rasht 41635, Iran, rmghanaei@gmail.com

Yalda Donyaei-Mobarrez
Department of Midwifery, School of Nursing and Midwifery, Guilan University of Medical Sciences, Rasht 41635, Iran, donyaeimobarrez1396@gmail.com

Kobra Abouzari-Gazafroodi
Department of Midwifery, School of Nursing and Midwifery, Guilan University of Medical Sciences, Rasht 41635, Iran, kaboozari@yahoo.com

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Contraceptive Methods in Diabetic Women Referring to Government Diabetes Clinics in Northern Iran

Roya Mansour-Ghanaei[1,2], Yalda Donyaei-Mobarrez[3], Kobra Abouzari-Gazafroodi[3*]

[1]Gastrointestinal and Liver Diseases Research Center, Guilan University of Medical Sciences, Rasht 41635, Iran
[2]Department of Nursing, School of Nursing and Midwifery, Guilan University of Medical Sciences, Rasht 41635, Iran
[3]Department of Midwifery, School of Nursing and Midwifery, Guilan University of Medical Sciences, Rasht 41635, Iran

Abstract

Background: Unwanted pregnancies in diabetic women can endanger the mother and the fetus. The present study was conducted to determine contraceptive methods for diabetic women referred to government diabetes clinics in the north of Iran.

Methods: A total of 153 diabetic women referred to government clinics in Guilan were included in this cross-sectional study. A questionnaire made by the researcher regarding personal and social information and information related to contraceptive methods was administered. Data were analyzed analytically using SPSS version 19.

Results: The findings of the present study revealed that 87.6% of diabetic women used contraceptive methods, of which 44.4% utilized low-effective contraceptive methods (withdrawal method and condoms), and 43.2% opted for highly effective contraceptive methods (tubal ligation, oral contraceptive pill, intrauterine device, and vasectomy). Decision regarding the choice of contraceptive methods was mainly made by couples, followed by consultation with a doctor.

Conclusions: A relatively high percentage of diabetic women use less effective contraceptive methods, and the decision to use contraceptive methods is made mainly by couples. Therefore, targeted reproductive health interventions and providing counseling services as part of medical care for diabetic women seem necessary.

Keywords: contraception, diabetes mellitus, family planning services

INTRODUCTION

Diabetes is a common health concern in the world.[1] The World Health Organization statistics show that the number of people with diabetes has increased from 108 million people in 1980 to 422 million people in 2014. This number is expected to increase to more than 600 million people worldwide by 2045.[2] In 2011, 4.5 million people in Iran were estimated to have diabetes, and by 2030, their number is predicted to increase to more than 9 million people.[3] This continuous and substantial increase in the prevalence of diabetes implies the peak of this condition in Iran.[4] In addition to the increased prevalence of diabetes, which is an important health concern in the world and comes with high health costs,[3] management of women's reproductive health, along with the management of diabetes, brings many challenges to healthcare systems.[5] In diabetic women, reproductive health includes the prevention of pregnancy and preparation for pregnancy at the right and optimal time.[6]

Diabetes during pregnancy is associated with increased risks of maternal and fetal complications, including miscarriage, preeclampsia, fetal abnormalities and preterm birth, polyhydramnios, and difficult labor due to macrosomia.[7] Diabetic women can suffer from severe maternal complications, which can also threaten a mother's life, but they are often ignored by women who want to have children.[8] Experimental and clinical pieces of evidence have shown the relationship between increased risk of congenital abnormalities and miscarriage in diabetic pregnant women to the disturbance in a mother's metabolism during conception and in the organogenesis phase.[9]

Unwanted pregnancy and uncontrolled blood sugar in diabetic women are associated with high rates of maternal and fetal complications and mortality.[10,11] Therefore, for the reduction of these risks among diabetic women, the disease must be controlled before pregnancy, and appropriate contraceptive methods must be used.[11] Highly effective contraceptive methods include tubal ligation (TL), oral contraceptive pills (OCPs), intrauterine devices (IUDs), and vasectomy. By contrast, traditional methods with low effectiveness include withdrawal, periodic abstinence, and condoms.[6,12,13] Less effective contraceptive methods are unsuitable for diabetic women due to the higher probability of failure.[14] Britton *et al*. showed that more than half of the women with diabetes that they studied either did not use contraceptive methods or used less effective ones.[6] According to Horwitz *et al*., women diagnosed with diabetes were less inclined to use contraceptive methods, especially hormonal drugs

***Corresponding author:**
Kobra Abouzari-Gazafroodi
Department of Midwifery, School of Nursing and Midwifery,
Guilan University of Medical Sciences, Rasht, Iran
E-mail: kaboozari@yahoo.com

containing estrogen, because of their fear of side effects.[15] According to Stransky et al., women with autoimmune diseases believed that contraceptive methods are unsafe for them due to their underlying health condition, which explains their avoidance of contraceptive methods.[16] Insufficient information and fear of side effects cause diabetic women to inhibit from using contraceptive methods or use less effective ones, such as withdrawal and periodic abstinence.[6,12,13,17] Thus, scholars should focus on high-effect methods as the unexpected failure of contraceptive methods can increase the risks of congenital abnormalities and spontaneous abortion in diabetic pregnancies.[9]

The recommendation and use of effective contraceptives are challenging for diabetic women and counseling service providers.[15] Diabetic women receive little counseling and guidance in selecting the type of contraceptive method.[18] Therefore, this study aimed to determine contraceptive methods for diabetic women referred to state diabetes clinics in Guilan province, north of Iran. The findings of this research can provide information that can be used to support, guide, and develop programs for diabetic women in reproductive age and offer a foundation for future studies.

METHODS

This research was conducted with the approval of the Research Council of the Research and Technology Vice-Chancellor of Guilan University of Medical Sciences and in compliance with ethical guidelines (407/132/3/P).

The present study is a descriptive, cross-sectional research, with a research population comprising diabetic women referred to government diabetes clinics of Guilan province (diabetes clinics of Razi Hospital and Besat Clinic), north of Iran in 2015.

The sample size (146) was determined based on the results of preliminary work on 25 subjects with a confidence level of 95% and an accuracy of d = 0.08. Finally, 153 people were selected as the research sample, with an attrition rate of approximately 5%.

Diabetic women with an age range of 15–49 years, having a spouse in married life, not pregnant, and being fertile were included in the study. Those who were unwilling to cooperate and participate in the research while completing the questionnaires were considered excluded from participating.

A personal–social information questionnaire was used in this research, and it included 13 questions regarding age, weight, height, education, spouse's education, occupation, spouse's occupation, place of residence, family income, type of diabetes, the number of children, complications of diabetes, and source of information about diabetes. The questionnaire on contraceptive methods was used to obtain answers regarding five questions regarding contraceptive methods, namely, the purpose of using contraceptive methods, consultation and decision-making about contraceptive methods, reasons for not using contraceptive methods, and history of failure to use contraceptive methods. The content validity method was used to determine the validity of the questionnaire. In this regard, a review of related articles was articulated. Then, a questionnaire was prepared, reviewed, and evaluated by ten expert faculty members.

The "minimum values" table compiled by Lawshe was used to determine the content validity ratio (CVR) numerically. The score was calculated based on the relevant formula and compared with the standard value in the table. A content validity index of 0.95 and a CVR of 0.89 were obtained. The reliability of the questionnaire was determined using Cronbach's alpha method, with the reliability coefficient reaching 0.78.

The available sampling method was used by two trained nursing experts to conduct sampling from June 2015 to September 2015 on diabetic women referred to government diabetes clinics in Guilan province (Razi Hospital Clinic and Besat Clinic). The project managers ensured the reliability of nursing experts by holding a briefing first to coordinate data collection and fully explain the research objectives, conditions for accepting the samples, and methods of collecting information to the nursing experts.

The respective clinics were visited daily by the two trained nursing experts. After the informed consent had been obtained and the study's objectives had been explained to diabetic women who met the conditions to participate in the study, the questionnaires were administered to the participants to complete. Data collection was continued to complete the sample size (153 people). All 153 eligible samples were included in the study, and no one was excluded due to refusal to participate.

Medical records were consulted to collect the medical information on the included diabetic women, such as diabetes and its complications. Weight (kg) was measured with the diabetic women having light clothes on and without shoes (seca 755 scale, Hamburg, Germany), and height (cm) was measured without shoes on (seca 206 wall-mounted measuring device, Hamburg, Germany) with an accuracy of 0.1. Body mass index (BMI) was obtained by dividing the subjects' weight (kg) by the square of height (M).

SPSS, version 19 (IBM, United States), was used in data analysis. Descriptive statistics, including frequency and percentage for categorical variables and mean and standard deviation for numerical variables, and inferential statistics, including the Chi-square test, independent t-

test, and Fisher's exact test, were obtained. $p < 0.05$ was considered significant.

RESULTS

The diabetic women studied had a mean age and standard deviation of 43.75 ± 5.38 years, with an age range of 28–49 years. The mean weight was 74.48 ± 12.46, the mean height was 159 ± 0.07, and the mean BMI was 29.29 ± 4.55. Most participants (45.8%) had a BMI equal to or above 30 and were obese. Table 1 lists other personal and social characteristics of the diabetic women included in the study of the participants.

A significant relationship was observed between the type of contraception used (low effect versus high effect) and the number of children ($p = 0.01$). Those who used low-effect contraceptive methods had more children. A significant relationship was identified between the type of contraception used (low effect versus high effect) and an occupation ($p = 0.02$), with more housewives using low-effect contraceptive methods. The relationship between demographic information and the type of contraceptive methods (low effect versus high effect) used by diabetic women was also determined (Table 2).

A total of 44.4% of diabetic women used low-effective contraceptive methods (withdrawal and condom), 43.2% used high-effective ones (TL, OCP, IUD, and vasectomy), and 12.4% did not use any contraceptive method. Of 19 diabetic women who did not use contraceptive methods, 9 women reasoned because of their husband's objection, 7 women reasoned because of their desire to get pregnant, and 3 women reasoned because of their fear of side effects. Exactly 14.4% and 73.2% used hormonal contraception (OCP) and nonhormonal methods, respectively. Meanwhile, 13.8% reported experiencing failure in the use of contraceptive methods, 45% of whom utilized the withdrawal contraceptive method. The characteristics of contraceptive methods used by diabetic women are provided in Table 3.

The OCP and non-OCP users had mean ages and standard deviations of 44.41 ± 5.22 and 43.79 ± 5.44, respectively. The majority of OCP users (54.6%) had primary education. No blood pressure and cardiovascular complications were observed in 72.7% of OCP users and 70.5% of non-OCP contraceptive users. Moreover, no significant difference was observed between the two groups ($p = 0.53$). Among OCP users, 63.6% jointly selected a contraceptive method with their spouse, 18.2% accepted the recommendations of a specialist physician, and 18.2% considered the recommendations of a midwife. The relationship between demographic information and the use of OCP and non-OCP contraceptives among diabetic women can be found in Table 4.

TABLE 1. Individual–social characteristics of diabetic women referred to government diabetes clinics in Guilan province (N = 153)

Variable	N	%
Age		
<30	5	3.3
31 – 35	10	6.5
>36	138	90.2
Number of children		
No child	12	7.8
1-3	121	79.1
4-6	20	13.1
Place of residence		
Urban	132	86.3
Rural	21	13.7
Education		
Primary	62	40.5
Middle and high school	83	54.3
Academic	8	5.2
Spouse's education		
Primary	50	32.7
Middle and high school	91	59.5
Academic	12	7.8
Occupation		
Housewife	134	87.6
Healthcare employee	3	2.0
Nonsanitary-medical employee	16	10.5
Spouse's occupation		
Worker	20	13.1
Self-employment	79	51.6
Healthcare employee	4	2.6
Nonsanitary-medical employee	50	32.7
Family income		
Insufficient	73	47.8
Relatively sufficient	68	44.4
Sufficient	12	7.8
Diabetes		
Type 1	15	9.8
Type 2	138	90.2
Complications of diabetes		
No	26	17.0
Yes		
Optical	48	31.4
Blood pressure and heart disease	53	34.6
Renal	15	9.8
Diabetic foot ulcer	11	7.2
Source of information about diabetes		
Doctor	98	64.1
Educational books and booklets	22	14.3
Friends	14	9.2
Media	19	12.4

TABLE 2. Relationship between demographic information and the type of contraceptive methods (low effect vs. high effect) used by diabetic women referred to government diabetes clinics in Guilan province

Variable	High-effective contraceptive methods N (%)	Low-effective contraceptive methods N (%)	*p*
Number of children			0.010‡
No child	2 (3.0)	2 (2.9)	
1–3	60 (90.9)	50 (73.5)	
4–6	4 (6.1)	16 (23.6)	
Place of residence			0.750†
Urban	56 (84.8)	59 (86.8)	
Rural	10 (15.2)	9 (13.2)	
Education			0.490‡
Primary	31 (47.0)	26 (38.2)	
Middle and high school	33 (50.0)	38 (55.9)	
Academic	2 (3.0)	4 (5.9)	
Spouse's education			0.730†
Primary	21 (31.8)	24 (35.3)	
Middle and high school	40 (60.6)	37 (54.4)	
Academic	5 (7.6)	7 (10.3)	
Occupation			0.020‡
Housewife	53 (80.3)	63 (92.7)	
Healthcare employee	1 (1.5)	2 (2.9)	
Nonsanitary-medical employee	12 (18.2)	3 (4.4)	
Spouse's occupation			0.080‡
Worker	5 (7.6)	14 (20.6)	
Self-employment	1 (1.5)	2 (2.9)	
Healthcare employee	29 (43.9)	19 (27.9)	
Nonsanitary-medical employee	31 (47.0)	33 (48.6)	
Family income			0.590†
Insufficient	30 (45.5)	34 (50.0)	
Relatively sufficient	32 (48.4)	28 (41.2)	
Sufficient	4 (6.1)	6 (8.8)	
Diabetes			0.640†
Type 1	6 (9.1)	6 (8.8)	
Type 2	60 (90.9)	62 (91.2)	
Complications of diabetes			0.890†
No	9 (13.6)	12 (17.6)	
Yes			
Optical	22 (33.3)	23 (33.8)	
Blood pressure and heart disease	24 (36.4)	20 (29.4)	
Renal	6 (9.1)	8 (11.8)	
Diabetic foot ulcer	5 (7.6)	5 (7.4)	
Source of information about diabetes			0.520†
Doctor	44 (66.7)	40 (58.8)	
Educational books and booklets	7 (10.6)	11 (16.2)	
Friends	8 (12.1)	6 (8.8)	
Media	7 (10.6)	11 (16.2)	
Age (Mean ± SD)	44.49 ± 5.43	43.59 ± 5.38	0.450§

† Chi-square test; ‡ Fisher's exact test; § Independent T-test

TABLE 3. Contraceptive methods used by diabetic women referred to government diabetes clinics in Guilan province

Variable	N	%
Contraceptive		
High efficacy		
Tubal ligation	36	23.5
Oral contraceptive pills	22	14.4
Intrauterine device	5	3.3
Vasectomy	3	2.0
Low efficacy		
Withdrawal	58	37.9
Condom	10	6.5
No contraceptive method	19	12.4

Table 3. continued

Variable	N	%
The purpose of using contraception		
Limit the number of children	99	73.9
Distance between children	35	26.1
Counseling and decision-making about contraception		
Together with her husband	84	62.7
Gynecologist	22	16.4
Midwife	17	12.7
Endocrinologist	11	8.2
A history of contraceptive failure		
Yes	21	13.8
No	132	86.2

TABLE 4. Relationship between demographic information on the use of OCP and no OCP contraceptives among diabetic women referred to government diabetes clinics in Guilan province

Variable	OCP	No OCP	*p*
Age			
<30	0 (0.0)	4 (3.6)	0.660†
31 – 35	5 (22.7)	24 (21.4)	
>36	17 (77.3)	84 (75.0)	
Education			
Primary	12 (54.6)	45 (40.2)	0.440†
Middle and high school	9 (40.9)	62 (55.4)	
Academic	1 (4.5)	5 (4.4)	
Spouse's education			
Primary	8 (36.4)	37 (33.0)	0.720†
Middle and high school	13 (59.1)	64 (57.1)	
Academic	1 (4.5)	11 (9.9)	
Occupation			
Housewife	21 (95.5)	95 (84.8)	0.140‡
Healthcare employee	1 (4.5)	2 (1.8)	
Nonsanitary-medical employee	0 (0.0)	15 (13.4)	
Spouse's occupation			
Worker	2 (9.1)	17 (15.2)	0.680‡
Self-employment	1 (4.5)	2 (1.8)	
Healthcare employee	7 (31.9)	41 (36.6)	
Nonsanitary-medical employee	12 (54.5)	52 (46.4)	
Family income			
Insufficient	9 (40.9)	55 (49.1)	0.440†
Relatively sufficient	10 (45.5)	50 (44.6)	
Sufficient	3 (13.6)	7 (6.3)	
Place of residence			
Urban	19 (86.4)	96 (85.7)	0.620†
Rural	3 (13.6)	16 (14.3)	
Blood pressure and heart disease			
Yes	6 (27.3)	33 (29.5)	0.530†
No	16 (72.7)	79 (70.5)	
Counseling and decision-making about contraception			
Together with her husband	14 (63.6)	70 (62.5)	0.540†
Specialist physician	4 (18.2)	29 (25.9)	
Midwife	4 (18.2)	13 (11.6)	

† Chi-square test; ‡ Fisher's exact test

DISCUSSION

The findings of the present study reveal the prevalent use of contraceptive methods in the majority of diabetic women. By contrast, 12.4% were inhibited from using contraceptive methods for reasons such as the opposition of their husbands (47.4%), the desire to get pregnant (36.8%), and fear of side effects (15.8%). Diabetic women

have less likelihood of using contraceptive methods due to various reasons, including the fear of weight gain caused by hormonal contraceptive methods, the exacerbation of their condition as a result of subsequent obesity and weight gain, risks of cardiovascular diseases such as arterial and venous thrombosis, and increased risk of infection caused by IUD and subcutaneous implants.[15,19–22] Britton *et al*. reported that in women with diabetes, given their fear of side effects and lack of support from their spouse, the decision for family planning is not necessarily associated with the use of contraceptive methods.[23]

In the present study, 44.4% and 43.2% of diabetic women used low-effect (interruption and condoms) and used high-effect (TL, OCP, IUD, and vasectomy) contraception, respectively. A significant relationship was observed between the number of children and the type of contraception (high or low effect). Those who used low-efficacy contraceptive methods had more children. In addition, the low-effect withdrawal method was mainly used by subjects who had a history of contraceptive method failure. In the study of Horsan *et al*., which is in line with the present research and was conducted to investigate the quality of sexual life among Iranian diabetic women, the withdrawal method and use of condoms are the main contraception methods.[1] According to Khan et al., women with diabetes mainly used withdrawal and periodic abstinence for contraception.[13] Another work showed that more than half of diabetic women used low-efficacy contraceptive methods; they assumed that their currently preferred method was appropriate and believed that the risks of an unwanted pregnancy were far less than those of using methods such as OCP, IUD, and implants.[12] In the work of Harris *et al*., although most young women with chronic diseases used contraceptive methods, most of the approaches they considered had a low efficacy in the prevention of pregnancy.[17] In our study, considering the relatively high percentage of diabetic women using less effective contraceptive methods and the use of withdrawal methods by those with a history of contraceptive failure, the importance of counseling and care services for diabetic women should be given more attention. Inadequate information and fear of side effects cause diabetic women to inhibit from using prevention methods or use less effective ones, such as withdrawal methods and periodic abstinence.[6,12,13,17] On the other hand, most of the diabetic women included in our study mentioned that they were using contraception to limit the number of children they were having. Given this consideration, a number of diabetic women may become pregnant under unplanned and suboptimal conditions.

Various factors influence the use of contraceptive methods: age, education, employment status, economic status, expected number of children, place of residence (urban/rural), knowledge, and attitude.[24,25] The use of appropriate contraceptive methods may be reduced in diabetic women residing in rural areas due to poverty and low levels of wealth, limited access to health services, and low levels of education.[24] Low literacy also hinders self-care education among diabetic patients.[26] In the present study, among the demographic factors investigated, a significant relationship was observed between the number of children and the type of contraceptive method used (low effect versus high effect), with more children reported by diabetic women who used low effect contraceptive methods. Devita *et al*. discovered a significant relationship between the number of children and modern contraceptive methods.[27] Thus, women who had three or more children used modern contraceptive methods more compared with those who had no children.[27] In our study, a significant relationship was noticed between occupation and the type of contraceptive method (low effect versus high effect), with more housewives using low-effect contraceptive methods. Although no significant relationship was observed between other demographic factors and the type of contraceptive method (low effect versus high effect) in the present study, based on some research, an essential relationship exists between demographic factors, such as women's education, men's education, place of residence (urban/rural), and economic status, and contraceptive methods. As a result, an increase in a couple's level of education and an improvement in a family's socioeconomic well-being have been associated with the increased use of contraceptive methods, especially highly effective ones.[24,25] Devita *et al*. observed a significant relationship between age and modern contraceptive methods.[27] Notably, younger women used more modern contraceptive methods.[27] Britton *et al*. revealed a significant relationship between education level and high-effect contraceptive methods.[6]

In the present study, blood pressure complications and cardiovascular disease were detected in 27.3% of people who used OCP contraceptives. However, no significant relationship was found between blood pressure complications and heart disease and the use of OCP and non-OCP contraceptives. The use of OCP was selected mainly by couples without consulting a doctor. Although contraceptive recommendations for women with and without diabetes show no difference from various respects, concerns have been raised regarding the relationship between hormonal contraception, glycemic control, and vascular disease.[11,15] Based on a cohort study that was conducted to determine contraceptive methods before and after the diagnosis of diabetes, the use of contraceptive methods containing estrogen decreased in the first year after the diagnosis of the disease.[15] Thus, the fear of side effects is an essential factor that prevents diabetic women from using hormonal contraceptive methods.[15,19] Meanwhile, contraceptive methods containing estrogen for women with uncomplicated diabetes are mostly safe and secure.[11,15] Diabetic women and healthcare providers face challenges related to the

prescription and the use of effective contraception. On the one hand, diabetic women assume that they have limited options regarding effective and safe contraceptives, given their underlying condition. On the other hand, clinicians face challenges with regard to the prioritization of disease management, appropriate prevention methods, and optimal and suitable timing for pregnancy.[15]

Most of the subjects were obese (BMI ≥ 30) and suffering from type 2 diabetes and related complications. Studies have shown that the increased prevalence of obesity is a global concern and a significant risk factor for type 2 diabetes. Diabetes has been associated with microvascular complications, such as retinopathy, nephropathy, and neuropathy, and macrovascular complications, such as cardiovascular problems, which affect women of reproductive age.[3,11]

In the present study, physicians were the source of information about diabetes for more than half of the studied population, and the role of media accounted for 12.4%. Hendrieckx *et al*. also reported physicians as the main source of information for women with type 2 diabetes.[28] However, in our study, the decision to use contraceptives was mainly the couple's responsibility, followed by consultation with a specialist. A qualitative study revealed that diabetic women barely received contraceptive advice in their routine care; regardless, advice from healthcare professionals strongly influenced their contraceptive decisions.[19] According to Hibbert *et al*., despite the awareness of the risks of diabetes in pregnancy, less than half of the women they studied sought counseling and preconception care; in addition, despite mainly obtaining information on contraceptive methods from general practitioners (69.9%), most of them had little knowledge regarding effective and reliable contraceptive methods.[18] Given the uniqueness of selecting the proper contraceptive method for each person, especially women with chronic diseases, comprehensive assessment and proper planning must be carried out to ease access to safe and effective contraceptive methods for women with chronic diseases.[29] In Iran, given the decrease in population growth rate,[30] policymakers have started paying attention to population increase policies. The Family and Youth Protection Law in Iran (approved in 2021) prohibits the free distribution of any items related to pregnancy prevention, the insertion of prevention items, and the encouragement of their use in healthcare networks affiliated with medical sciences universities. A doctor must prescribe the provision of contraceptives in pharmacies across the country and health networks and the insertion of contraceptive items.[31]

This study encountered the following limitations. Our cross-sectional analysis did not imply that diabetes motivates contraceptive use. Instead, we described patterns of contraceptive use among women with diabetes. Given the socioeconomic characteristics of the research population in the current study, which comprised diabetic women referred to government diabetes clinics in Guilan, the generalization of the obtained results had its limitations. In Iran, individuals who visit government centers usually belong to lower socioeconomic deciles compared with those who make appointments in private centers. Meanwhile, the inhibition from the use of safe and effective contraceptive methods can be attributed to the lack of knowledge, financial problems, and difficulty of accessing contraceptive methods from government sources.[13] Thus, future studies should consider such issues. Another limitation was the lack of accurate and honest answers from diabetic women who responded to the questionnaire. Meanwhile, a strength of the current study was the highlighting of existing gaps, including the use of less effective contraceptive methods and limited use of counseling services by diabetic women. Therefore, considering the current policies on population increase in Iran, healthcare professionals can support women with diabetes to achieve their pregnancy goals by providing preconception care and family planning.

CONCLUSIONS

The findings of the present study show that a relatively high percentage of diabetic women use less effective contraceptive methods, and the decision to use contraceptive methods is made mainly by couples. A significant relationship was observed between the number of children, occupation, and the type of contraception (high or low effect). Therefore, targeted reproductive health interventions and providing counseling services as part of medical care for diabetic women seem necessary.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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Yaren Nur Tayyar
Department of Nursing, Institute of Health Sciences, Trakya University, Edirne 22030, Turkey, tayyaryarennur@gmail.com

Hatice Kahyaoglu Sut
Department of Women Health and Disease Nursing, Faculty of Health Sciences, Trakya University, Edirne 22030, Turkey, haticesut@yahoo.com

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Age, Body Mass Index, Physical Activity and Quality of Life in Turkish Pregnant Woman with and Without a Diagnosis of Gestational Diabetes Mellitus: A Comparative Study

Yaren Nur Tayyar[1], Hatice Kahyaoglu Sut[2*]

[1]Department of Nursing, Institute of Health Sciences, Trakya University, Edirne 22030, Turkey

[2]Department of Women Health and Disease Nursing, Faculty of Health Sciences, Trakya University, Edirne 22030, Turkey

Abstract

Background: This study aimed to examine and compare the age, body mass index (BMI), physical activity (PA), and quality of life (QOL) of third-trimester Turkish pregnant women with and without a diagnosis of gestational diabetes mellitus (GDM).

Methods: A comparative study was conducted in the obstetrics clinic of a university hospital in Turkey, and it included 210 women (GDM women = 105 and non-GDM women = 105). Personal Information Form, International Physical Activity Questionnaire-Short Form (IPAQ), and World Health Organization Quality of Life-Short Form-Turkish (WHOQOL-Bref-TR) were used.

Results: The age and BMI of GDM women were higher than those of non-GDM ($p < 0.05$). The results show that non-GDM women in their third trimester had higher scores on the WHOQOL-Bref-TR domains compared with those with GDM ($p < 0.05$). Among GDM women, a significant positive correlation was observed among WHOQOL-Bref-TR psychological ($r = 0.77$, $p < 0.05$) and environmental ($r = 0.85$, $p < 0.05$) domains and moderate IPAQ scores. A moderate positive correlation was detected among physical, psychological, social relations, environmental domains of WHOQOL-Bref-TR, and walking and total score in IPAQ ($r = 0.39–0.54$, $p < 0.05$).

Conclusions: Local health policies should focus on community education programs, such as regular PA based on BMI and age, for the positive QOL of GDM women.

Keywords: gestational diabetes, physical activity, pregnancy, quality of life

INTRODUCTION

Gestational diabetes mellitus (GDM), which causes abnormal glucose tolerance, is a medical condition that affects pregnant women. GDM screening and diagnosis usually involves the single-step 75 g oral glucose tolerance test at generally 24–28 weeks of pregnancy and in the third trimester.[1] The prevalence of GDM is increasing worldwide, and this condition affects one in every six pregnant women.[2] The global prevalence of GDM is 14%.[3] GDM has been associated with obstetric and neonatal complications.[1] This condition has also been connected to the risks of macrosomia at birth (birth weight ≥ 4 kg), birth trauma, fractures, and birth difficulties, such as shoulder dystocia and neonatal hypoglycemia.[4,5] The main risk factors for GDM development include the following: ≥40 years of age, overweightness or obesity (body mass index (BMI) ≥ 25 kg/m^2) at the beginning of pregnancy,[6,7] and excessive weight gain during pregnancy.[8] The risk of negative health outcomes associated with excessive weight gain during pregnancy can be reduced through routine lifestyle interventions for all women.[9] Women diagnosed with GDM produce 40%–70% less insulin for any degree of insulin resistance.[10] GDM and type 2 diabetes mellitus (T2DM) share pathophysiological similarities,[10,11] and women with GDM have a 70% higher risk of developing T2DM within 28 years after delivery.[12] In some cases, lifestyle modifications can be sufficient to achieve glycemic targets in 70%–85% of women with GDM.[13]

In general, physical activity (PA) and increased exercise are integral to diabetes mellitus management and GDM. Lifestyle changes, such as increased engagement in PA, can help in reducing the risks associated with GDM.[14] Regular engagement in PA is essential to lead a healthy life and can improve the labor and delivery process for pregnant women.[15] As recommended by the American College of Obstetricians and Gynecologists, women with GDM who maintain an active lifestyle should be encouraged to continue with an approved exercise program for pregnancy.[16] Pregnancy complicated by GDM considerably negatively affects women's quality of life (QOL) in the short and long terms.[17] The adverse effects of GDM lead to a decline in the QOL.[18] Moderate-to-vigorous PA during pregnancy provides a number of health benefits, such as the reduced risk of GDM.[19] Thus, studies should investigate in detail the relationship between PA and QOL associated with GDM.[20,21] Evidence on the comparison of age, BMI, PA behaviors, and QOL in the

***Corresponding author:**
Hatice Kahyaoglu Sut
Department of Women Health and Disease Nursing,
Faculty of Health Sciences, Trakya University, Edirne, Turkey
E-mail: haticesut@yahoo.com

third trimester of Turkish pregnant women with GDM and non-GDM is scarce. This research is original in terms of the results obtained. The findings of this study are considered important for the regulation of PA behavior related to age and BMI and the improvement of the local health of GDM women.

METHODS

This study received ethical approval after obtaining written consent from the University Scientific Research Ethics Committee (BAEK 2021/335). After receiving ethical approval, written permission was secured from the Chief Physician of the University Hospital. Pregnant women who volunteered to participate were informed about the research, and their verbal consent was obtained.

A comparative study is used to analyze and compare two or more ideas. This comparative research of Turkish pregnant women with GDM and non-GDM diagnosis was conducted between September 2021 and February 2022 in the obstetrics and gynecology clinic of a university hospital in Turkey. For the assessment of the levels of PA and QOL in the third trimester of GDM and non-GDM women, 210 pregnant women, including 105 with GDM and 105 non-GDM, who met the inclusion criteria and applied to the obstetrics and gynecology clinic during a specified period were recruited based on clinical experience and predicted moderate effect size (d = 0.5). Power-analysis sampling method was used to calculate the 5% margin of error and 95% power, and the results confirmed that the sample size was sufficient for the detection of significant differences between the two groups. The GDM pregnant group consisted of pregnant women over 18 years of age, in their third trimester, and diagnosed with GDM. The without-GDM pregnant group consisted of pregnant women over 18 years of age, in their third trimester, and without any chronic health problems, including GDM and risky pregnancy.

Data collection was completed through the administration of Personal Information Form, World Health Organization Quality of Life Short Form, Turkish version (WHOQOL-Bref-TR), and International Physical Activity Questionnaire Short Form, Turkish version (IPAQ-TR). It consists of 10 questions, including five questions on age, gestational week, and BMI and five personal categorical characteristics (education level, family type, working status, income status, and place of residence) of pregnant women.[11–20]

WHOQOL-Bref-TR[22] adaptation was performed by Fidaner *et al*.[23] WHOQOL-Bref-TR consists of 27 questions, including the national environment subdimension. The Turkish version of the scale included the national environment domain (Domain 5) because the 27th question is used only in national studies. The scale consists of five domains: physical (7 items: 3, 4, 10, 15, 16, 17, and 18), psychological (6 items: 5, 6, 7, 11, 19, and 26), social relations (3 items: 20, 21, and 22), environmental (8 items: 8, 9, 12, 13, 14, 23, 24, and 25), and national environmental (1 item: 27) domains. The physical domain assesses an individual's ability to perform daily tasks, dependence, vitality, fatigue, discomfort, sleep, rest, and work. The psychological domain assesses the body's appearance, positive or negative emotions, self-esteem, and personal beliefs. The social relations domain assesses an individual's social environment, communication, interpersonal relationships, emotional, material, spiritual, and, where necessary, cognitive support to the individual. The environmental domain assesses issues related to financial resources, benefits and accessibility in health care, chances to acquire knowledge and skills, leisure time, and physical environment. The national environment domain measures an individual's perception of social pressure. In WHOQOL-Bref-TR Likert-type scoring, each of the 27 questions was scored between 1–5. Questions 3, 4, and 26 were reverse coded. Domain scores can range between 4 and 20 or between 0 and 100. A high domain score indicates a high QOL. The total score of the scale is not calculated.

IPAQ assesses PA in different areas related to leisure time, home, work, and transportation.[24] The Turkish adaptation of the scale was conducted by Sağlam *et al*.[25] The short form comprises seven questions. IPAQ assesses walking, moderate, and vigorous PA performed for at least 10 min every day for seven days. Metabolic equivalent (MET) refers to the energy of PA served and provides a set value of PA energy consumption. This score is presented as MET minutes/week (walking + moderate + vigorous PA). Individual MET scores for walking, moderate, and vigorous PA are calculated separately for each domain and then combined to obtain a total score (formula: Total- MET minutes/week = MET-level x minutes per day x days per week). For the analysis of IPAQ data, walking: 3.3 METs, moderate physical activity: 4.0 METs, and vigorous physical activity: 8.0 METs. The PA level rises with the increase in MET. The PA of the participants were classified as inactive (<600 MET-min/week), moderately active (600-3000 MET-min/week), and highly active (>3000 MET-min/week) based on their levels.[24]

The data were analyzed using SPSS 25. Descriptive statistics, including number, percentage, minimum and maximum values, mean, and standard deviation, were presented. The normal distribution of data was determined using the Shapiro–Wilk test. Normally distributed quantitative data were compared between GDM and non-GDM women using Student's t-test. Mann–Whitney U test was used on data with non-normal distribution. Categorical data were compared using the Chi-square test. The level of statistical significance was set at $p < 0.05$.

RESULTS

The GDM and non-GDM women had a mean gestational week of 33.79 ± 4.37 (p = 0.098). The mean age of non-GDM women was 28.15 ± 5.56, and that of GDM women was 30.03 ± 5.98 (p = 0.023). The mean initial weight of non-GDM women was 64.8 ± 14.78, and that of GDM women was 75.05 ± 18.07 (p < 0.001). The mean weight of non-GDM women in the third trimester was 74.62 ± 14.76, and that of GDM women was 84.12 ± 16.41 (p < 0.001). The mean BMI of non-GDM women was 24.38 ± 5.03, and that of GDM women was 28.33 ± 6.19 (p < 0.001). In this study, the age and BMI of GDM women were higher than those of non-GDM women (p < 0.05). Table 1 presents the comparison of age, gestational week, and BMI in the third trimester of GDM and non-GDM women.

More GDM women reported reaching high school and higher education levels (p < 0.05). No significant difference was observed in the family type, working status, income status, and place of residence between the two groups of pregnant women (p > 0.05). Table 2 presents the comparison of personal categorical variables of GDM and non-GDM women in their third trimester.

The scores of the physical domain of the WHOQOL-Bref-TR scale were 14.21 ± 2.60 in non-GDM women and 12.99 ± 3.25 in GDM women. The psychological domain scores were 15.17 ± 2.07 in non-GDM women and 14.17 ± 2.82 in GDM women. The scores in the social relations domain were 15.20 ± 3.01 for non-GDM women and 13.55 ± 4.17 for GDM women. The scores on the environmental domain were 15.28 ± 2.59 in non-GDM women and 14.49 ± 3.34 in GDM women. The scores on the national environment domain reached 16.34 ± 4.19 in non-GDM women and 14.93 ± 4.09 in GDM women. The study revealed a significant difference in the scores of GDM and non-GDM women in the physical, psychological, social relations, national environment domains (p < 0.05). The OQL of non-GDM women in the physical, psychological, social, and national domains were significantly better than those of GDM women. No significant difference was observed in the environmental subdimension scores between the two groups of pregnant women (p > 0.05). Table 3 presents the comparison of the mean scores of WHOQOL-Bref-TR subscales of GDM and non-GDM women in the third trimester.

TABLE 1. Comparison of age, gestational week, and BMI of GDM and non-GDM women in their third trimester (N = 210)

Variable	Non-GDM women (N = 105)	GDM women (N = 105)	Total	p
	Mean ± SD	Mean ± SD	Mean ± SD	
Gestational week	34.11 ± 4.65	33.47 ± 4.08	33.79 ± 4.37	0.098
Age	28.15 ± 5.56	30.03 ± 5.98	29.09 ± 5.83	0.023
Initial Weight	64.80 ± 14.78	75.05 ± 18.07	69.92 ± 17.25	<0.001*
Weight in the 3rd trimester	74.62 ± 14.76	84.12 ± 16.41	79.37 ± 16.28	<0.001*
BMI	24.38 ± 5.03	28.33 ± 6.19	26.36 ± 5.97	<0.001*

*p < 0.05, Mann–Whitney U test statistics

TABLE 2. Comparison of personal categorical variables of GDM and non-GDM women in their third trimester (N = 210)

Variable	Non-GDM women (N = 105)		GDM women (N = 105)		Total		p
	N	%	N	%	N	%	
Education level							0.043*
Primary education and below	44	41.9	30	28.6	74	35.2	
High school and above	61	58.1	75	71.4	136	64.8	
Family type							0.071
Nuclear family	90	85.7	98	93.3	188	89.5	
Extended family	15	14.3	7	6.7	22	10.5	
Working status							0.662
Working	37	35.2	34	32.4	71	33.8	
Not working	68	64.8	71	67.6	139	66.2	
Income status							0.425
Income is less than expenses	15	14.3	9	8.6	24	11.4	
Income equals expenses	83	79.0	89	84.8	172	81.9	
Income exceeds expenses	7	6.7	7	6.7	14	6.7	
Place of residence							0.413
Village	7	6.7	7	6.7	14	6.7	
Town	41	39.0	32	30.5	73	34.8	
Province	57	54.3	66	62.9	123	58.6	

*p < 0.05, Chi-square analysis

The study revealed that non-GDM women had a mean IPAQ total score of 757.37 ± 662.46, and those with GDM had a mean score of 673.54 ± 787.27 (moderately active). The mean scores for moderate activity were 465.00 ± 398.25 for non-GDM women and 548.57 ± 847.49 for those with GDM (inactive). The mean activity scores for walking were 717.34 ± 662.80 for non-GDM women and 621.65 ± 744.25 for those with GDM (moderately active). No significant difference was observed in the total, moderate, walking activity values (IPAQ) between the groups ($p > 0.05$). In this study, we were unable to calculate and compare the vigorous activity scores of GDM women because none of the women with GDM had vigorous physical activity. Table 4 presents the comparison of IPAQ scale mean scores of pregnant women with and non-GDM in their third trimester.

In non-GDM women, a weak positive correlation was observed between the scores on the physical domain of WHOQOL-Bref-TR, walking domain in IPAQ (r = 0.299, p = 0.007), and total IPAQ score (r = 0.297, p = 0.007). A weak positive correlation was also found between the scores on psychological domain and walking (r = 0.242, p = 0.031). In GDM women, a moderate positive correlation was observed between the scores on physical domain of WHOQOL-Bref-TR and walking in IPAQ (r = 0.421, $p < 0.05$). A moderate positive correlation was detected between physical domain of WHOQOL-Bref-TR and IPAQ total score (r = 0.415, $p < 0.05$). A highly significant positive correlation was observed among psychological domain (r = 0.774, $p < 0.05$) and environmental domain (r = 0.855, $p < 0.05$) and moderate IPAQ scores. A moderate positive correlation was noted between psychological domain and IPAQ total (r = 0.544, $p < 0.05$) and walking (r = 0.506, $p < 0.05$) scores, between social relations and IPAQ total (r = 0.437, $p < 0.05$) and walking (r = 0.413, $p < 0.05$) scores, between environmental and IPAQ walking (r = 0.391, p < 0.05) and total (r = 0.416, $p < 0.05$) scores. A weak positive relationship was identified between the national environment and walking IPAQ score (r = 0.268, $p < 0.05$). Table 5 presents the relationship between the scores of GDM and non-GDM women in their third trimester on the WHOQOL-Bref-TR subscales and IPAQ scale.

TABLE 3. Comparison of the mean scores on the WHOQOL-Bref-TR subscales of GDM and non-GDM women in their third trimester

WHOQOL-Bref-TR subscales	Min	Med	Max	Mean	*p*
Physical[a]					0.003*
Non-GDM women	20.00	13.71	8.00	14.21 ± 2.60	
GDM women	20.00	13.14	6.29	12.99 ± 3.25	
Psychological[b]					0.015*
Non-GDM women	19.33	15.33	9.33	15.17 ± 2.07	
GDM women	20.00	14.67	6.67	14.17 ± 2.82	
Social relations[b]					0.005*
Non-GDM women	20.00	16.00	8.00	15.20 ± 3.01	
GDM women	20.00	14.67	4.00	13.55 ± 4.17	
Environmental[b]					0.175
Non-GDM women	20.00	15.50	8.00	15.28 ± 2.59	
GDM women	19.50	15.00	4.00	14.49 ± 3.34	
National environment[b]					0.008*
Non-GDM women	20.00	16.00	4.00	16.34 ± 4.19	
GDM women	20.00	16.00	4.00	14.93 ± 4.09	

[a]: Independent sample t test statistics, [b]: Mann–Whitney U test statistics, *$p < 0.05$

TABLE 4. Comparison of IPAQ scale mean scores of GDM and non-GDM women in their third trimester

IPAQ scale (N)	Min	Med	Max	Mean ± SD	*p*
IPAQ Total					0.176
Non-GDM women (81)	66.00	594.00	2,970.00	757.37 ± 662.46	
GDM women (74)	66.00	420.75	5,544.00	673.54 ± 787.27	
Severe					
Non-GDM women (1)	240.00	240.00	240.00	240.00 ± -	-
GDM women (0)	-	-	-	-	
Moderate					0.382
Non-GDM women (8)	80.00	360.00	1,200.00	465.00 ± 398.25	
GDM women (7)	40.00	240.00	2,400.00	548.57 ± 847.49	
Walking					0.232
Non-GDM women (80)	66.00	594.00	2,970.00	717.34 ± 662.80	
GDM women (74)	66.00	396.00	5,544.00	621.65 ± 744.25	

TABLE 5. Relationship between scores of GDM and non-GDM women in their third trimester on the WHOQOL-Bref-TR subscales and IPAQ scale

WHOQOL-Bref-TR subscales	IPAQ Moderate	IPAQ Walking	IPAQ Total
Non-GDM women (N)	8	80	81
Physical	-0.464	0.299*	0.297*
Psychological	-0.295	0.242*	0.206
Social Relations	-0.510	0.145	0.156
Environmental	-0.531	0.153	0.142
National Environment	0.126	0.101	0.054
GDM women (N)	7	74	74
Physical	0.090	0.421*	0.415*
Psychological	0.774*	0.506*	0.544*
Social Relations	0.275	0.413*	0.437*
Environmental	0.855*	0.391*	0.416*
National Environment	-0.179	0.268*	0.194

*$p < 0.05$, N: number

DISCUSSION

This study aimed to examine and compare the age, BMI, PA behaviors, and QOL of Turkish pregnant women with and without a diagnosis of GDM in the third trimester. The results show that the age and BMI of GDM women were higher than those of non-GDM women in the third trimester. The QOL of GDM women in all domains was lower compared to that of non-GDM women. The PA levels were similar in GDM and non-GDM women. The psychological, environmental, physical and social relations QOL domains were positively related to the increased PA in GDM women. The prominent findings are discussed in light of the literature on similar topics.

The age of a pregnant mother is an important risk factor for pregnancy and the QOL.[26] The risk factors for GDM include being overweight/obese at the beginning of pregnancy and excessive weight gain during pregnancy.[6,8] Significantly overweight pregnant women often have poor diet and mild PA.[27] In this study, age and BMI were higher in GDM women than that of non-GDM women during the third trimester. Abolfathi *et al*. conducted a study on GDM women and observed that most of them were overweight and obese.[28] Ede observed that the mean age of GDM women was higher than that of non-GDM women. Pre-pregnancy BMI was higher in GDM women than in those non-GDM.[29] Muhli *et al*. reported that pre-pregnancy BMI was higher in women with a history of GDM compared with those without a history.[27] Keskin *et al*. found no significant difference in age, weight gain, and BMI between GDM and non-GDM women.[30] In general, GDM women have higher age and BMI than non-GDM women. The risk of GDM in pregnancy increases with the increase in age and BMI. Age is a risk factor that cannot be changed. However, BMI can be changed through a healthy diet and engagement in PA.

The study determined that the QOL levels related to physical, psychological, social relations, national environment domains of the WHOQOL-Bref-TR scale were better in the third trimester of non-GDM women than those of GDM women. Pantzartzis *et al*. reported that in the third trimester of pregnancy, decreases in the total, environmental, physical domains of the QOL were observed in GDM women compared with those with non-GDM women (no difference in the psychological and social relationships).[31] According to Danyliv *et al*., GDM women had lower health-related QOL levels than pregnant women with normal glucose tolerance.[32] Dalfrà *et al*. compared the QOL levels of GDM women, pregnant women with type I diabetes, and healthy pregnant participants. The GDM women exhibited a significantly lower QOL level in terms of general health perception in the third trimester than in the first and second trimesters.[33] Trutnovsky *et al*. reported that after the 20th week of pregnancy, the QOL level of GDM women in terms of physical, psychological, and social aspects and overall decreased substantially.[34] Kim *et al*. noted that GDM women were more likely to report poor physical functioning and health status than healthy pregnant women.[35] Bień *et al*. reported a slightly poorer psychological domain in the QOL of GDM women compared with other domains.[36] Kopec *et al*. revealed the negative impact of GDM on social domain.[37] GDM women in their third trimester showed deterioration in the general QOL and all general QOL domains. Especially after the second half of pregnancy, when GDM is diagnosed, psychologically poor health perception leads to a decrease in the general QOL.

The study revealed that the PA levels of GDM and non-GDM women were similar according to the results on the IPAQ scale (walking: moderately active; moderate: inactive). GDM women stated that they did not perform vigorous PA. Muhli *et al*. reported that the PA level in women with a history of GDM was not different from that of women without a history of GDM. Overweight/obese women were likely to have lower PA levels than average-weight women.[27] Heybet discovered a difference between the PA levels of pregnant women with high and low blood glucose levels. The group with lower blood glucose levels

exhibited higher PA levels.[38] In a meta-analysis, Doi *et al*. revealed that the risk of GDM in pregnant women was considerably reduced with PA.[39] After the diagnosis of GDM, pregnant women may reduce their need for insulin therapy and improve glycemic control in late pregnancy by engaging in an exercise program. Prenatal exercise has a potential role in the reduction of obesity risks for the next generation.[40] Pagel *et al*. reported lower PA levels of pregnant women diagnosed with GDM in early pregnancy than those non-GDM. Engagement in PA in early pregnancy has been associated with the reduced risk of GDM and reversal of excess risk in women with a genetic predisposition.[41] Performing PAs in pregnancy does not increase the risk of adverse outcomes for the fetus. Such activities offer many health benefits, including the reduced risk of gestational diabetes.[42] Previous studies revealed that regular PA, especially in early pregnancy, is essential in reducing the risk of GDM.

The assessment of PA and QOL in GDM women is critical in maternal, fetal, and neonatal health care planning.[28] This study indicated that engaging in moderate level PA (IPAQ) and psychological and environmental domain QOL (WHOQOL-Bref-TR) increased the QOL to a high level in GDM women. Walking activity and general PA moderately improved the physical-psychological-social and environmental QOL domain and slightly boosted the national domain of the QOL. Uria-Minguito *et al*. implemented an online structured and supervised exercise program to prevent and manage gestational diabetes in a randomized controlled trial. Their results confirmed the benefit of PA and an optimal QOL throughout pregnancy.[43] Ghasemi *et al*. provided information on self-care, nutrition, and PA in counseling pregnant women between 24–26 weeks. At the end of counseling, fasting blood glucose levels, self-care, and QOL showed improvement.[44] Andersen *et al*. determined that in pregnant women diagnosed with GDM, postprandial glucose levels can be controlled with 20 min of intermittent walking after a meal.[45] Soylu detected a higher PA level in GDM women with controlled blood glucose monitoring than those with uncontrolled GDM. A high QOL was observed in GDM women with high PA levels.[46] Engberg *et al*. reported the application of cardiovascular fitness and PA programs to overweight/obese (BMI > 29 kg/m^2) women with a history of GDM and planned pregnancy. Women at risk of GDM who performed cardiovascular fitness and PA programs showed a positive association with general health and physical well-being.[47] Woodside *et al*. conducted a systematic review and demonstrated the positive impact of exercise on the presence of glucose transporter type 4, which facilitates the transportation of glucose from the bloodstream into cells.[48] Maintaining a healthy lifestyle and engaging in regular PA before, during, and after pregnancy can help in the prevention of the risk of several complications and improve the QOL.[49,50] In addition, PA during pregnancy can help in the regulation of insulin resistance and blood glucose levels. The literature and findings of this study suggest that the QOL of GDM women is related to their PA level.

Based on the results of this study, walking activity and general PA in non-GDM women slightly positively affected their QOL in terms of the physical and psychological domains (Table 5). PA positively affects the QOL status of healthy pregnant women. Heybet observed that the QOL was high among healthy non-GDM women who engaged in intense PA. Moreover, PA stabilizes blood glucose levels.[38] According to Vieira *et al*., despite the low self-reported exercise participation in the third trimester of pregnancy, it has been associated with improvements in physical and environmental QOL. Women who were in good physical condition and had environmental resources during pregnancy were likely to exercise.[51] Moundary *et al*. revealed the positive association of total and light-intensity PA during pregnancy with the psychological and social domains of the QOL.[52] Göker *et al*. reported that the QOL increased with the increase in PA level among pregnant women. He emphasized the need to plan interventions to help healthy women become physically active during pregnancy.[53] Kara *et al*. reported that an increase in the PA level during pregnancy considerably affects the QOL associated with health improvement.[20] Krzepota *et al*. associated the high levels of vigorous, occupational, and sport/exercise activity during pregnancy with desirable results on several domains of the QOL, including overall QOL, psychological, social, and physical domains.[54] The findings suggest that regular walking and increased intensity of PA during healthy pregnancy positively affect the overall QOL and its domains and contribute to maintaining a healthy state of being.

The limitation of this cross-sectional study is that it is single-center research. Therefore, its generalizability is limited. Its strengths include the use of valid and reliable instruments to assess PA and QOL with comparison between GDM and non-GDM women groups.

CONCLUSIONS

In conclusion, in this study, age and BMI were higher in the third trimester of GDM women and revealed that the QOL was positively related to the PA. Therefore, local health policies should be focused on community education programs, such as lifestyle changes of regular engagement in PA, especially in overweight/obese and higher-age GDM women. Multicenter studies should be conducted in the future.

CONFLICT OF INTEREST

The authors declare no potential conflicts of interest with respect to the authorship and/or publication of this article.

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Attitudes toward Persons with Disabilities and Disability Awareness of University Students Providing Healthcare

Canan Ertemoğlu Öksüz
Department of Anatomy, Vocational School of Health Services, Karadeniz Technical University, Trabzon 61080, Turkey, cananertem61@hotmail.com

Özlem Kanber Uzun
Department of Anatomy, Vocational School of Health Services, Karadeniz Technical University, Trabzon 61080, Turkey, ozlemkanber@hotmail.com

Şahi Nur Kalkışım
Department of Anatomy, Vocational School of Health Services, Karadeniz Technical University, Trabzon 61080, Turkey, sah.nur@hotmail.com

Nihat Burak Zihni
Department of Anatomy, Vocational School of Health Services, Karadeniz Technical University, Trabzon 61080, Turkey, nihatburakzihni@gmail.com

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Attitudes toward Persons with Disabilities and Disability Awareness of University Students Providing Healthcare

Canan Ertemoğlu Öksüz*, Özlem Kanber Uzun, Şahi Nur Kalkışım, Nihat Burak Zihni

Department of Anatomy, Vocational School of Health Services, Karadeniz Technical University, Trabzon 61080, Turkey

Abstract

Background: This study aims to determine the attitudes and disability awareness of university students who provide health services to persons with disabilities.

Methods: This study included 291 volunteer students studying at the Vocational School of Health Services, Karadeniz Technical University (KTU), and conducting clinical practice at KTU Farabi Hospital. A sociodemographic form was used to determine the individual characteristics of the students included in this study, and the Attitudes toward Disabled Persons Scale (ATDP) was applied to determine their attitudes toward persons with disabilities.

Results: The students' average ATDP score was 61.75 ± 12.34. Statistically significant differences were found among situations wherein the students had chronic diseases, participated in disability-related education, and their ATDP scores ($p < 0.05$).

Conclusions: This study shows that our students have few prejudices against persons with disabilities and can empathize with them at a sufficient level. In addition, our students have an awareness of people with disabilities, and this awareness can be increased. Disability-related regulations should be introduced into educational curricula, and additional awareness-raising activities should be provided to improve the attitudes of healthcare students toward persons with disabilities.

Keywords: attitude, awareness, disabled persons, students

INTRODUCTION

People may have to live with incurable, unresolved, or physiological deficiencies. This situation is defined as disability.[1] Disability is defined as an unfavorable situation that prevents or limits the performance of the activities that an individual is expected to perform in accordance with age, gender, and social and cultural status as a result of any hereditary or acquired deficiency in orthopedic or mental abilities.[2,3] Disability can affect the person with disabilities and the person responsible for their care physically, emotionally, and socially, exposing them to various problems.[2,3]

Approximately 15% of the world population (WHO, 2011) and 6.6% of the Turkish population have at least one disability (including the population who stated that they have difficulty or none at all in at least one function related to disability). This figure, when considered together with the family members with whom they are in contact, reveals that disability affects approximately 10 million people. In some countries and regions, people with disabilities have minimized their differences from those without disabilities in terms of lifestyle and standards, whereas in some countries, they are excluded from society. The root of this problem lies in negative attitudes toward persons with disabilities.[2,3] Attitude is defined as a set of preformed feelings, thoughts, and beliefs that are continuous toward individuals, clusters, objects, or thoughts.[4,5] It is not a behavior that can be directly observed but is instead a preparatory tendency for behaviors that are invisible to the eye; the presence of attitude is a result of seeing behaviors. Similar to numerous other behaviors, attitude is acquired in various ways and develops over the course of life.[1–3] Parents, friends, mass media, and past experiences are important factors that participate in the formation of attitude. Persons with disabilities often struggle with negative attitudes that prevent them from integrating into society. Physical disability in individuals is not the sole cause of a disability; it causes disability only if the person with disabilities feels inadequate or when others perceive them as inadequate.[2,3] Although the general social attitude toward persons with disabilities is generally positive in most social contexts, able-bodied individuals may have underlying biases that contradict these behaviors.[2] Negative attitudes pose an invisible obstacle to the integration of persons with disabilities into society. For individuals with disabilities to take part in society fully and effectively, it is important to change the attitudes towards them positively.[2,3]

Therefore, identifying individuals with and without prejudiced attitudes that make life difficult for persons

***Corresponding author:**
Canan Ertemoğlu Öksüz
Department of Anatomy, Vocational School of Health Services, Karadeniz Technical University, Trabzon, Turkey
E-mail: cananertem61@hotmail.com

with disabilities and revealing the factors that affect prejudiced attitudes are of great importance.[2] Health care professionals are individuals who frequently encounter persons with disabilities as well as provide services and care to them3. From this viewpoint, investigating how students who provide health services evaluate disability is necessary. Therefore, this study was conducted to determine the attitudes of university students providing health services toward persons with disabilities and evaluate their disability awareness.

METHODS

This study was conducted in accordance with the 2008 Declaration of Helsinki—Ethical Principles. Before this study was started, written consent was obtained from the institution wherein it will be conducted. The students participating in this study were informed about the research and provided verbal and written consent. Approval for the study protocol was obtained from the KTU Health Sciences Scientific Research Ethics Committee (E-13562490-799-305911).

This research was conducted at the Vocational School of Health Services, Karadeniz Technical University (KTU) during the academic year 2022–2023. The Vocational School of Health Services has four departments: Medical Documentation and Secretarial, Medical Imaging, Medical Laboratory, and Emergency First Aid. The data for this research were collected through a survey form created by using a random stratified sampling method. The inclusion criteria for the study group were as follows: conducted clinical practice at Farabi Hospital of KTU, in direct contact with patients, and voluntarily agreed to participate in the research. This research is based on volunteerism. Students who did not volunteer to participate were excluded from the study. A total of 320 students who conducted clinical practice at the hospital were assessed for eligibility. This study was conducted with 291 students because 26 students declined to participate, and three students were excluded for other reasons. The consent of the 291 students was obtained for participation.

In addition, for the determination of the sample size of the study, statistical power analysis was performed by using G*Power software to reach a power (β) value of 0.80 with an effect size of 0.50 and a sample rate of 1/3 between groups; the required total sample size was calculated as 174 students.[6] This research was conducted with 291 students, including 72 males and 219 females, with a sample rate of approximately 0.33 between groups to reach a similar power value.

The questionnaire technique was used as the data collection method. The questionnaire form used in this work consisted of two parts. In the first part, a sociodemographic form consisting of questions to determine the individual characteristics of the volunteer students participating in the research (age, gender, department, class, presence of persons with disabilities in the family, smoking, and working with persons with disabilities) was used. In the second part, the Attitudes toward Disabled Persons Scale (ATDP) developed by Yuker and Block as well as adapted into Turkish by Özyürek was applied to determine attitudes toward persons with disabilities.[7] The purpose of this scale is to measure attitudes toward persons affected by disabilities in general without specifically distinguishing disability groups. This scale has a reliability coefficient of 0.67–0.83 and a test–retest reliability coefficient of 0.76 when used in a Turkish setting.[1,2]

The scale consists of 20 items and is prepared with a six-point Likert format (+3, "I agree very much;" +2, "I agree pretty much;" +1, "I agree a little;" −1, "I disagree a little;" −2, "I disagree pretty much;" and −3, "I disagree very much"). Items 2, 5, 6, 11, and 12 of the scale are scored in reverse. After all items are added by taking their marks into account, the total score is obtained by adding +60 to eliminate negative values. The highest score that can be obtained on this scale is 120.[7] High scores on the scale indicate that persons with disabilities are perceived similarly to nondisabled persons. Low scores indicate that persons with disabilities are perceived differently from nondisabled persons. They signify that persons with disabilities are not only perceived differently but are also seen as worthless. Therefore, they also reflect a prejudiced attitude toward persons with disabilities.[1] The participants were questioned about their knowledge of the regulations and practices for persons with disabilities in the hospital wherein they practice and whether these accommodations are sufficient. Their opinions were asked to measure their disability awareness.

Data were collected through face-to-face interviews conducted by the researchers in an educational seminar collectively attended by students. They were assured that the data collected in the survey would be kept completely confidential, there was no rush during the data collection phase, and efforts were made to minimize prejudices by making the participants feel that the survey was valuable. Before data collection, the students who wanted to participate in the study were voluntarily informed about the purpose of the research, and written informed consent was obtained from all students. Most students took approximately 15 min to complete the questionnaire.

The data obtained from the research were analyzed in a computer environment by using the KTU-licensed SPSS 22.0 statistics program. In this study, the number, percentage, and mean ± standard deviation (SD) values of the descriptive data are given. The Shapiro–Wilk test was conducted to determine if the scale scores were normally distributed, and the reliability level was determined with Cronbach's alpha coefficient. The chi-square test was used

for the comparison of categorical variables, and the significance of differences between two means in comparative analysis and one-way analysis of variance was tested accordingly. Here, $p < 0.05$ was considered statistically significant.

RESULTS

A total of 291 students (219 females and 72 males) aged 17–26 years old were enrolled, and the response prevalence of the participants was 100%. The mean age of students was 19.44 ± 1.86. The students' mean ATDP score was 61.75 ± 12.34 (range 22–90).

The Cronbach's alpha coefficient of the scale was 0.573. Cronbach's alpha coefficient varies between 0 and 1. A coefficient of 0.00–0.40 indicates unreliability, that of 0.41–0.59 represents low reliability, that of 0.61–0.80 reflects moderate reliability, and that of 0.81–1.00 indicates high reliability.[8] Accordingly, the scale has low reliability. In this study, the power value was calculated as approximately 0.93 in accordance with the calculated Cronbach's alpha value and was sufficient. Shapiro–Wilk normality analysis performed for the ATDP score was also found to be suitable for a normal distribution.

The basic demographic characteristics of the students and the comparison of their ATDP scores in accordance with these characteristics are presented in Table 1. Some features related to the disabilities of the students and a comparison of ATDP scores in accordance with these features are presented in Table 2.

A total of 17 (5.8%) of the 25 (8.6%) students with chronic diseases stated that they continuously used drugs because of their condition. The comparison of ATDP scores in accordance with the basic demographic characteristics of the students revealed no significant difference between attitudes toward persons with disabilities in accordance with sex, age, department, grade, and smoking and that the groups generally had similar attitudes. However, a statistically significant difference was found between the students' presence of chronic diseases and ATDP scores, and those without chronic diseases had more positive attitudes toward persons with disabilities than other students ($p < 0.05$) ($p = 0.002$, Table 1). Of the 176 (60.5%) students who responded that they provide health services to persons with disabilities, 11 (6.2%) stated that they encountered difficulties while providing services, 39 (22.2%) stated that they did not encounter any difficulties while providing services, and 126 (71.6%) stated that they sometimes had difficulties while providing services. In addition, 161 (55.3%) students stated that they had encountered hearing-impaired persons at least once during their clinical practice and provided services to these individuals. A total of 138 (85.7%) students who encountered hearing-impaired individuals stated that they attempted to help the individuals by trying to understand them, 14 (8.7%) were upset that they could not communicate with the hearing-impaired individual, and nine (5.6%) communicated eye to eye.

In our study, 23 (7.9%) of the students stated that they observed that the regulations for persons with disabilities were sufficient, 132 (45.4%) stated that the regulations were insufficient, and 136 (46.7%) did not have an opinion on this issue during their clinical practice. When the students who thought that the regulations for persons with disabilities were not sufficient were asked what the priority problem was for disabled individuals, 36 (27.3%) stated that "lack of personnel who could understand and guide person with disabilities and answer their question;" 30 (22.7%) stated "not showing sufficient respect, importance, interest, and sensitivity to disabled person;" 51 (38.6%) stated "lack of communication with the disabled person;" and 15 (11.4) expressed "lack of necessary physical arrangements to facilitate the lives of persons with disabilities."

The comparison of ATDP scores on the basis of some features related to the disability of students found no significant difference between ATDP scores in accordance with the presence of persons with disabilities in the family, working experience with persons with disabilities during clinical practice, providing health services to persons with disabilities, willingness to share a home with persons with disabilities, willingness to work with persons with disabilities, training on approaches toward persons with disabilities throughout their education, and knowing sign language. However, a statistically significant difference was identified between the disability-related education participation status and ATDP scores of the students, and the students without disability-related education had more positive attitudes toward persons with disabilities than other students ($p < 0.05$) ($p = 0.039$, Table 2).

The knowledge status of the students about the accommodations made for persons with disabilities in the hospital wherein they conduct clinical practice is shown in Table 3. The students had low rates of knowing about the following regulations made for persons with disabilities in the hospital wherein they conduct clinical practice: car parking places, disabled lifts, wheelchair ramps, grab bars, welcoming staff, and sign language staff. However, 50.5% of the students know that there are toilets for the use of disabled individuals and 41.6% of them know that it is a guidance sign for sight-disabled persons (Table 3). In addition, when the students were asked about their opinions on prioritizing persons with disabilities in the hospital wherein they conduct clinical practice, 39.5% stated that persons with disabilities were given adequate priority for diagnosis and treatment procedures, 22.3% stated that no priority was given, and 38.1% stated that they had no idea.

TABLE 1. Basic demographic characteristics of students and comparison of their ATDP scores in accordance with characteristics

Basic demographic characteristics	N	%	Mean ± SD	*p*
Gender				0.394
Female	219	75.3	61.40 ± 12.41	
Male	72	24.7	62.83 ± 12.13	
Age				0.188
17–21	258	88.7	61.41 ± 12.46	
22–26	33	11.3	64.42 ± 11.13	
Department				0.503
Medical documentation and secretarial	95	32.6	62.61 ± 14.40	
Emergency first aid	73	18.2	60.26 ± 11.46	
Medical laboratory	70	24.1	61.28 ± 11.82	
Medical imaging	53	25.1	62.90 ± 10.03	
Grade				0.843
First	163	56	61.88 ± 12.54	
Second	128	44	61.59 ± 12.12	
Smoking				0.157
Never smoker	232	79.7	61.09 ± 12.27	
Current smoker	42	14.4	65.02 ± 12.27	
Ex-smoker	17	5.8	62.70 ± 12.88	
Chronic disease				0.002*
Yes	25	8.6	54.36 ± 12.84	
No	266	91.4	62.45 ± 12.08	

*Independent samples t-test

TABLE 2. Features related to the disability of students and comparison of ATDP scores in accordance with these features

Features related to disability	N	%	Mean ± SD	*p*
Presence of a person with disabilities in the family				0.264
Yes	9	3.1	54.66 ± 18.16	
No	282	96.9	61.98 ± 12.09	
Working experience with a person with disabilities during clinical practice				0.694
Yes	43	14.8	61.06 ± 10.71	
No	248	85.2	61.87 ± 12.61	
Providing health services to persons with persons with disabilities				0.099
Yes	176	60.5	62.72 ± 11.62	
No	115	39.5	60.27 ± 13.28	
Willingness to share a home with persons with disabilities				0.091
Yes	179	61.5	60.78 ± 12.73	
No	112	38.5	63.30 ± 11.57	
Willingness to work with persons with disabilities				0.074
Yes	226	77.7	61.06 ± 12.30	
No	65	22.3	64.16 ± 12.25	
Participation in disability-related education				0.039*
Yes	23	7.9	56.65 ± 13.29	
No	268	92.1	62.19 ± 12.18	
Training on approaches toward persons with disabilities throughout their education				0.459
Yes	46	15.8	63.23 ± 15.17	
No	245	84.2	61.47 ± 11.75	
Knowing sign language				0.092
Yes	10	3.4	55.30 ± 8.92	
No	281	96.6	61.98 ± 12.39	

*Independent samples t-test

TABLE 3. Knowledge rates of students regarding the regulations for persons with disabilities in the hospital wherein they conduct clinical practice

Regulations for Persons with Disabilities	Yes N (%)	No N (%)	No idea N (%)
Disabled parking places	66 (22.7)	94 (32.3)	131 (45.0)
Disabled lifts	77 (26.5)	119 (40.9)	95 (32.6)
Wheelchair ramps	95 (32.6)	115 (39.5)	81 (27.8)
Grab bars	89 (30.6)	113 (38.8)	89 (30.6)
Welcoming and directing staff	54 (18.6)	135 (46.4)	102 (35.1)
Disabled toilets	147 (50.5)	72 (24.7)	72 (24.7)
Guidance signs for persons with visual disabilities	121 (41.6)	114 (39.2)	56 (19.2)
Sign language staff	12 (4.1)	154 (52.9)	125 (43.0)

TABLE 4. Comparison of students' willingness to share a home with persons with disabilities in accordance with demographic and disability-related features

Variable	Willingness to share a home with persons with disabilities		
	Yes N (%)	No N (%)	*p*
Gender			
Female	136 (62.1)	83 (37.9)	0.719
Male	43 (59.7)	29 (40.3)	
Age			
17–21	157 (60.9)	101 (39.1)	0.518
22–26	22 (66.7)	11 (33.3)	
Department			
Medical documentation and secretarial	67 (70.5)	28 (29.5)	
Emergency first aid	45 (61.6)	28 (38.4)	
Medical laboratory	44 (62.9)	26 (37.1)	0.014*
Medical imaging	23 (43.4)	30 (56.6)	
Grade			
First	97 (59.5)	66 (40.5)	0.428
Second	82 (64.1)	46 (35.9)	
Smoking			
Never smoker	143 (61.6)	89 (38.4)	0.930
Current smoker	25 (59.5)	17 (40.5)	
Ex-smoker	11 (64.7)	6 (35.3)	
Chronic disease			
Yes	18 (72.0)	7 (28.0)	0.260
No	161 (60.5)	105 (39.5)	
Presence of persons with disabilities in the family			
Yes	8 (88.9)	1 (11.1)	0.086
No	171 (60.6)	111 (39.4)	
Working experience with persons with disabilities during clinical practice			
Yes	32 (74.4)	11 (25.6)	
No	147 (59.3)	101 (40.7)	0.060
Total	179 (61.5)	112 (38.5)	

*$p < 0.05$

The knowledge status of the students about the accommodations made for persons with disabilities in the hospital wherein they conduct clinical practice is shown in Table 3. The students had low rates of knowing about the following regulations made for persons with disabilities in the hospital wherein they conduct clinical practice: car parking places, disabled lifts, wheelchair ramps, grab bars, welcoming staff, and sign language staff. However, 50.5% of the students know that there are toilets for the use of disabled individuals and 41.6% of them know that it is a guidance sign for sight-disabled persons (Table 3). In addition, when the students were asked about their opinions on prioritizing persons with disabilities in the hospital wherein they conduct clinical practice, 39.5% stated that persons with disabilities were given adequate priority for diagnosis and treatment procedures, 22.3% stated that no priority was given, and 38.1% stated that they had no idea.

The comparison of the students' willingness to share a home with a person with disabilities in accordance with several features is presented in Table 4, and the comparison of their opinions on prioritizing persons with disabilities in the hospital wherein they perform clinical practice in accordance with features is provided in Table 6. The comparison of the students' willingness to share a home with persons with disabilities in accordance with some features revealed no significant differences among gender, age, grade, smoking, chronic disease, presence of persons with disabilities in the family, working experience with persons with disabilities during clinical practice, and their thoughts of willingness to share a home with persons with disabilities. However, a statistically significant difference was found between the students' thoughts of willingness to share a home with persons with disabilities in accordance with their departments ($p < 0.05$) ($p = 0.014$, Table 4). Gender, age, department, grade, smoking, chronic disease, presence of persons with disabilities in the family, and working experience with persons with disabilities during clinical practice did not have a significant effect on thoughts about giving priority to persons with disabilities (Table 5).

DISCUSSION

Persons with disabilities are defined as those who have lost their physical, mental, spiritual, emotional, and social abilities to various degrees because of any congenital or acquired disease or accident and who do not comply with the requirements of normal life.[3] Persons with disabilities encounter numerous problems in their social life. One of the most important of these problems is experienced in the field of healthcare. This study was conducted to determine the attitudes of university students providing healthcare services toward persons with disabilities.

In our research, the average ATDP score, which was used to determine students' attitudes toward persons with disabilities, was 61.75 ± 12.34, and the Cronbach's alpha coefficient was 0.573. A study aiming to determine the attitudes of healthcare university students toward persons with disabilities by using ATDP reported a Cronbach's alpha coefficient for ATDP of 0.592 and stated that the scale had low reliability.[2] Our research is similar to Sahin and Bekir's study in terms of scale reliability.[2]

TABLE 5. Comparison of students' opinions on prioritizing persons with disabilities in the hospital wherein they conduct clinical practice in accordance with features

Variable	Giving priority to persons with disabilities			*p*
	Yes N (%)	No N (%)	No idea N (%)	
Gender				
Female	87 (39.7)	45 (20.5)	87 (39.7)	0.395
Male	28 (38.9)	20 (27.8)	24 (33.3)	
Age				
17–21	102 (39.5)	57 (22.1)	99 (38.4)	0.955
22–26	13 (39.4)	8 (24.2)	12 (36.4)	
Department				
Medical documentation and secretarial	42 (44.2)	18 (18.9)	35 (36.8)	
Emergency first aid	25 (34.2)	21 (28.8)	27 (37.0)	0.668
Medical laboratory	26 (37.1)	17 (24.3)	27 (38.6)	
Medical imaging	22 (41.5)	9 (17.0)	22 (41.5)	
Grade				
First	65 (39.9)	31 (19.0)	67 (41.1)	0.261
Second	50 (39.1)	34 (26.6)	44 (34.4)	
Smoking				
Never smoker	98 (42.2)	53 (22.8)	81 (34.9)	
Current smoker	12 (28.6)	11 (26.2)	19 (45.2)	0.065
Ex-smoker	5 (29.4)	1 (5.9)	11 (64.7)	
Chronic disease				
Yes	8 (32.0)	6 (24.0)	11 (44.0)	0.715
No	107 (40.2)	59 (22.2)	100 (37.6)	
Presence of persons with disabilities in the family				
Yes	5 (55.6)	2 (22.2)	2 (22.2)	0.543
No	110 (39.0)	63 (22.3)	109 (38.7)	
Working experience with persons with disabilities during clinical practice				
Yes	23 (53.5)	8 (18.6)	12 (27.9)	
No	92 (37.1)	57 (23.0)	99 (39.9)	0.123

However, on the contrary, there are studies that find the reliability coefficient of the scale higher and report that it is reliable.[9]

In our study, the average ATDP score shows that our students who provide health services have moderately positive attitudes and lack prejudiced attitudes toward persons with disabilities. The average ATDP scores of our study share similarities with those of several works investigating the attitudes of other healthcare students and employees toward persons with disabilities.[1,9–11] However, other studies investigating the attitudes of healthcare students toward persons with disabilities found low average ATDP scores,[2,12] whereas others found high average ATDP scores.[13,14] The literature has emphasized that important experiences are needed to form positive attitudes.[15,16] Another study that measured nursing students' attitudes toward persons with disabilities before and after using ATDP reported a considerable difference between the first and second scale scores; specifically, it found that students' attitudes changed positively.[17] The positive attitudes of healthcare professionals, a group that encounters the disabled frequently, will enable persons with disabilities to receive good health services. Studies investigating the effect of the sociodemographic characteristics of students and employees in other healthcare fields on ATDP scores concluded that age and sex did not have a remarkable effect on attitude scores.[1,9,12] These studies and our research demonstrate that sex and age do not affect attitudes toward persons with disabilities ($p < 0.05$) (Table 2). However, a statistically significant difference was observed between the disability-related education event participation status and ATDP scores of the students, and the students who did not participate in disability-related education events had positive attitudes toward persons with disabilities ($p < 0.05$, Table 3). Studies conducted in the healthcare field discovered no significant difference between the presence of a person with disabilities in the family and ATDP scores, as well as between participation in educational activities related to persons with disabilities or persons with disabilities and attitude scores.[1,2,10,12,13]

In our study, 3.1% of the students stated that their family includes a member with disabilities. A study investigating the attitudes of healthcare professionals toward persons with disabilities reported a rate of 4.1%, which is in line with our research results.[1] A work investigating the attitudes of students in the healthcare field toward persons with disabilities reported a rate of 22.2%.[13] The rate of students who stated that they desire to share a home with persons with disabilities was 61.5%, that of those who stated that they worked with a person with disabilities during their clinical practice at the hospital was 14.8%, and that of those who stated that they desire to work with persons with disabilities was 77.7%. In contrast to our work, a study investigating the attitude of healthcare professionals toward persons with disabilities reported that the rate of those who desire to share the same house with persons with disabilities was 30.5%, that of those who stated that they have a person with disabilities in their working environment was 3.6%, and that of those who stated that they desire to work with a person with disabilities was 36.4%.[1] The results of our research indicate that our students have few prejudices against persons with disabilities and can show sufficient empathy.

In our study, 3.4% of the students stated that they knew sign language, and 55.3% had encountered a hearing-impaired person at least once during clinical practice at the hospital. A total of 85.7% of the students who encountered a hearing-impaired person stated that they tried to help the individual by trying to understand them, 8.7% were upset that they could not communicate, and 5.6% communicated eye to eye. A study that determined the attitude of healthcare professionals toward hearing-impaired individuals found that all of the participants in the study did not know sign language, 75.5% had encountered a hearing-impaired individual at least once during their profession, and 47.4% were upset because they could not communicate with hearing-impaired individuals.[9] The similar results of our research and previous studies indicate that adding sign language education to educational curricula in the healthcare field may be beneficial.

Approximately 8.5 million patients with chronic diseases and persons with disability live in Turkey, and these individuals face many problems in their social life due to numerous obstacles and inappropriate regulations that restrict their mobility in their environment. One of the most important problems is that the environment, especially the health environment, is not equipped in accordance with their needs. Therefore, persons with disabilities cannot sufficiently benefit from health services. The level of the arrangements made for the disabled persons in the hospitals they apply to for the disabled individuals to benefit from the health services in the best way is of great importance.[1] The students in our research answered "no" or "no idea" to most of the questions about practices and physical accommodations for persons with disabilities in the hospital wherein they conducted clinical practice (Table 4). On the basis of these results, we conclude that our students have a low awareness of the regulations made for persons with disabilities in the hospital wherein they conduct clinical practice. In line with the results of our study regarding regulations for persons with disabilities, a previous work investigating the attitudes of healthcare professionals toward persons with disabilities found that employees have a low level of awareness.[1] A total of 39.5% of the students in our study stated that persons with disabilities were given sufficient priority in diagnosis and treatment procedures. In contrast to our work, a study investigating the attitudes of healthcare professionals toward persons

with disabilities found a considerable difference between the participants' opinions on giving priority to persons with disabilities in the hospital they work in and gender and age.[1] In our study, the comparison of students' willingness to share a home with a disabled person according to their characteristics indicates that although there is a statistically significant difference between the students' thoughts of willingness to share a home with a disabled person and the departments they study.

Other studies in the literature aiming to determine the attitude toward persons with disabilities used a different scale (Questionnaire of Attitudes toward Disability). They reported that university students in the healthcare field have positive attitudes toward persons with disabilities.[3,18,19] A work investigating the importance of early contact with persons with disabilities for the attitude of two different groups of university students in the field of health concluded that the group with close contact with persons with disabilities gained additional preliminary information about attitude.[20] A study that evaluated the perspective and disability awareness of university students studying in health and non-health departments with their own questionnaire questions without using a scale concluded that the disability awareness of the departments was insufficient, and their answers were similar.[21]

This study has some limitations. Firstly, the findings obtained from this study cannot be generalized to all providing health services in a university hospital in only one province. The second limitation is university students and all hospitals in our country; since our sample group consisted of university students the majority of our sample was female. Another limitation is that the insufficient number of students with persons with disabilities in their families made statistical comparison and interpretation difficult. Future researchers may use larger sample sizes and different methodologies to investigate this issue further.

CONCLUSIONS

All employees serving in the healthcare field are expected to provide the highest and equal level of healthcare to individuals who constitute society without any discrimination. People with disabilities should be able to benefit from health services as easily as non-disabled individuals, and they should be ensured to benefit from health services without any problems from the moment they enter a health institution. Therefore, determining the attitudes and awareness of disabilities of a group of university students providing healthcare makes our study different from other similar studies. Disability-related regulations should be introduced to educational curricula, and additional awareness-raising activities should be included to ensure that healthcare students' attitudes toward persons with disabilities improve.

CONFLICT OF INTEREST

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

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Obesity, Overweight Rates, and Related Factors Among Adults in the Rustic Realm of Western India

Monika Patel
Department of Community Medicine, Shri M.P Shah Government Medical College, Jamnagar 361008, India, mpatel0129@gmail.com

Jimmy Kagathara
Department of Community Medicine, Shri M.P Shah Government Medical College, Jamnagar 361008, India, drjimmy2407@gmail.com

Eshwar Kumar Gupta
Department of Community Medicine, Shri M.P Shah Government Medical College, Jamnagar 361008, India, eshwargupta61@gmail.com

Nancy Kagathara
Department of Medicine, Zydus Medical College and Hospital, Dahod 389151, India, drnency22@gmail.com

Jitesh Mehta
Department of Community Medicine, Shri M.P Shah Government Medical College, Jamnagar 361008, India, drjpmehta@gmail.com

See next page for additional authors

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Authors

Monika Patel, Jimmy Kagathara, Eshwar Kumar Gupta, Nancy Kagathara, Jitesh Mehta, and Dipesh Parmar

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Obesity, Overweight Rates, and Related Factors Among Adults in the Rustic Realm of Western India

Monika Patel[1*], Jimmy Kagathara[1], Eshwar Kumar Gupta[1], Nency Kagathara[2], Jitesh Mehta[1], Dipesh Parmar[1]

[1]Department of Community Medicine, Shri M.P Shah Government Medical College, Jamnagar 361008, India
[2]Department of Medicine, Zydus Medical College and Hospital, Dahod 389151, India

Abstract

Background: Obesity and overweight pose significant challenges in developing countries, underscoring the need for evidence-based prevention strategies. This study focuses on assessing the prevalence and associated factors of overweight and obesity in the rural areas of Jamnagar district, Gujarat, India.

Methods: Data collection encompassed six tehsils within Jamnagar district, with primary health center selection via simple random sampling. Individual selection employed the consecutive sampling approach. Statistical analysis was conducted using SPSS software. Regression analysis was employed to identify the independent factors linked to overweight and obesity.

Results: The analysis included 408 participants, revealing a higher obesity prevalence among men (20.8% vs 13.5%). Strong evidence suggests that married and physically inactive individuals have 2.8 times higher odds of being overweight or obese. After thorough adjustments, homemakers and physically inactive individuals had 5.9-fold higher odds.

Conclusions: The study findings illuminate a pronounced prevalence of overweight and obesity among adults in the study area, signifying an emerging issue that necessitates prompt attention.

Keywords: adults, India, noncommunicable diseases, obesity, overweight

INTRODUCTION

In the swiftly evolving global landscape of health, the disease spectrum is undergoing a dramatic transformation, seizing the attention of medical experts and policymakers worldwide. This transformation is pronounced in low- and middle-income countries. At the forefront of this paradigm shift are the widespread epidemics of obesity and other non-communicable diseases. Obesity alone contributes to 2.6 million annual deaths worldwide, solidifying its status as one of the most critical public health challenges.[1] This obesity epidemic serves as the vanguard of a cluster of noncommunicable diseases known as the new world syndrome, casting an immense socioeconomic and public health burden on regions with limited resources.[2]

Rooted in causes such as sedentary lifestyles, unhealthy dietary habits, genetic predisposition, and behavioral elements such as tobacco use, alcohol consumption, and stress, obesity is a key instigator of severe health conditions, including the ominous metabolic syndrome. This syndrome includes disorders such as obesity, hypertension, glucose intolerance, and dyslipidemia.[3] Shockingly, by 2014, nearly 39% of adults globally were classified as overweight (body mass index [BMI] 25.0–29.9 kg/m^2) or obese (BMI > 29.9 kg/m^2), marking a twofold surge since 1975.[4] Drawing from the National Family Health Survey (NFHS-5) data, India also reflects a disconcerting trend, with a combined prevalence of overweight and obesity reaching 24% in women aged 15–54 years and 23.7% in men of the same age group. These figures indicate a worrisome increase of at least 3% in women and 4% in men.[5]

Even within the rural confines of India, living conditions have witnessed substantial improvements across transportation, dietary choices, and education levels. Increased household income, coupled with easy access to urban areas and television, has led to inadvertent lifestyle shifts. These factors collectively drive a significant increase in BMI for both sexes.[6] With these dynamics in play, this study was meticulously conducted to unveil the prevalence of obesity and its associated determinants among adults inhabiting the rural expanse of Jamnagar.

METHODS

Before the study was started, an ethical approval letter (Project No. 125/05/02/2021) was obtained from the Institutional Ethics Committee.

This cross-sectional community-based study enrolled men and women aged 20–60 years residing in the study area. The study was conducted in the rural area of the

***Corresponding author:**
Monika Patel
Department of Community Medicine, Shri M.P Shah Government Medical College, Jamnagar, India
E-mail: mpatel0129@gmail.com

Jamnagar district of Gujarat state between May 2022 and July 2022. The sample size was calculated by using the following formula for a single proportion: $n = Z^2 p (1 - p) / L^2$. Considering the prevalence of overweight + obesity (p) as 20% from the NFHS-5 data for Gujarat, the final sample size was obtained for 95% confidence interval (CI) with an absolute error of 4% and a nonresponse rate of 5%, which is 403.[5]

Regarding the population criteria, all individuals aged 20–60 years and those who provided informed consent were considered, whereas all individuals aged <20 and >60 years of age, antenatal women, and persons having severe morbidity or disability were not considered in the study.

This study aimed to assess the prevalence of overweight and obesity among adults in a rural Indian community. The objectives of this study include determining the overall occurrence of these conditions, identifying demographic and lifestyle associations, examining the role of education, and contributing insights for targeted interventions.

The district encompasses six distinct tehsils or talukas. Employing a systematic approach, one primary health center (PHC) was selected from each hospital by simple random sampling. The following PHCs were earmarked for comprehensive examination: Latipur PHC within the Dhrol tehsil/taluka, Dhrafa PHC in Jamjodhpur tehsil/taluka, Dared PHC within Jamnagar district, Hadiyana PHC in the Jodiya tehsil/taluka, Mota Vadala PHC in the Kalavad tehsil/taluka, and Padana PHC within the Lalpur tehsil/taluka.

The overall sample size (N = 403) was judiciously distributed among these PHCs, resulting in an equitable allocation of 68 study participants from each PHC. Consequently, the cumulative sample size was 408 participants. The consecutive sampling approach was adopted for participant selection. In accordance with this strategy, the initial 68 individuals attending the outpatient department (OPD) and satisfying the stipulated criteria were consecutively enlisted as study participants.

The process was meticulously executed within the operational hours of the PHCs and was overseen by proficient female health workers trained for this purpose. To ensure precision and uniformity, a predesigned and pretested semistructured questionnaire was deployed as the primary tool for data acquisition. This questionnaire was meticulously curated based on a review of relevant literature, supplemented by insights gleaned from a pilot study involving 40 participants, which was approximately 10% of the target study population. Following this pilot phase, necessary refinements were incorporated to fine-tune the questionnaire, culminating in the development of the definitive version employed for data collection.

For anthropometric measurements, height was meticulously recorded using a standardized measuring tape affixed to the wall, following predefined markings. Participants' posture was adjusted to ensure that their heels, calf muscles, buttocks, shoulder blades in the back, and occiput contacted the wall. This procedure ensured accurate measurement, with the results rounded to the nearest centimeter. Similarly, weight measurements were performed using a calibrated electronic weighing machine adhering to standardized protocols. Then, weight measurements were rounded off to the nearest 100 g, preserving precision in the data collection process. BMI was calculated using the formula weight (in kg) / height (in m^2).[7] The Asian Classification of BMI was used. BMI less than 16.5 kg/m^2 was categorized as severely underweight, with BMI of 16.5–18.5 kg/m^2 for underweight, 18.5–23 kg/m^2 for normal, 23–24.99 kg/m^2 for overweight/pre-obese, and BMI more than 25 kg/m^2 for obesity.[8]

The Chi-square test was used to determine the association between sociodemographic profile and obesity. Univariate logistic regression was applied for various factors associated with overweight or obesity. A multivariable logistic regression model was used to adjust for various associated factors.

RESULTS

The study population comprised 408 individuals. Predominant demographic characteristics featured a male majority (53.9%), with marital status predominantly being married (77.0%). A significant portion of the participants were engaged in occupational roles (29.6%), and a noteworthy segment held college-level education (31.2%), as detailed in Table 1. These participants were 20–59 years old, with an average age of 37.31 years (standard deviation = 11.8 years).

Furthermore, a distinctive observation surfaced concerning the BMI of the participants. Specifically, men exhibited a higher adiposity measure in terms of BMI than their female counterparts. This divergence in BMI was quantified as a mean of 24.39 ± 3.50 kg/m^2 for men compared with 23.85 ± 3.5 kg/m^2 for women.

As shown in Table 2, the prevalence of overweight was higher among women than among men (overweight = 13.5% vs 11%), and obesity was higher in men than in women (20.8% vs 13.5%). Married participants had a higher prevalence of overweight and obesity than single participants (overweight, 20.1% vs 4.4%; obesity, 29.7% vs 4.7%).

Table 3 shows the factors associated with overweight or obesity on univariate logistic regression analysis. Married and physically inactive participants demonstrated 2.8 times higher odds of being overweight or obese (odds ratio [OR] 2.817; 95% CI, 1.754–4.526), and 1.55 times higher odds

were observed for physically inactive individuals (OR, 1.55; 95% CI, 1.042–2.305) compared with their respective counterparts. Occupational factors also played a role, with homemakers exhibiting 10-fold higher odds of being overweight or obese than their counterparts (OR, 10.303; 95% CI, 3.94–26.902). In addition, 40% had lower odds of being overweight or obese among current smokers than nonsmokers (OR, 0.608; 95% CI, 0.392–0.942).

The final multivariate logistic regression model was adjusted for age, marital status, employment status, caste, smoking status, alcohol consumption status, and physical activity. After full adjustments, data showed that homemakers and participants who were physically inactive had 5.9-fold (adjusted OR [aOR], 5.929; 95% CI, 1.91–18.32) and 2.34-fold (aOR, 2.34; 95% CI, 1.446–3.786) higher odds of being overweight or obese than their counterparts. Data showed 80% lower odds of being overweight or obese among people age <30 (aOR, 0.203; 95% CI, 0.097–0.424)

The multiple regression model had a Hosmer–Lemeshow test that was nonsignificant, indicating a good model fit ($\chi 2 = 1.987$, $p = 0.981$).

DISCUSSION

The nutrition transition in the rural West Indian district has resulted in a growing burden of overweight and obesity, in addition to a persistent burden of being underweight in approximately one-third of the adult population. The transition is still in the early stages: even with the application of the Asian-specific cutoff point of BMI 23 kg/m^2, the prevalence of overweight in this population was relatively high, with a mean BMI of 24.14 kg/m^2.

TABLE 1. Characteristics of the study population

Variable	Total	Male N (%)	Female N (%)
Age			
<30	259	142 (34.8)	117 (28.7)
>30	149	78 (19.1)	71 (17.4)
Mean age = 37.31 years, SD = 11.8 years			
Religion			
Hindu	380	206 (50.5)	174 (42.6)
Others	28	14 (3.4)	14 (3.4)
Native of Gujarat			
Yes	353	181 (44.4)	172 (42.0)
No	55	39 (9.6)	16 (4.0)
BMI			
Normal	168	90 (22.1)	78 (19.1)
Overweight	100	45 (11.0)	55 (13.5)
Obese	140	85 (20.8)	55 (13.5)
Marital status			
Single	94	49 (12.0)	45 (11.0)
Married	314	171 (42.0)	143 (35.0)
Education status			
Uneducated	24	10 (2.4)	14 (3.4)
Secondary school	257	125 (30.6)	132 (32.4)
Graduate/postgraduate	127	85 (20.8)	42 (10.4)
Employment status			
Employed (job/business)	121	105 (25.7)	16 (3.9)
Farmer	111	77 (18.9)	34 (8.3)
Student	35	18 (4.4)	17 (4.2)
Homemaker	119	2 (0.05)	117 (28.7)
Retired	22	18 (4.4)	4 (0.1)
Current smoker			
Yes	127	123 (30.2)	4 (0.1)
No	281	97 (23.8)	184 (45.9)
Current alcohol consumption			
Yes	63	59 (14.5)	4 (0.1)
No	345	161 (39.5)	184 (45.9)
Physical activity			
Yes	207	101 (24.8)	106 (26.0)
No	201	119 (29.2)	82 (20.0)

TABLE 2. Prevalence of adiposity among sociodemographic groups

Variable	Normal (N = 168) N (%)	Overweight (N = 100) N (%)	Obese (N = 140) N (%)	*p*
Overall crude prevalence (%)	41.17	24.5	34.31	
Gender				0.055
Male	90 (22.1)	45 (11.0)	85 (20.8)	
Female	78 (19.1)	55 (13.5)	55 (13.5)	
Religion				0.074
Hindu	162 (39.7)	92 (22.5)	126 (30.9)	
Others	6 (1.5)	8 (2.0)	14 (3.4)	
Native of Gujarat				0.386
Yes	141 (34.6)	87 (21.3)	125 (30.6)	
No	27 (6.6)	13 (3.2)	15 (3.7)	
Marital status				0.000
Single	57 (14.0)	18 (4.4)	19 (4.7)	
Married	111 (27.2)	82 (20.1)	121 (29.7)	
Education status				0.776
Uneducated	10 (2.5)	6 (1.5)	8 (2.0)	
Secondary school	111 (27.2)	63 (15.4)	83 (20.3)	
Graduate/postgraduate	47 (11.5)	31 (7.6)	49 (12.0)	
Employment status				0.000
Employed (job/business)	41 (10.0)	29 (7.1)	51 (12.5)	
Agriculture	52 (12.7)	27 (6.6)	32 (7.8)	
Student	29 (7.1)	2 (0.5)	4 (1.0)	
Homemaker	38 (9.3)	36 (8.8)	45 (11.0)	
Retired	8 (2.0)	6 (1.5)	8 (2.0)	
Current tobacco usage				0.009
Yes	42 (10.3)	28 (6.9)	57 (14.0)	
No	126 (30.9)	72 (17.6)	83 (20.3)	
Current alcohol consumption				0.027
Yes	17 (4.2)	22 (5.4)	24 (5.9)	
No	151 (37)	78 (19.1)	116 (28.4)	
Physical activity				0.044
Yes	96 (23.5)	51 (12.5)	60 (14.7)	
No	72 (17.6)	49 (12.0)	80 (19.6)	

TABLE 3. Factors associated with overweight and obesity on univariate logistic regression analysis

Variables	Number of cases (N = 240)	OR (95% CI)	*p*
Age <30 (ref: age >30)	56	0.245 (0.160–0.376)	0.000*
Female (ref: male)	110	0.976 (0.657–1.457)	0.906
Level of education (ref: uneducated)			
Graduation	148	1.216 (0.500–2.940)	0.666
Occupation (ref: student/retired)			
Homemaker	81	10.303 (3.94–26.902)	0.000*
Office worker	80	9.430 (3.625–24.534)	0.000*
Married (ref: single)	203	2.817 (1.754–4.526)	0.000*
Other caste (ref: Hindu)	218	0.367 (0.145–0.926)	0.034*
Native Gujarati (ref: migrated)	212	1.450 (0.820–2.564)	0.201
Nonsmoker (ref: smoker)	155	0.608 (0.392–0.942)	0.026*
Nonalcoholic (ref: alcoholic)	194	0.475 (0.262–0.861)	0.014*
Not physically active (ref: physically active)	129	1.550 (1.042–2.305)	0.031*

*Included in the multivariate logistic regression analysis. CI, confidence interval; OR, odds ratio; Ref, reference category

Adiposity is a well-known risk factor for cardiovascular disease, type 2 diabetes mellitus, and cancer.[9–11] Delving into the context of our community-based investigation, a striking revelation emerges: approximately three out of every five participants bear the imprint of either overweight or obese. A slew of factors have been identified as influential determinants of this phenomenon.

The influence of sex, marital status, and occupational roles were noteworthy determinants of this burgeoning issue.

Being male, along with being married and engaged in an office-based occupation or a homemaker, correlated with a higher likelihood of being overweight or obese. This suggests the potential influence of occupational factors and lifestyle choices on adiposity. A countervailing pattern emerged among current smokers who displayed a diminished likelihood of experiencing these conditions when juxtaposed with their nonsmoker counterparts. In addition, a nuanced relationship with age emerged, where participants aged <30 years displayed a lower propensity for being overweight or obese, suggesting that younger age may be a protective factor against adiposity, particularly when coupled with regular engagement in physical activities.

In this study, obesity had an incidence of 34.31%, and 24.5% of the participants were identified as overweight. A comparative analysis by Karmakar *et al*., conducted among adults in rural Bengal, revealed noteworthy differences. In their study, 22.4% of individuals were categorized as overweight, whereas 30.4% fell into the obese category. These variations in incidence rates could be indicative of regional differences or distinct factors influencing weight status among adult rural populations in different parts of India. In this study, the incidence rates of obesity and overweight were 34.31% and 24.5%, respectively, which is about sixfold higher than that reported by Sobngwi *et al*. 2002 in rural western Cameroon.[12] The incidence of overweight and obesity reported in this study was also higher than the rates of 20.9% and 8.4%, respectively, reported by Adebayo *et al*. 2014 in a Nigerian adult rural population[13] and of 19.9% and 8.6%, respectively, reported recently in an Ethiopian urban setting.[14] A possible reason for the observed disparity in obesity rates could be that Gujrat is a developed state in India; thus, its population may have a more sedentary lifestyle and better living conditions. This hypothesis aligns with existing research, as developed regions often face unique lifestyle-related challenges, such as increased sedentary behavior and access to energy-dense foods.

However, the prevalence of overweight and obesity in our study was lower than that in the adult population reported in previous studies.[16,17] We observed an overall tendency toward normal weight in our study population (mean BMI, 24.14 kg/m^2), which is higher than that reported by Simo *et al*. (mean BMI, 22.77 kg/m^2).[18] One possible reason for this disparity could be attributed to various factors, including differences in lifestyle, dietary habits, genetic predisposition, and environmental influences across these diverse geographic and cultural settings.

After adjusting for other factors, age <30 years, being a homemaker or an office worker, being married, belonging to a caste other than Hindu, being a nonsmoker, being a nonalcoholic, and being physically inactive remained significantly associated with overweight or obesity. These findings emphasize the multifactorial nature of adiposity, with lifestyle, sociocultural, and behavioral factors playing pivotal roles.

This study showed that the incidence of overweight and obesity was the highest among those who were educated up to secondary school (35.7%), followed by graduates and postgraduates (19.6%). However, a previous study showed that the prevalence was higher among those who were educated up to primary school (11.5%) than those who were educated up to secondary school (6.5%) and higher secondary school (1.2%).[19]

In this study, Gujarati participants showed a significantly higher tendency to be overweight or obese, which is seen as a sign of being well-fed and consuming energy-dense traditional meals by the people of Gujarat.

The associations between married status and obesity or overweight have been documented in a previous study.[20] Marriage confers a greater sense of security than being single, which may explain this association since married people no longer worry about finding a partner, and married couples tend to spend more time together, thus eating more regular and energy-dense foods.[21]

In summary, this study not only uncovers the ongoing nutritional shift in the rural landscape of Western India but also underscores the pressing need to comprehend and address the multifaceted factors driving this transition. The implications for public health, particularly given the association with a constellation of serious medical conditions, demand proactive interventions tailored to the unique attributes of this demographic.

CONCLUSIONS

The current findings indicate that the prevalent issue of overweight and obesity in Jamnagar (Gujarat), an Indian community, affects a significant proportion of the population. The identified factors, such as sex, marital status, occupation, physical activity, and education, underscore the multifaceted nature of this health concern. Addressing these factors through targeted interventions is imperative to mitigate the growing burden of overweight and obesity in this population.

CONFLICT OF INTEREST

No conflicts are declared.

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Attitudes Toward Caring for Older Adults among Undergraduate Nursing Students at a Public University in Kuala Lumpur, Malaysia

Azera Hasra Ismail
Department of Nursing, Faculty of Medicine, Universiti Kebangsaan Malaysia, Cheras 56000, Malaysia, azera@ppukm.ukm.edu.my

Siti Zuhaida Hussein
Department of Nursing, Faculty of Medicine, Universiti Kebangsaan Malaysia, Cheras 56000, Malaysia, zuhaida_hussein@ukm.edu.my

Aslina Mohamed Yasi
Department of Nursing, Faculty of Medicine, Universiti Kebangsaan Malaysia, Cheras 56000, Malaysia, aslina@ppukm.ukm.edu.my

Nurul Izzati Ishak
Department of Nursing, Faculty of Medicine, Universiti Kebangsaan Malaysia, Cheras 56000, Malaysia, a175567@siswa.ukm.edu.my

Nurul Nazira Mohd Yazar
Department of Nursing, Faculty of Medicine, Universiti Kebangsaan Malaysia, Cheras 56000, Malaysia, a176414@siswa.ukm.edu.my

See next page for additional authors

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Authors

Azera Hasra Ismail, Siti Zuhaida Hussein, Aslina Mohamed Yasi, Nurul Izzati Ishak, Nurul Nazira Mohd Yazar, and Nur Syafiqah Sabri

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Attitudes Toward Caring for Older Adults among Undergraduate Nursing Students at a Public University in Kuala Lumpur, Malaysia

Azera Hasra Ismail, Siti Zuhaida Hussein*, Aslina Mohamed Yasin, Nurul Izzati Ishak, Nurul Nazira Mohd Yazar, Nur Syafiqah Sabri

Department of Nursing, Faculty of Medicine, Universiti Kebangsaan Malaysia, Cheras 56000, Malaysia

Abstract

Background: The growing number of elderly members of the population is expected to increase the demand for more dedicated nursing students committed to providing excellent care. This study aims to determine prevailing attitudes toward the care of older adults among undergraduate nursing students at a public university in Kuala Lumpur, Malaysia.

Methods: This is a quantitative cross-sectional survey of 107 undergraduate nursing students enrolled at a public university in Kuala Lumpur, Malaysia. The students were recruited using stratified random sampling. The respondents' attitudes toward caring for older adults were measured using 14 items from the Geriatrics Attitudes Scale Survey Questionnaire. Data were analyzed using IBM® SPSS® Statistic V.26.0, in which $p < 0.05$ was statistically significant.

Results: The mean total score of attitudes was 46.64 (SD = 4.87), and 88.2% of respondents had a positive attitude. A significant relationship was observed between attitudes toward caring for older adults and years of study ($p = 0.015$, U = 10.416).

Conclusions: The majority of undergraduate students had positive attitudes toward caring for older adults. Early clinical practice and geriatric education are needed to ensure that older adults will receive the best and most efficient care and treatment in the future.

Keywords: attitude, caring, nursing student, older adults, undergraduate

INTRODUCTION

The demographic transition of the population based on age is expected to continue to change should the current decline in fertility rates persist, along with the increase in human life expectancy. Projections made by the World Health Organization indicate that, globally, there will be close to 2 billion people aged 60 years and up by the year 2050.[1] Meanwhile, the Department of Statistics - Malaysia estimates that the country will become an aging country by 2030 when 15% of its population will be 60 years old and above.[2] Given that older adults comprise Malaysia's most significant demographic, improving their quality of life is crucial, because they are especially vulnerable to the effects of aging[3] and chronic diseases.[4] The quantity of daycare facilities and nursing homes in Malaysia is inadequate, resulting in a quality of care for old people that is considered "very poor."[5] As people age, their physical strength, mental health, and behavioral patterns change and may eventually become quite unstable, leading those around them to view them as a burden and liability. This is where most people need additional help to survive and flourish. Hence, one of a nurse's responsibilities is to ensure that these conveniences are available to older adults.

Good nursing care can make a huge difference in the quality of life for seniors.[6] The cornerstone of authentic nursing care and intervention is good nursing knowledge and a positive mindset.[7] Nurses' attitudes toward providing care for older patients have significantly impacted patient outcomes, including decreased rates of readmission and shorter lengths of stays in hospitals.[8,9] Indeed, satisfaction levels increased among patients, their families, and caregivers.[8] Nurses' perspectives on aging and their knowledge of the aging process can affect nursing practice and the quality of care provided to older patients.[10,11] Nursing students need considerable information and experience to meet the healthcare needs of older adult patients. Given the significance of this subject, numerous international studies on students' knowledge and attitudes regarding elder care have been conducted.[12–20]

Previous studies have reported positive attitudes toward caring for older adults among nursing students.[14,21,22] Similarly, nursing students in Malaysia have a positive attitude toward caring for older adults.[13,15,23,24] In particular, studies have revealed that female students care more for older adults than male students. Furthermore, having close relationships with grandparents[25,26] or living with

***Corresponding author:**
Siti Zuhaida Hussein
Department of Nursing, Faculty of Medicine, Universiti Kebangsaan Malaysia, Cheras, Malaysia
E-mail: zuhaida_hussein@ukm.edu.my

them might impact how nursing students approach caring for older patients.[27] Previous study revealed that an amazing 87.1% of respondents living with older adults at home had good attitudes toward providing care for older adults.[23] On the contrary, previous study in Ghana discovered that living with older adults did not statistically influence attitudes toward older adults.[28]

The most concerning tendency in contemporary nursing education is that, despite having solid background information, most students still retain pessimistic attitudes about their potential interactions with older adults.[7,17,29] For example, previous research has demonstrated that nursing students have negative attitudes and are less motivated to provide care for older adults.[6,8,9,16] This negative attitude can impede the development of a productive therapeutic relationship between nurses and older adults. In reality, these nurses' unfavorable attitudes diminish older adults' quality of life and exacerbate their health difficulties by increasing the likelihood of hopelessness, low self-esteem, depression, and even suicidal ideation.[30]

In a previous review, complicated and contradictory attitudes toward care for elderly individuals were identified.[8] Inconsistent findings have been found regarding knowledge and attitudes toward the care of older adults, particularly among nursing students in Malaysia. Therefore, the present study was conducted to determine prevailing attitudes toward the care of older adults among undergraduate nursing students at a public university in Kuala Lumpur, Malaysia. Assessing nursing students' attitudes toward caring for older adults is important in improving the quality of care that they can provide.

METHODS

The Research Ethics Committee approved the study before it was carried out (Project Code: FF-2023-052). Every participant in the study provided prior written consent. Furthermore, the ethical values of autonomy, beneficence, confidentiality, and anonymity were considered so that this research study safeguarded the participants' rights.

This study is a quantitative cross-sectional survey to determine attitudes toward caring for older adults among 107 undergraduate nursing students enrolled at a public university in Kuala Lumpur, Malaysia. We opted for this design as it offered insights into every approach employed to acquire a deeper understanding of the subjects' attitudes toward older adults.[31] In this research, the study population consisted of nursing students enrolled in a bachelor's program. To recruit the participants, we used stratified random sampling after compiling a student list. We separated the population into different strata in which the sample size for each stratum was proportional to the measurement of the study program, which we randomly selected following the stratum sample size. Indeed, stratified random sampling eliminated selection bias and helped create a sample that represented all population members enrolled in undergraduate nursing programs.[31]

The demographic data questions consisted of gender, year of study, whether their grandparents were alive, and relationship with grandparents. The latter item was defined as whether or not the participants had good connections with their grandparents.

We measured the students' attitudes toward caring for older adults using 14 items from the Geriatrics Attitudes Scale (GAS) Survey Questionnaire developed by Reuben *et al*. The instrument exhibited strong validity, as indicated by a Cronbach's alpha coefficient of 0.76. This instrument is a 5-point Likert scale with options ranging from "strongly disagree" (1) to "strongly agree" (5).[32] To calculate the total attitude score, the scores on the negatively formulated statements were inverted and then combined with the scores from the positively formulated statements. In addition, a total score was obtained by summing up the points for each of the 14 items in the survey. A mean cutoff score of 2.00 was used to compute the total scores. A higher total score indicated positive attitudes toward caring for older people, whereas a lower score indicated negative attitudes toward caring for older adults. Furthermore, the validity of this instrument was checked again as in a previous study where they were applied to populations and settings that were different from those of the current study. The study instrument was validated by experts in the English language and a geriatric specialist to assess the tool's face validity. Then, a pilot study was conducted to determine the internal consistency reliability using Cronbach's alpha. In this research, the Cronbach's alpha value was 0.861 for all items.

Data collection commenced in April and May of 2023 among nursing students in their first through fourth years of study. The researchers approached each nursing student and identified individuals who met the study's inclusion and exclusion criteria. The researchers supplied participants with a study information sheet to review. Upon expressing agreement to take part in the study, the respondents were provided with a link to a Google Forms survey sheet. The researchers collected the filled-out questionnaires through online records. Those respondents who still needed to complete the questionnaire were requested to do so again. Upon completion, the data were encrypted and stored on the researchers' computers.

Data were analyzed by using IBM® SPSS® Statistic V.26.0 and $p < 0.05$ was set as statistically significant. Descriptive and inferential analyses were conducted in this study. Furthermore, we employed descriptive methods, such as calculating the mean, standard deviation, and determining frequencies and percentages. To carry out inferential analyses, non-parametric tests were chosen due to the

absence of a normal data distribution. Specifically, the Mann–Whitney U test and the Kruskal–Wallis H test were used in the statistical tests. Whenever the Kruskal–Wallis test yielded significant results, a post hoc test was applied. All findings were then organized and presented in tabular form for clear presentation.

RESULTS

Sociodemographic characteristics

This study gathered 126 respondents (100%), whose sociodemographic characteristics were tabulated in Table 1. The results indicated that most respondents were female (86%), had positive relationships with their grandparents (95.3%), and had living grandparents.

The geriatrics attitudes scale

In this study, the outcome of the GAS was tabulated in Table 2. The results revealed that a higher percentage of the respondents strongly agreed with the statements, "It is society's responsibility to provide care for its elderly persons" (45.8%) and "It is interesting listening to old people's accounts of their past experiences" (59.8%). Out of 107 respondents, 36.4% strongly disagreed with the statement, "Treatment of chronically ill old patients is hopeless," and 45.8% somewhat disagreed with the statement, "Old persons do not contribute their fair share toward paying for their healthcare."

Attitudes toward caring for older adults

Table 1 also shows the findings regarding the levels of attitude toward caring for older adults among nursing students in the Medical Faculty of UKM. The mean total score of attitudes was 46.64 (SD = 4.87) (Min 34; Max 59). When the attitude level was categorized into two groups, positive and negative, the findings showed that most respondents (88.2%) held positive attitudes.

TABLE 1. Sociodemographic data (N = 107)

Variables	N (%)
Gender	
Male	15 (14.0)
Female	92 (86.0)
Year of study	
Year 1	37 (34.6)
Year 2	29 (27.1)
Year 3	20 (18.7)
Year 4	21 (19.6)
Living grandparents	
Yes	61 (57.0)
No	46 (43.0)
Relationship with grandparents	
Good	102 (95.3)
Bad	5 (4.7)
Attitude level	
Positive	88 (88.2%)
Negative	19 (17.8%)

TABLE 2. Response to the geriatrics attitudes scale (N = 107)

Items	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
	N (%)	N (%)	N (%)	N (%)	N (%)
Most old people are pleasant to be with.	2 (1.9)	4 (3.7)	34 (31.8)	52 (48.6)	15 (14.0)
The federal government should reallocate money from Medicare to research on AIDS or pediatric diseases.	0 (0)	2 (1.9)	19 (17.8)	53 (49.5)	33 (30.8)
If I have the choice, I would rather see younger patients than elderly ones.	3 (2.8)	16 (15.0)	53 (49.5)	25 (23.4)	10 (9.3)
It is society's responsibility to provide care for its elderly persons.	0 (0)	1 (0.9)	11 (10.3)	46 (43.0)	49 (45.8)
Medical care for old people uses up too much human and material resources.	8 (7.5)	28 (26.2)	32 (29.9)	30 (28.0)	9 (8.4)
As people grow older, they become less organized and more confused.	2 (1.9)	5 (4.7)	17 (15.9)	49 (45.8)	34 (31.8)
Elderly patients tend to be more appreciative of the medical care I provide than are younger patients.	1 (0.9)	7 (6.5)	33 (30.8)	33 (30.8)	33 (30.8)
Taking a medical history from elderly patients is frequently an ordeal.	4 (3.7)	8 (7.5)	33 (30.8)	46 (43.0)	16 (15.0)
I tend to pay more attention and have more sympathy toward my elderly patients than my younger patients.	3 (2.8)	4 (3.7)	27 (25.2)	44 (41.1)	29 (27.1)
Old people in general do not contribute much to society.	17 (15.9)	42 (39.3)	36 (33.6)	10 (9.3)	2 (1.9)
Treatment of chronically ill old patients is hopeless.	39 (36.4)	43 (40.2)	11 (10.3)	12 (11.2)	2 (1.9)
Old persons don't contribute their fair share toward paying for their healthcare.	17 (15.9)	49 (45.8)	29 (27.1)	10 (9.3)	2 (1.9)
In general, old people act too slow for modern society.	11 (10.3)	26 (24.3)	46 (43.0)	20 (18.7)	4 (3.7)
It is interesting listening to old people's accounts of their past experiences.	2 (1.9)	1 (0.9)	7 (6.5)	33 (30.8)	64 (59.8)

Relationship between sociodemographic data and attitude toward caring for older adults

Table 3 shows the relationship between gender and attitudes toward caring for older adults. In particular, the results indicated a greater positive attitude toward caring for older adults among females, with living grandparents, and those who had good relationships with their grandparents. There were no significant relationships between attitude toward care of older adults and gender (p = 0.847), living grandparents (p = 0.159), or relationship with grandparents (p = 0.236).

The Kruskal–Wallis test results showed a statistically significant difference in attitude toward the care of older adults between the different years of the study group (p < 0.05). Based on the results, Year 4 students showed the highest mean score than others, which indicated their greater positive attitudes compared with those in the remaining years.

Next, we conducted a post hoc test to determine which group was statistically significant compared to others (Table 4). There was a statistically significant relationship between two groups, namely, Years 3 and 4 (p = 0.032), Years 2 and 3 (p = 0.017), Years 1 and 4 (p = 0.036), and Years 1 and 2 (p = 0.016). We also calculated the effect size using eta squared. The effect size of Years 3 and 4 and 1 and 4 were both 0.19, while those of Years 3 and 2 and Years 1 and 2 were 0.25 and 0.23, respectively. According to Cohen (1998), 0.1 is considered a small effect, indicating that the difference between the means of the two groups is small.

TABLE 3. Relationship sociodemographic data and attitude toward caring for older adults (N = 107)

Sociodemographic data	Total score of attitudes	
	N (%)	*p*
Gender		
Male	92 (86.0)	0.847
Female	15 (14.0)	
Living grandparents		
Yes	46 (43.0)	0.159
No	61 (57.0)	
Relationship with grandparents		
Good	102 (95.3)	0.236
Bad	5 (4.7)	
Year of study		
Year 1	37 (34.6)	0.015
Year 2	29 (27.1)	
Year 3	20 (18.7)	
Year 4	21 (19.6)	

Test: Mann–Whitney U Test; *Test: Kruskal–Wallis Test: p < 0.005

TABLE 4. Post hoc test for attitude score between year of study

Year of study	*p*
Year 3–Year 1	0.721
Year 3–Year 4	0.032*
Year 3–Year 2	0.017*
Year 1–Year 4	0.036*
Year 1–Year 2	0.016*
Year 4–Year 2	0.930

*p < 0.05

DISCUSSION

This study aimed to determine nursing students' attitudes toward caring for older adults and their relationships with this population. The overall result showed that over three-quarters of the respondents had positive attitudes toward caring for older adults. These results align with previous studies confirming that nursing students generally have positive attitudes toward caring for older adults.[20,21] However, their unpleasant interactions with older adults during their clinical posting may have influenced their attitudes. To ensure better healthcare and maintain the well-being of older persons, positive attitudes toward caring for older adults are absolutely essential.[23] In contrast, previous studies conducted in Malaysia reported that more than half of nursing students held negative attitudes toward caring for older adults.[17]

In the present study, attitudes toward the care of older adults were significantly related to several socio-demographic variables (e.g., year of study). However, other sociodemographic data, such as gender, whether grandparents are living, and relationship with grandparents, showed no significant relationship to their attitudes.

Furthermore, gender did not significantly impact nursing students' attitudes regarding the care of older individuals, consistent with the findings of prior studies.[17] In our study, females recorded slightly higher mean attitude scores, indicating slightly more positive attitudes than males, although that difference was not significant. This finding is similar to that obtained from previous studies.[15,23]

Nonetheless, our result is contrary, male respondents had more positive attitudes about the care of older adults compared with their female peers.[17] Furthermore, the findings of the present study illustrated that respondents who had living grandparents had the greatest positive attitudes than those who did not have living grandparents. In contrast to individuals who did not communicate with elder family members and perceived older people as politically powerless, those who had close relationships with older family members generally understood that older people needed help and affection.[7] Experiences obtained when caring for older adults may involve assisting family members with everyday tasks, preventing falls and abuse among older adults, and maintaining their bodily hygiene. Respondents with good relationships with their grandparents had greater positive attitudes toward caring for older adults than those with bad relationships with grandparents. Social engagement and prior

experience with older adult care may have influenced their attitudes.[33]

Furthermore, the present study revealed statistically significant differences across the years of study and attitudes toward the care of older adults. This result is in contrast to a previous study in which there is no differences in attitude scores between years of study among undergraduate nursing students.[17] In particular, Year 2 students in this study had the most favorable attitudes toward caring for older adults, followed by Years 4, 1, and 3 undergraduate nursing students. The reason for the higher attitudes among Year 2 nursing students is still being determined.

The study findings also showed that students might have negative attitudes toward the care of older adults because some felt that older adults generally did not contribute much to society as they may have limited movement and were fully dependent on the nurses. Therefore, it is recommended that a new gerontology curriculum be developed and implemented and that nursing students be given more opportunities to work with older adult patients. In addition, students should apply what they have been taught to deliver equal and unbiased care to older adults during their clinical practice.[3] Next, healthcare workers should also actively mentor younger nursing students by displaying positive attitudes toward older adults in the wards and involving the students in gerontology research and interventions.

This study adds to the growing number of research on how to care for older adults. In particular, the findings may help develop evidence-based practices for improving the creation of the faculty syllabus and guidelines for clinical teaching in the future. Furthermore, this study's stratified random sampling approach ensured that the samples truly represented the population.

This research, however, has some areas for improvement, such as its use of cross-sectional data from a particular point in time, which makes it more difficult to conclude the cause and effect. As a result, the findings of this study cannot be applied to other universities. Second, the study used a self-reported questionnaire, which may have introduced bias because respondents tend to give more socially acceptable answers than the truth. Finally, this study's quantitative methods may have also limited the generalizability of the findings.

Several suggestions for improvement are made based on the results of this study, including studies with different designs, comparison studies, and single-intervention studies. Furthermore, further research is required to investigate the impacts of nursing curricula on the care of elderly individuals. In addition, the use of a longitudinal approach is strongly encouraged to investigate the causal relationships between caregivers' attitudes and the quality of care provided to older adults.

CONCLUSIONS

The current study aimed to determine undergraduate nursing students' attitudes toward caring for older adults. The most important conclusion from this study is that the majority of nursing students have positive attitudes toward care for older individuals. In particular, significant relationships have been found between attitude and year of study.

CONFLICT OF INTEREST

We declare that there was no conflict of interest in conducting this research.

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Health Profession Education Students' Satisfaction toward Online Courses during the COVID-19 Pandemic

Diantha Soemantri
Department of Medical Education, Faculty of Medicine, Universitas Indonesia, Jakarta 10430, Indonesia, diantha.soemantri@ui.ac.id

Zhafirah Salsabila
Department of Health Administration and Policy, Faculty of Public Health, Universitas Indonesia, Depok 16424, Indonesia, zhafirah.salsabila17@gmail.com

Vernonia Yorasaki
Department of Medical Education, Faculty of Medicine and Health Sciences, Universitas Bengkulu, Bengkulu 38119, Indonesia, yorasaki1331@gmail.com

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Health Profession Education Students' Satisfaction toward Online Courses during the COVID-19 Pandemic

Diantha Soemantri[1*], Zhafirah Salsabila[2], Vernonia Yorasaki[3]

[1]Department of Medical Education, Faculty of Medicine, Universitas Indonesia, Jakarta 10430, Indonesia

[2]Department of Health Administration and Policy, Faculty of Public Health, Universitas Indonesia, Depok 16424, Indonesia

[3]Department of Medical Education, Faculty of Medicine and Health Sciences, Universitas Bengkulu, Bengkulu 38119, Indonesia

Abstract

Background: Given the extensive use of e-learning, especially during the COVID-19 pandemic, a validated instrument is deemed important for continuous evaluation. This study aimed to measure health profession education students' satisfaction toward the e-learning process within all health sciences cluster (HSC) courses, following further validation of the satisfaction scale for the e-learning process.

Methods: A cross-sectional study using an exploratory factor analysis (EFA) was conducted to validate the 29-item Indonesian version of the satisfaction scale for the e-learning process. That the validated tool was used to measure 2,471 students' satisfaction toward the e-learning process.

Results: The EFA resulted in 19 items divided into three subscales: the teaching process (5 items), the instructional content (4 items), and the interaction and evaluation (10 items). The scores of students' satisfaction toward the e-learning process are at 84–94% of the possible maximum score of the whole instrument or each subscale.

Conclusions: The Indonesian version of the satisfaction scale for the e-learning process serves as a valid tool to measure students' satisfaction toward e-learning. Current students have relatively good perceptions toward e-learning used in all HSC courses, including the interaction domain, which is an important aspect in an e-learning system. Strategies are warranted to maintain and further improve the e-learning process.

Keywords: e-learning, online learning, health professions, students, validity

INTRODUCTION

The coronavirus disease 2019 (COVID-19) pandemic has forced every educational institution to undergo a significant transformation of their teaching and learning processes. The transformation takes place in various formats and on different aspects of the educational program. A scoping review on the development of medical education in the midst of the COVID-19 pandemic shows that approximately 50% of articles reported changes to online learning, both synchronous and asynchronous. Other changes include more attention to students' well-being, the use of telehealth, and the modification of the student selection methods.[1]

Given the fact that changes into online learning are the most prominent, how students' react to the online learning and how they perceive it should be evaluated. Furthermore, students' perceptions of the learning environment will affect their satisfaction, behavior, and success in their study.[2] This also applies to the learning environment created by the online teaching and learning processes. Rodriguez *et al.* demonstrated that comfort and motivation to learn and use the learning technology are related to the satisfaction toward the online course and are subsequently associated with the course quality as perceived by the students.[3]

Baber investigated Indian and South Korean undergraduate students and identified several factors influencing the students' satisfaction toward the online classes and the perceived learning outcomes. These factors include the interaction in the online classroom, student motivation, course structure, instructors' knowledge, and instructors' facilitation.[4] The implementation of online classes may result in different outcomes depending on related factors. For example, Owusu-Fordjour *et al.* identified problems such as Internet accessibility and the lack of technical knowledge on the Internet may be the factors related to decreased students' scores.[6] However, Almusharraf and Khahro revealed students' satisfaction during the course management and the faculty preparedness for online learning.[5] The study also showed the students' scores were improved alongside the online course improvement.

The satisfaction toward online course is based on several factors, such as the level of support received from teachers, the feedback and interaction in class, and the

***Corresponding author:**
Diantha Soemantri
Department of Medical Education, Faculty of Medicine, Universitas Indonesia, Jakarta, Indonesia
E-mail: diantha.soemantri@ui.ac.id

various teaching methods employed, such as group discussion, games and quizzes.[5] Students' attitudes toward online learning are highly correlated to their satisfaction, and their satisfaction is then associated with their success in the online course.[7] Therefore, the quality of the online learning should also be examined, as the quality relates to the students' responses and satisfaction. The quality of online learning is determined by various factors, such as the quality of the Internet, instructors, and learning materials.[8,9]

The courses within health sciences cluster (HSC) consist of both multiprofessional education (MPE) and interprofessional education (IPE) courses. MPE is defined as the groups of students from various professions learn together to increase their understanding of certain learning materials, whereas IPE is more specific, in which students from different backgrounds learn with, from, and about each other to improve collaboration.[15] Thus, the MPE and IPE courses, which are integrated courses involving more than one health profession, are relatively more complex than the uniprofessional ones given the involvement of teachers and students from different health professions background. We argue that it is even more important to evaluate the students' perceptions on online learning. One of the means to achieve this aim is through a validated instrument or scale. Gulbahar developed a scale to evaluate university students' satisfaction and readiness in the e-learning environment and has conducted a confirmatory factor analysis.[10] The scale, the satisfaction scale for the e-learning process, has since been used in a dental educational setting by Kolcu *et al*.[11] Since this particular scale has already been used in a health profession's education setting, it is deemed to be content relevant. Furthermore, Abriya *et al.* has adapted the scale into the Indonesian language and has proven its appropriateness to evaluate students' perceptions of online learning in an Indonesian setting through an expert review and a pilot study process.[12] Thus, the adapted scale should be validated through an exploratory factor analysis. The current study aimed to measure health profession education students' satisfaction toward the e-learning process within HSC courses, following further validation of the satisfaction scale for the e-learning process through an exploratory factor analysis. Understanding the students' perceptions and satisfaction toward online learning will help educational leaders develop and improve various factors related to online courses and learning environment.

METHODS

This study has received ethical clearance from the Faculty of Medicine Universitas Indonesia Research Ethics Committee (number KET-832/UN2.F1/ETIK/PPM.00.02/2021). The current study was conducted in the Health Sciences Cluster Universitas Indonesia (HSC UI), an integrated campus of five health professions' education: medicine, dentistry, public health, nursing, and pharmacy. The cluster oversees the development and implementation of multiprofessional and interprofessional educational courses applied for all health profession students within the HSC UI. The courses are distributed into the odd semester (Basic Biomedical Sciences 1 and 2, Health Communication, Ethics and Law in Health, and Collaboration of Healthcare Team 2) and the even semester (Disaster Management, Health Research Methodology and Teamwork, and Collaboration of Healthcare Team 1). During the pandemic, all courses are delivered through an online mode. The MPE courses include Basic Biomedical Sciences 1 and 2, Health Communication, Ethics and Law in Health, Disaster Management, and Health Research Methodology, whereas the IPE courses include Teamwork and Collaboration of Healthcare Team 1 and 2.

The current study employed a cross-sectional design to obtain primary data on students' perceptions of the online MPE and IPE courses of the HSC UI following an exploratory factor analysis further to validate the satisfaction scale for the e-learning process. The study included health sciences students from five faculties, medicine, dentistry, pharmacy, nursing, and public health who have completed six courses (Disaster Management, Health Research Methodology, Teamwork and Collaboration of Healthcare Team, Basic Biomedical Sciences, Health Communication, and Ethics and Law in Health) in 2021. The total sampling approach was used to collect data samples. At the end of each semester, students were invited to complete the survey. A total of 2,471 responses were obtained during both semesters in this study.

The instrument used in this study was the Indonesian version of satisfaction scale for the e-learning process. The Indonesian version of the satisfaction scale for the e-learning process was adapted and piloted by Abriya *et al.*[12] from the original version.[10,11] The 29-item scale consists of four subscales: communication and practicality (7 items), teaching process (8 items), teaching content (4 items), and interaction and evaluation (10 items). Each item of the scale is evaluated using a 5-point Likert scale: from 1 (never) to 5 (always). The complete scale of the Indonesian version of the satisfaction scale for the e-learning process is presented in Table 1. In line with the study objective, i.e., to establish the validity of the scale using exploratory factor analysis (EFA), the minimum required sample is at least 300 participants to validate one instrument or at least 5–10 participants per item of the scale.[13,14] The scale consists of 29 items; thus, the minimum required sample in the current study was 145 participants. Therefore, the 2,471 responses obtained in this study were sufficient for the EFA.

The survey was administered through an online format, google form, and sent to participants via email and chat-

based platform (WhatsApp). Participants provided their consent to participate in the study by completing the survey. The survey was anonymized and would not affect the students' performance in their study in any way. Data obtained through an online survey was transferred into the SPSS version 20.0 format to first undergo EFA. Based on factors produced from the EFA, factor scores were calculated, and differences between the scores of each factor based on each HSC course were analyzed.

RESULTS

The requirement to perform EFA on the dataset was fulfilled, marked by the Kaiser–Meyer–Olkin (KMA) value of 0.968 (>0.5) and Bartlett's test of sphericity of 0.0001 (<0.05). Thus, the factor analysis process can be continued. Four iterations were performed on the obtained data to examine the communality extraction values. Items with <0.5 communality extraction values were eliminated. In total, ten items were eliminated (item 4, 9, 2, 8, 10, 3, 6, 28, 1, and 5) leaving 19 items for factor extraction. Originally, the scale consists of four scales, i.e., transmission and usability (7 items), teaching process (8 items), instructional content (4 items), and interaction and evaluation (10 items). Based on the item elimination process, only one item is left in the transmission and usability factor, five items in the teaching process factor, and nine items in the interaction and evaluation factor. However, the number of items in instructional content remains the same.

TABLE 1. Distribution of each survey item into each factor and its factor loading

	Item	Factor		
		1 Interaction and evaluation	2 Instructional content	3 Teaching process
7.	Different information and communication technologies (chat, forum, blog, Wiki, etc.) were used to support course activities and assignments.	**0.641**	0.243	0.260
11.	At the beginning of the lesson, the instructors conveyed a welcome message/announcement/video containing general information about the course and directing it to the syllabus of the course.	0.330	0.220	**0.662**
12.	In order to create a positive online learning atmosphere, the instructors planned a comprehensive introduction and meeting activities for students.	0.368	0.176	**0.732**
13.	The instructors provided timely and descriptive feedback on homeworks and activities.	0.254	0.222	**0.770**
14.	The instructors were successful in guiding the teaching process.	0.245	0.271	**0.832**
15.	The instructors were experienced and capable of e-learning.	0.238	0.323	**0.778**
16.	The content is logically and effectively organized.	0.232	**0.818**	0.249
17.	The course content was structured to facilitate learning.	0.305	**0.800**	0.265
18.	The course content is understandable and clearly presented.	0.262	**0.803**	0.278
19.	The teaching materials were adequate, up-to-date, and appropriate in terms of knowledge.	0.348	**0.744**	0.254
20.	Different tools (chat, forum, blog, Wiki, email, etc.) were used for the interaction.	**0.718**	0.132	0.274
21.	Cooperative group activities were held to increase social learning and interaction.	**0.723**	0.235	0.267
22.	Different activities and opportunities were offered to strengthen the interaction between students.	**0.756**	0.260	0.235
23.	Different activities and opportunities were offered to strengthen the interaction between the student and the instructor.	**0.670**	0.283	0.411
24.	The activities that need to be carried out synchronous and asynchronous were specified separately.	**0.606**	0.410	0.264
25.	Various classical and alternative evaluation methods were used together in the course.	**0.652**	0.510	0.242
26.	The evaluation methods used were sufficient to determine student success.	**0.602**	0.550	0.232
27.	The evaluation criteria to be used for the events are clearly stated for each different event.	**0.562**	0.547	0.263
29.	Evaluation percentages, evaluation criteria, and grading information were presented for different activities.	**0.606**	0.423	0.283
	Internal consistency (Cronbach alpha value)	**0.936**	0.918	0.895

TABLE 2. Distribution of students' satisfaction scores of each course (mean ± SD)

Course	Domain score			
	Interaction and evaluation (max possible score 50)	Instructional content (max possible score 20)	Teaching process (max possible score 25)	The whole questionnaire (max possible score 95)
1. Basic Biomedical Sciences 1 (N = 198)	45.97 ± 5.273	18.67 ± 2.015	23.11 ± 2.832	87.75 ± 9.331
2. Basic Biomedical Sciences 2 (N = 277)	45.01 ± 6.614	18.29 ± 2.562	22.82 ± 3.125	86.13 ± 11.334
3. Health Communication (N = 291)	46.78 ± 4.332	18.67 ± 1.933	23.66 ± 2.131	89.12 ± 7.519
4. Ethics and Law in Medicine (N = 201)	46.08 ± 4.744	18.55 ± 1.870	23.21 ± 2.853	87.85 ± 8.641
5. Disaster Management (N = 390)	43.52 ± 5.604	17.37 ± 2.368	22.31 ± 3.070	83.21 ± 9.769
6. Health Research Methodology (N = 297)	43.69 ± 5.399	17.45 ± 2.330	22.54 ± 2.726	83.67 ± 9.319
7. Collaboration of Healthcare Team 1 (N = 623)	43.68 ± 5.662	16.88 ± 2.849	22.51 ± 2.914	83.07 ± 10.373
8. Collaboration of Healthcare Team 2 (N = 194)	43.51 ± 6.201)	17.09 ± 2.967	22.11 ± 3.554	82.71 ± 11.369

Based on the eigenvalue, three factors were extracted with an eigenvalue of >1, and the scree plot also demonstrated a point of inflexion at three factors. The 19 items were distributed into three factors as depicted in Table 1, with a Cronbach alpha value of the whole instrument of 0.957, indicating a high internal consistency (note that a reliability coefficient of ≥0.70 is considered "acceptable" in most social science research situations).

The new factors produced from the factor analysis mostly consist of items from the original factor, except item 7, in the transmission and usability factor, which is now merging into the interaction and evaluation factor; thus, nine out of their 10 original items have been retained. The content of the item is consistent with the construct measured by the interaction and evaluation factor; therefore, the integration of item 7 (Different information and communication technologies (chat, forum, blog, Wiki etc.) were used to support course activities and assignments) was deemed relevant.

Using these new factors from the factor analysis process, the scores of students' satisfaction toward the e-learning within the MPE and IPE courses were calculated. The score distribution is presented in Table 2. The number of respondents per course varied due to slight differences in the number of student participants and the response rate in each course.

DISCUSSION

The current study has validated an instrument to measure medical students' satisfaction toward the e-learning process. The steps of factor analysis have been conducted comprehensively and produced three factors. Originally there were four factors in the scale: transmission and usability (7 items), teaching process (8 items), instructional content (4 items), and interaction and evaluation (10 items). The factor analysis process has eliminated most items from the transmission and usability factor, except for one item (7), which now has merged into the interaction and evaluation factor. Kolcu *et al*. revealed that the interaction among students can be achieved through online learning and the use of technologies increased students' interaction.[11,31,32] Since item 7 is related to the use of various information and communication that can support students' activities, it should therefore be integrated into the interaction and evaluation factor.

As a result of the current factor analysis, the instruments are now more concise and structured based on the instructional design components. Basically, instructional design consists of learning objectives, teaching and learning materials, learning architecture (structure and sequence), learning experiences, assessment, and evaluation, which in general highlights how teaching and learning materials are determined, delivered, and assessed.[33] Each factor obtained from the current factor analysis corresponds to one or more instructional design components. The instructional content factor covers learning objectives and teaching and learning materials; the teaching process factor is related to learning architecture; and the interaction and evaluation factor corresponds to learning experience, assessment, and evaluation components. However, although the above factors seem to be clear-cut, the internal consistency calculation demonstrated otherwise. A redundancy for some items in the instrument seems to exist, given the very high Cronbach alpha ranging from 0.895 to 0.936 (for the subscales) and 0.957 for the entire instrument. Kolcu *et al.* revealed a comparable Cronbach alpha value of 0.97, which also indicates some redundancies. Despite the

reduction of item numbers, a similar problem regarding redundancy still occurs; thus, further studies should re-examine the constructs and modify each item to ensure that each group of items measures different constructs. A value of 0.9 is considered to be the recommended maximum Cronbach alpha value.[37]

Overall current students' satisfaction toward the e-learning process in the IPE and MPE courses of HSC is considered good as indicated by the obtained scores, 84–94% of the possible maximum score of the whole instrument or each subscale. One of the possible explanations is the existing learning management system that has been developed and used long before the pandemic; thus, the degree of students' familiarity toward the online course platform is high. The findings also indicate that the course curriculum developed for the face-to-face teaching and learning process has been quite successfully adapted into the online or distance learning system. The possible barriers for online learning, as formulated by Baticulon *et al.*, include technological (learning management system and Internet connectivity), individual (students' learning styles and students' health), and institutional (curriculum, institutional resources, and teachers' skills), among others.[34] Thus, to achieve a favorable online learning process, these factors should be accounted for. We argue that the established curriculum, comprehensive learning management system, clear learning sequences, and the use of active teaching and learning methods before switching to online learning, are among the important factors contributing toward students' satisfaction.

One of the highlights in our findings is the good perceptions toward interaction during the online course. Engagement is important for students' satisfaction and is cultivated through interaction; hence, promoting interaction is important during online learning, either the interaction between students or between the student and the teacher.[35] Specifically for the context of IPE, online learning is suitable for facilitating interprofessional interaction in a particular course.[36] Moore and Kearsley argued that interaction with other students, teachers, and learning content should be highlighted and examined in all forms of education, either face-to-face or online.[27] Consistent interaction with teachers is the most common contributing factor toward students' online satisfaction, especially at the early stages of a course. This is due to the explicit roles of teachers within an online learning environment, which includes providing direction and support for students, conducting assessment and evaluation, becoming a role model, and assisting students in the application of knowledge.[16,26,28] The interaction between students is also important since it allows student to strengthen, socialize, exchange, and discuss ideas and participate in group activities.[24,29] Interaction with content is also closely related to the course content quality, which in turn affects the students' satisfaction.[21] Student engagement in the learning process will likely increase the students' participation in class and enable them to achieve the learning objectives, which eventually contribute to increased satisfaction in both face-to-face and online learning.[18,19,22] Thus, an e-learning system should be designed to maximize students' autonomy and involvement in the learning process.[28]

The use of a cross-sectional research design in the current study could not indicate causal inferences. Thus, future studies may adopt a longitudinal or experimental design to provide more supporting evidence about the relationships between the online course design with students' satisfaction. The study participants may also provide socially desirable responses in the survey, which would introduce a response bias in the current study. However, our study has succeeded in producing a validated instrument to measure students' satisfaction toward the e-learning process. The instrument can serve as a tool to examine students' satisfaction, which in turn will provide important information on how to continuously improve the quality of online courses and enhance students' achievement.

CONCLUSIONS

The 19-item Indonesion version of the satisfaction scale for the e-learning process consists of three domains: teaching process, instructional content, and interaction and evaluation. This instrument serves as a valid tool to measure students' satisfaction toward the e-learning process. The current study shows relatively good perceptions toward the e-learning process throughout all HSC courses, including the interaction domain, which is considered an important aspect in an e-learning system. Despite the course being fully online, the interaction aspect can still be fulfilled. One of the factors influencing the good perceptions is the already established e-learning system used in the courses, even before the COVID-19 pandemic. Thus, sustained use of an e-learning system as a part of daily teaching and learning practices is inevitable.

CONFLICT OF INTEREST

None of the authors reported any conflict of interest.

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Relationships between Nursing Students' Attitudes Toward the Nursing Profession, Fear of COVID-19, and Intolerance of Uncertainty: A Cross-sectional Study

Banu Terzi
Department of Fundamentals of Nursing, Faculty of Nursing, Akdeniz University, Antalya 07070, Turkey,
copurbanu@hotmail.com

Fatma Azizoğlu
Department of Nursing, Faculty of Health Sciences, Haliç University, Istanbul 34060, Turkey,
fatmaazizoglu@yahoo.com

Çağla Seven
Department of Nursing, Faculty of Health Sciences, Haliç University, Istanbul 34060, Turkey,
sevencaglaa@gmail.com

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Relationships between Nursing Students' Attitudes Toward the Nursing Profession, Fear of COVID-19, and Intolerance of Uncertainty: A Cross-sectional Study

Banu Terzi[1*], Fatma Azizoğlu[2], Çağla Seven[2]

[1]Department of Fundamentals of Nursing, Faculty of Nursing, Akdeniz University, Antalya 07070, Turkey
[2]Department of Nursing, Faculty of Health Sciences, Haliç University, Istanbul 34060, Turkey

Abstract

Background: Nursing students were caught unprepared for the COVID-19 pandemic. Both the inability to control the epidemic and the interruption of education caused students to experience fear, anxiety, and uncertainty. This study investigates the relationships between nursing students' attitudes toward the nursing profession and their fear of COVID-19 and intolerance of uncertainty.

Methods: This cross-sectional study included 727 nursing students who were members of the Student Nurses Association and who volunteered to participate in the research. Research data were collected using the Student Information Form, The Fear of COVID-19 Scale, the Intolerance of Uncertainty Scale (IUS-12), and the Attitudes Towards Nursing Profession Scale.

Results: Statistically significant positive relationships were found between the fear of COVID-19 and intolerance of uncertainty levels ($p < 0.01$) and attitudes toward the nursing profession in general ($p < 0.05$).

Conclusions: Students had a mid-level of fear of COVID-19, a high level of intolerance of uncertainty, and positive attitudes toward the nursing profession. To decrease nursing students' intolerance of uncertainty during pandemic-like crisis situations, preventive and reformative activities should be planned.

Keywords: attitude, COVID-19, nursing students, uncertainty

INTRODUCTION

In February 2020, the World Health Organization declared the new coronavirus disease COVID-19 a pandemic; the COVID-19 has been the deadliest pandemic since the 1918 influenza and deeply affected the global society.[1] Because of the rapid spread of COVID-19 and the lack of information on exactly how the virus is transmitted, people have experienced fear and panic related to various issues. These fears have ranged from becoming infected to dying because of the virus, transmitting the virus to others, losing close ones due to the virus, not getting appropriate and adequate care, and losing their jobs.[2] Moreover, with the pandemic, intolerance to certain thoughts toward the future emerged due to the life threat caused by the virus. As Deniz stated, intolerance of uncertainty is defined as "the states in which there are strong perceptions towards the unknown, emphasizing the emotional difficulties causing anxiety and a tendency towards fear." Intolerance of uncertainty includes negative reactions in cases of uncertainty, except when there is a rational possibility of a phenomenon to happen.[2] In addition, researchers have stated that intolerance of uncertainty causes anxiety disorders and increases anxiety levels.[3,4]

With the pandemic, as in all other countries in the world, nursing education in Turkey has been significantly affected by this unprecedented health crisis. On March 11, 2020, the day the first case of COVID-19 was detected in Turkey, the Council of Higher Education announced that the 2020 spring semester would be carried out entirely by distance education.[5] In this direction, higher education institutions providing nursing education began adapting distance education. Issues such as the duration of the pandemic, whether face-to-face education would start in the next fall semester, and where and how clinical applications for nurses would be carried out caused nursing students to experience some uncertainties.[6] In some countries, due to the inadequate number of nurses, nursing students were asked to provide support at the hospitals.[7] In a qualitative study carried out with nursing students during this period, the authors stated that students reported experiencing negative feelings such as fear, uneasiness, and serious anxiety about the critical health conditions caused by the pandemic.[7] The COVID-19 pandemic has had a noticeable impact on the experience of nursing students, ranging from organizational changes to uncertainty about their own competence and even having doubts about whether to continue their education. This situation caused practical concerns and sometimes inconsistencies between learning objectives and learning opportunities. This led to confusion and the feeling that

***Corresponding author:**
Banu Terzi
Department of Fundamentals of Nursing, Faculty of Nursing, Akdeniz University, Antalya, Turkey
E-mail: banuterzi@akdeniz.edu.tr

they were not supported enough.[8] Moreover, in another research study that asked nursing students to evaluate the effects of the transition from traditional classes and clinical environments to the online environment on the quality of their learning, more than 65% of students evaluated the level of the effect as high.[9]

In another study investigating the effects of fear of COVID-19 on perceived clinical stress levels of senior nursing students in Turkey, the authors found that students experienced a medium level of COVID-19 fear.[10] In another study, nursing students were found to experience a high level of fear due to COVID-19.[11]

An investigation of the COVID-19 experiences of midwifery students reported that the pandemic caused confusion and uncertainty for students; these students stated that there were inconsistencies between the suggestions of the universities and healthcare institutions. The authors of that study also reported that some clinical internships were canceled and that students experienced anxiety regarding how to fulfill graduation requirements since they lost face-to-face contact with pregnant women.[12]

Nursing students have a strong need to be heard, be prepared, and get support during the pandemic. Students must be prepared for certain competencies. Despite the efforts of nursing schools and clinics, students generally got lost in the chaos of the pandemic, which caused practical concerns, fewer learning opportunities, and even doubts regarding their choice of being a nurse.[8]

In another study conducted among a total of 506 nursing students between May 18 and 29, 2020, in Turkey, the researchers found that as the students' intolerance of uncertainty increased their level of depression, anxiety and stress also increased.[13] It was also stated that individuals with high intolerance of uncertainty were repetitively exposed to many problematic situations due to the fact that they felt that life was unpredictable, and they interpreted emotionally stressful and uncertain situations as signs of danger or fear.[14] The aim of this research is to investigate the relationships between the fear of COVID-19 and intolerance of uncertainty among nursing students and their attitudes toward the nursing profession.

METHODS

Throughout the research, we abided by World Medical Association Declaration of Helsinki (2013) and students' willingness and voluntariness to participate in the research. Students who were willing to participate in the research were asked to open a message sent to their mobile phones, and they provided their written consent by clicking the "I agree to fill out the online questionnaire" statement. Written consents were obtained from the local ethics committee of a university (04/03/2021, permission No. 259) and Ministry of Health Scientific Research Consent Portal (2021-02-20T22_22_05).

This study is descriptive and cross-sectional research with the population of the research comprised undergraduate and graduate nursing students from all universities in Turkey who were also members of the Student Nurses Association. The power of the study is expressed as $1 - \beta$ (β = probability of type II error); in general, research should have 80% power. In our study, we calculated the number of cases to be included as 537 to achieve 80% power at the level of $\alpha = 0.04$. However, taking into consideration the losses, we predicted that the number of cases should be 650. The research was completed with a total of 727 nursing students who volunteered to participate in the research.

Research data were collected using the Student Information Form, Fear of COVID-19 Scale, Intolerance of Uncertainty Scale (IUS-12), and Attitudes Towards Nursing Profession Scale.

Student Information Form: The Student Information form consists of a total of 20 questions on how the COVID-19 pandemic affected students' thoughts regarding their jobs and future as well as sociodemographic information such as age, gender, program of study, and year of study.

Fear of COVID-19 Scale: This scale was developed by Abhors *et al*.[15] to measure the level of fear caused by COVID-19 and was adapted into Turkish by Satici *et al*.[16] Items in the scale were created by reviewing in detail the existing scales on fear and considering the expert opinion of and interviews conducted with the participants. The single-factorial, five-point Likert-type scale (1 = totally disagree, 5 = totally agree) consists of a total of seven items. There are no reverse-scored items on the scale. Higher scores indicate a higher level of fear of COVID-19. We found the internal consistency to be 0.82 and the test–retest reliability to be 0.72 for the original scale. The Cronbach's alpha coefficient for this study was 0.880.

IUS-12: The short form of the IUS-12 developed by Carleton *et al*.[17] was adapted into Turkish, and its validity and reliability were evaluated by Saricam *et al*.[18] The scale consists of a total of 12 items. The five-point Likert-type scale is scored between 1 and 5 (1 = not at all characteristic of me to 5 = entirely characteristic of me). Only the first item is reverse coded. A total of 12 to 60 points can be obtained from the scale. Higher scores indicate the presence of an intolerance of uncertainty. The scale has no cutoff point. The scale also has two subdimensions. The first seven questions indicate "forward-looking anxiety," and the other questions indicate "preventative anxiety." The Cronbach's alpha coefficient for the original scale was $\alpha = 0.88$. We found the Cronbach's alpha coefficient to be 0.77 for the

preventative anxiety subdimension and 0.84 for the forward-looking anxiety subdimension.[18] In this research, we found the Cronbach's alpha coefficient to be 0.892 for the preventative anxiety subdimension and 0.805 for the forward-looking anxiety subdimension.

Attitude Scale for Nursing Profession: The scale developed by Çoban and Kaşıkçı[19] consists of a total of 40 questions and the following three subdimensions: Characteristics of Nursing Profession, Preferring Nursing Profession, and Attitude towards the General State of Nursing Profession. It is a 5-point Likert-type scale with answers ranging from 1 to 5 (1 = totally disagree to 5 = totally agree). The Attitude Scale for Nursing Profession was evaluated based on the average total score obtained from each subdimension, not on the total score from the scale.[19] Positive attitudes toward the nursing profession increase as the score obtained from the scale increases. Accordingly, scores of ≥3 indicate a positive attitude, and scores <3 indicate a negative attitude.[20] The Cronbach's alpha coefficient for the original validity reliability studies of the scale was 0.91. In this study, the Cronbach's alpha coefficient was calculated as 0.911 for the Characteristics of Nursing Profession subdimension, 0.480 for the Preferring Nursing Profession subdimension, and 0.820 for the Attitude towards the General State of Nursing subdimension.

Research data were collected using questionnaires that were converted into Google questionnaires and sent to the students in the research group via WhatsApp of MMS. Students were asked to click on the Google Questionnaire links in the message they received and fill out the forms.

We used the Number Cruncher Statistical System for the statistical analyses. Descriptive statistical methods (average, standard deviation, median, frequency, percentage, minimum, maximum) were used to evaluate the research data. We used the Shapiro–Wilk test and graphical examinations to test the conformity of the quantitative data to normal distribution. The Mann–Whitney *U* test was used to compare two groups for the nonnormally distributed quantitative variables. The Kruskal–Willis test and Dunn–Bonferroni test were used to compare more than two groups for the nonnormally distributed quantitative variables. We used the Spearman correlational analysis to evaluate the relationships between quantitative variables. A statistical significance level of $p < 0.05$ was accepted.

RESULTS

We examined the research results under the following three topics.

Characteristic features

The average age of the participants was 20.75 ± 2.51 years (range, 18–51 years), and 84.7% (N = 616) were female. Most of the students were in their first year of undergraduate study (98.8%, N = 717). Of the students, 67.3% (N = 489) stated that they had chosen this profession willingly, 34.3% (N = 249) reported that they saw a positive future for the nursing profession, and 76.3% (N = 555) stated that the COVID-19 pandemic had negatively affected the nursing profession.

Relationships between the students' attitude level toward the nursing profession and their fear of COVID-19 and intolerance of uncertainty

The participants' average total score on the Fear of COVID-19 scale was 18.66 6.14 (range, 7 – 35). For the Intolerance of Uncertainty Scale, the average total score was 24.23 ± 5.03 (range, 10–35) for the Forward-Looking Anxiety subdimension and 15.93 ± 4.95 (range, 5 – 25) for the Preventative Anxiety subdimension. The average total score was 79.34 ± 9.19 (range, 25 – 90) for the characteristics of Nursing Profession subdimension, 36.19 ± 5.02 (range, 21–65) for the Preferring Nursing Profession subdimension, 38.64 ± 4.78 (range, 11 – 45) for the Attitudes towards the General State of Nursing Profession subdimension, and 154.16 ± 15.30 (range, 57 – 200) for the Attitude Scale for Nursing Profession. Relationships between the students' attitudes toward the nursing profession and the fear of COVID-19 and intolerance of uncertainty are given in Table 1 in detail.

Comparison of the scale scores with students' characteristics and opinions

We found a positive and statistically significant relationship between the students' ages and their average total scale scores and scores obtained from the Characteristics of Nursing Profession, Preferring Nursing Profession, and Attitudes towards the General State of Nursing Profession subdimensions of Attitude Scale for Nursing Profession ($p < 0.01$; Table 2).

Scores obtained from the Fear of COVID-19 Scale were significantly higher for female students compared with male students ($p = 0.001$ and $p < 0.01$, respectively; Table 2). There was no statistically significant difference detected according to gender in the scores obtained from the Forward-Looking Anxiety subdimension of the Intolerance of Uncertainty Scale ($p > 0.05$; Table 2).

The average scores of female students were significantly higher than those of male students for the Characteristics of Nursing Profession and Attitudes towards the General State of Nursing Profession subdimensions of Attitude Scale for Nursing Profession and the total Attitude Scale for Nursing Profession ($p = 0.003$, $p = 0.002$, $p = 0.014$, $p < 0.05$, respectively; Table 2).

A statistically significant difference was detected between the students' year of study and the average subdimension and total score from the Attitude Scale for Nursing Profession ($p < 0.01$; Table 2).

According to the answers that the students gave to the question of "Did you willingly choose the nursing profession?" we detected statistically significant differences between the Characteristics of Nursing Profession and Preferring Nursing Profession subdimensions of the Attitude Scale for Nursing Profession scale and the average total score from the scale ($p < 0.01$; Table 3). According to the answers that the students gave to the question of "How do you see the future of the nursing profession?" we detected statistically significant differences between the average scores of the Fear of COVID-19 Scale, Intolerance of Uncertainty Scale, and Attitude Scale for Nursing Profession ($p < 0.01$; Table 3).

Based on the answers provided by students to the question of "Do you think that the COVID-19 pandemic negatively affected nursing profession?" we found statistically significant differences between the average scores of the Fear of COVID-19 Scale, Intolerance of Uncertainty Scale, and Attitude towards the General State of Nursing Profession subdimension of the Attitude Scale for Nursing Profession ($p < 0.01$; Table 3).

TABLE 1. Correlation between the scales

Scales	Intolerance of Uncertainty Scale		COVID-19 Fear Scale Total Score
	Forward Anxiety	Inhibitory Anxiety	
COVID-19 Fear Scale total score	0.212**	0.316**	
Attitude Scale towards Nursing Profession			
Characteristics of the Nursing Profession	0.179**	0.106**	0.041
Preference Status for Nursing Profession	0.115**	0.003	−0.001
Attitude towards the General Status of the Nursing Profession	0.237**	0.152**	0.077*
Total score	0.216**	0.117**	0.052

Spearman's correlation coefficient. *$p < 0.05$; **$p < 0.01$

TABLE 2. Comparison of demographic data and scale scores

Variable	COVID-19 Fear Scale	Intolerance of Uncertainty Scale		Attitude Scale toward Nursing Profession			
		Forward Anxiety	Inhibitory Anxiety	Characteristics of the Nursing Profession	Preference Status for Nursing Profession	Attitude toward the General Status of the Nursing Profession	Attitude Scale toward Nursing Profession total score
Gender							
Female (N = 616)	19 (7–35)	24 (10–35)	16 (5–25)	82 (49–90)	36 (24–65)	40 (23–45)	157 (57–200)
Male (N = 111)	16 (7–35)	24 (10–35)	15 (5–25)	79 (25–90)	37 (21–65)	38 (11–45)	154 (57–200)
p	[a]0.001**	[a]0.517	[a]0.001**	[a]0.003**	[a]0.160	[a]0.002**	[a]0.001**
Program							
Undergraduate (N = 717)	18.5 (7–35)	24 (10–35)	16 (5–25)	82 (25–90)	36 (21–65)	39 (11–45)	157 (57–200)
Postgraduate (N = 9)	19 (8–35)	22 (12–29)	15 (6–18)	81 (54–90)	37 (34–46)	40 (26–45)	157 (114–181)
p	[a]0.657	[a]0.241	[a]0.085	[a]0.945	[a]0.067	[a]0.342	[a]0.517
Class							
Prep class (N = 30)	17.5 (7–33)	22 (13–35)	16 (5–25)	80 (54–90)	35.5(27–59)	38 (18–45)	149 (124–173)
First class (N = 248)	18 (7-35)	24 (10–35)	15 (5–25)	80 (38–90)	36 (24–63)	38 (18–45)	153 (82–180)
Second class (N= 187)	20 (7–35)	25 (11–35)	17 (5–25)	80 (35–90)	35 (23–65)	39 (18–45)	154 (81–200)
Third class (N = 134)	19 (7-33)	25 (10–35)	17 (5–25)	84 (49–90)	35.5 (24–59)	41 (26–45)	159 (110–187)
Fourth class (N = 128)	18 (7–35)	24.5 (13–35)	16 (5–25)	85 (25–90)	38 (21–65)	41 (11–45)	162.5 (57–200)
p	[b]0.051	[b]0.090	[b]0.089	[b]0.001**	[b]0.001**	[b]0.001**	[b]0.001**
Age							
r	−0.016	−0.009	−0.046	0.125	0.109	0.136	0.108
p	[r]0.658	[r]0.812	[r]0.212	[r]0.001**	[r]0.003**	[r]0.001**	[r]0.004**

[a]Mann–Whitney U test; [b]Kruskal–Wallis test; r: Spearman correlation coefficient; *$p < 0.05$; **$p < 0.01$.

TABLE 3. Comparison of students' opinions and scale scores

Students' opinion	COVID-19 Fear Scale	Intolerance of Uncertainty Scale		Attitude Scale towards Nursing Profession			
		Forward Anxiety	Inhibitory Anxiety	Characteristics of the Nursing Profession	Preference Status for Nursing Profession	Attitude towards the General Status of the Nursing Profession	Attitude Scale towards Nursing Profession total score
Did you choose the nursing profession on your own?							
Yes (N = 489)	18 (7–35)	24 (10–35)	16 (5–25)	84 (35–90)	37 (23–65)	39 (18–45)	160 (81–200)
No (N = 83)	20 (7–35)	25 (15–35)	15 (5–25)	81 (25–90)	35 (21–59)	41 (11–45)	153 (57–175)
Undecided (N = 155)	19 (7–35)	24 (10–35)	17 (5–25)	78 (54–90)	33 (27–65)	39 (23–45)	149 (114–200)
p	[b]0.574	[b]0.160	[b]0.059	[b]0.001**	[b]0.001**	[b]0.121	[b]0.001**
How do you see the future of the nursing profession?							
Very good (N = 98)	17 (7–35)	23.5 (10.35)	15.5 (5–25)	86 (36–90)	39 (27–65)	40.5 (18–45)	166 (81–200)
Good (N = 249)	18 (7–35)	24 (10–35)	15 (5–25)	82 (35–90)	36 (23–49)	39 (23–45)	156 (91–177)
Undecided (N = 284)	19 (7–35)	26 (12–35)	17 (6–25)	80 (38–90)	35 (24–65)	39 (18–45)	154 (82–200)
Bad (N = 79)	18 (7–35)	25 (14–35)	18 (6–25)	84 (58–90)	36 (27–47)	41 (26–45)	159 (121–177)
Very bad (N = 16)	17 (12–33)	21.5 (14–35)	15 (7–25)	79 (25–89)	34.5(21–42)	41 (11–45)	156 (57–171)
p	[b]0.001**	[b]0.003**	[b]0.001**	[b]0.001**	[b]0.001**	[b]0.045*	[b]0.001**
Do you think the COVID-19 pandemic has negatively affected the nursing profession?							
Yes (N = 555)	19 (7–35)	25 (11–35)	16 (5–25)	82 (35–90)	36 (23–65)	40 (18–45)	157 (81–200)
No (N = 92)	16 (7–33)	23 (10–35)	14 (5–25)	80.5 (25–90)	36 (21–52)	39 (11–45)	156.5 (57–174)
Undecided (N = 80)	16 (7–27)	22 (13–31)	15.5 (5–25)	82 (56–90)	35.5 (26–44)	38 (25–45)	154 (118–178)
p	[b]0.001**	[b]0.001**	[b]0.001**	[b]0.278	[b]0.553	[b]0.006**	[b]0.121

[b]Kruskal–Wallis test; *$p < 0.01$; **$p < 0.05$

DISCUSSION

In this study, we investigated the relationships between nursing students' attitudes toward the nursing profession and their fear of COVID-19 and intolerance of uncertainty and found that the nursing students experienced a medium level of fear of COVID-19. In the literature, it was reported that nursing students experienced a medium level[10,21,22] and high level[11] of fear of COVID-19. The fear of COVID-19 might have negative effects on students' mental, emotional, and psychological health.[23] Therefore, to overcome the pandemic-related fear, psychological support should be provided for students, and projects should be planned to enhance their psychological and emotional health.

In our study, we found that nursing students experienced a high level of intolerance of uncertainty during the pandemic. Intolerance of uncertainty, defined as being incapable of coping with uncertain or unpredictable situations, is considered an important factor affecting mental health, and it indicates serious psychological problems.[24] In another study conducted with healthcare professionals during the COVID-19 pandemic, the authors found that those who adapt to uncertainty are less likely to experience psychological problems.[25] In our study, we did not investigate the relationships between the students' intolerance of uncertainty and their psychological states. Therefore, using qualitative research methods, students' uncertainty during pandemic conditions could also be investigated based on psychological dimension.

In our study, the students' attitudes toward the nursing profession was positive. There are similar research results in the literature showing that nursing students had positive attitudes toward the nursing profession during the COVID-19 pandemic.[21,26,27]

We found that students' forward-looking anxiety and preventative anxiety increased as their fear of COVID-19 increased. Similar to our results, Satici[16] and Bakioğlu *et al*.,[28] in their studies of university students in Turkey, found that individuals with a high level of fear of COVID-19 also had a high level of intolerance of uncertainty. In another study carried out with university students in Turkey during the pandemic, the authors found that the fear of COVID-19 and intolerance of uncertainty were related to each other.[29] Another resource indicated that uncertainty was positively related with insecurity in self-protection resources. During the COVID-19 pandemic, uncertainty and insecurity for self-protection emerged in society. Legislation requiring self-protection has been used and led to mass protests in many countries. Given the importance of establishing self-protection habits in society to manage COVID-19 and similar epidemics, it is

necessary to break this cycle of fear, insecurity, and uncertainty.[30]

In our study, the students' fear of COVID-19 did not affect their attitude toward the nursing profession. Contrary to the results of our study, Çalışkan *et al*.[21] found that as the fear of COVID-19 increased, the positive attitude toward the nursing profession decreased, and the positive attitude toward the general state of the nursing profession increased. Factors related to COVID-19, such as increased working hours, chaotic work environments, and fear of becoming infected, might have negatively affected the nursing candidates' attitudes toward the profession.[21] Conversely, at the time our research data were collected during the pandemic, the heroism of nurses came to the fore on social media platforms and mass media in both Turkey and all over the world. During this period, nurses remained loyal to the ethical codes of benefit and altruism. Despite being away from their families and the risk of infection transmission, nurses did their jobs in the best possible way and were praised by the public.[31] Therefore, although it did not seem to affect the results of our research, nurses' attitudes might have been positively affected by the fact that the nursing profession was glorified in the eyes of the Turkish nation as an indispensable part of society.

We found in our research that nursing students' level of intolerance of uncertainty increased as their attitude toward the nursing profession increased in a positive way. Contrary to this result, in another study by Chen *et al*.,[32] the authors reported that intolerance of uncertainty was negatively correlated with the career maturity of the students. Nurses in Turkey stood out as heroes on social media platforms during the pandemic. On the other hand, uncertainties about how long the pandemic would last and how to come out of it might have caused the students in the research group to feel anxiety about the future.

In our study, we found that students showed positive attitudes toward the nursing profession as they got older. This result is similar to some research results in the literature.[27] Similar to the results of other studies,[11,21,33] we also found that female students had a greater fear of COVID-19 compared with male students. Because Turkey is a male-dominant society, a greater fear of COVID-19 in female students was an expected result. Accordingly, it can be expected that male nurses may better develop coping mechanisms for the crisis in the case of a pandemic such as COVID-19.

Students' level of intolerance of uncertainty did not differ by gender. Studies in the literature have reported results similar to our findings.[14] The fact that the level of intolerance of uncertainty did not differ by gender could be attributed to the fact that all nursing students went through the same period under pandemic conditions.

Female students had more positive attitudes toward the nursing profession compared with male students. Similar to the results of our study, the authors of other studies found that positive attitudes toward the nursing profession were higher in female than in male students.[21,26,34] As stated by Yüksel and Bahadir Yılmaz,[34] previous research also showed that Turkish nurses had positive attitudes toward the profession. Moreover, nursing students who are female, looking forward to entering the profession, and satisfied with their career path especially had positive attitudes.[34]

Students' attitudes toward the nursing profession differed by their year of study. Senior students had more positive attitudes than the other students did. Similar to our results, another study reported that senior students had a more positive attitude toward the profession, and this positive attitude decreased as the year of study decreased.[21] The results of our study could be associated with the fact that most students included in this research were first-year students, and these students took all of their theoretical and practical classes through distance education. This is because these students had never had face-to-face contact with the nurses and professors who typically serve as role models, and therefore nursing students who willingly chose the nursing profession had a more positive attitude toward the profession. Similar to the results of our study, Zencir and Eşer[20] found that students willingly choosing the nursing profession had more positive attitudes in all three subdimensions (Characteristics of Nursing Profession, Preferring Nursing Profession, General State of Nursing Profession) compared with students who unwillingly chose the profession.

Although the students who predicted a very bad future for the nursing profession had high levels of COVID-19 fear and intolerance of uncertainty, the students who viewed the future of the nursing profession very positively had positive attitudes toward the profession. Moreover, students who thought the COVID-19 pandemic had negatively affected the nursing profession experienced a high level of COVID-19 fear and intolerance of uncertainty. Alternatively, these students also showed positive attitudes toward the general state of the nursing profession. Contrary to our research, another study investigating senior nursing students' thoughts on the nursing profession during the COVID-19 pandemic found that the pandemic did not negatively affect the students' opinions on the nursing profession.[35] A study carried out with international high school students showed that the fear of COVID-19 and intolerance of uncertainty were negative correlated with career maturity. In addition, the authors stated that intolerance of uncertainty played a mediating role in the relationship between the fear of COVID-19 and career maturity.[32]

Not being able to participate in regular clinical trainings, experiencing difficulties in reaching professors and resources in a virtual environment, encountering obstacles to education and evaluation, and facing economic issues due to the pandemic caused various problems. However, despite of all these problems, another study showed that the general attitude of the participant nursing students toward the nursing profession was not negatively affected by the pandemic.[34] On the other hand, nurses did not want to change their profession after the COVID-19 pandemic despite the heavy working conditions. In other words, they wanted to work as a nurse under every possible condition. We found that the nurses felt insecure about providing care for a patient diagnosed with COVID-19, and they stated that nursing is a promising profession.

The primary limitation of this research was the inability to reach all nursing students in Turkey. The second limitation was not being able to collect qualitative data due to the pandemic conditions. Another limitation was not being able to compare the levels of students' intolerance of uncertainty and their attitudes toward the profession with post-pandemic results.

CONCLUSIONS

In this study conducted in Turkey, nursing students had a medium level of fear of COVID-19 under pandemic conditions. Moreover, we showed that although the fear of COVID-19 affected the students' level of intolerance of uncertainty, it did not affect their attitude toward the nursing profession. In crisis situations such as this pandemic, which caught society unprepared, factors that affect students' intolerance should be eliminated. By doing so, the nurse candidate's concern for the future can be decreased. To this end, nursing schools should plan to hold trainings on crisis management skills, and these trainings can be integrated into the curriculum.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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Factors Associated with Postacute COVID-19 Syndrome Among Patients in Malaysia

Ahtheemathurra Ballasingam
Faculty of Pharmacy, Universiti Kebangsaan Malaysia, Kuala Lumpur 50300, Malaysia,
ahtheemathurra@gmail.com

Farida Islahudin
Faculty of Pharmacy, Universiti Kebangsaan Malaysia, Kuala Lumpur 50300, Malaysia,
faridaislahudin@yahoo.com

Siti Azdiah Abdul Aziz
Faculty of Pharmacy, Universiti Kebangsaan Malaysia, Kuala Lumpur 50300, Malaysia,
sitiazdiah@ukm.edu.my

Mohd Makmor-Bakry
Faculty of Pharmacy, Universiti Kebangsaan Malaysia, Kuala Lumpur 50300, Malaysia,
mohdclinpharm@ukm.edu.my

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Factors Associated with Postacute COVID-19 Syndrome Among Patients in Malaysia

Ahtheemathurra Ballasingam[1,2], Farida Islahudin[1*], Siti Azdiah Abdul Aziz[1], Mohd Makmor-Bakry[1,3]

[1]Faculty of Pharmacy, Universiti Kebangsaan Malaysia, Kuala Lumpur 50300, Malaysia

[2]Pharmacy Department, Hospital Sultanah Aminah, Ministry of Health Malaysia, Johor Bahru 80000, Malaysia

[3]Faculty of Pharmacy, Universitas Airlangga, Surabaya 60132, Indonesia

Abstract

Background: Post-acute COVID-19 is known to affect multiple organs. It is essential to determine factors that affect post-acute COVID-19 syndrome and medications needed by patients for optimized care.

Methods: A prospective cohort study was conducted among patients recruited by stratified sampling from two COVID-19 hospitals in Malaysia. Patients were followed up for 6 months using a standard questionnaire to identify demographics, symptoms, medications taken, and factors associated with post-acute COVID-19 syndrome.

Results: A total of 388 were successfully followed up. The most frequently reported symptom was respiratory symptoms (N = 168, 43.30%), of which cough (N = 134, 34.54%) was the most common. After 12 weeks of follow-up, respiratory syndrome (N = 56,14.43%) was frequently reported, of which cough (N = 41, 10.57%) was the most common. For respiratory syndrome, patients were commonly managed with diphenhydramine cough suppressants (N = 6, 1.55%, month 4) and metered dose inhaler (MDI) salbutamol (N = 7, 1.8%, month 4). The risk factors for post-acute COVID-19 syndrome were increased by 1.02 times (95% CI: 1.01, 1.04) with each advanced year of age and 2.87 times (95%CI: 1.51–5.48) in the presence of co-morbidities.

Conclusions: Post-acute COVID-19 causes multiorgan involvement, and symptoms may remain for months, with patients taking various medications. Patients with risk factors should be monitored closely for post-acute COVID-19 symptoms.

Keywords: medication, multiorgan, post-acute COVID-19, support, symptoms

INTRODUCTION

Coronavirus disease 2019 (COVID-19) caused 200 million infections globally, with more than 2 million infections recorded in Malaysia.[1] During infection, the virus affects multiple organs, which leads to various signs and symptoms, such as cough, fever, shortness of breath, sore throat, anosmia, ageusia, myalgia, chest pain, and headache during the initial infection.[2] Laboratory abnormalities with different organ involvement, such as lymphopenia, elevated levels of C-reactive protein, impaired liver profile, elevated erythrocyte sedimentation rate, and leukocytosis, have also been reported among COVID-19-infected individuals.[3,4] Despite the recovery, symptoms may persist, a condition termed postacute COVID-19, defined as the presence of symptoms in patients for more than four weeks or one month following a positive infection.[5] Postacute COVID-19 syndrome, alternatively, is defined as the persistence of symptoms for more than 12 weeks or three months.[5] The prevalence of postacute COVID-19 varies between 2% and 86%[6] of those diagnosed with initial COVID-19 infection; however, the numbers can be underreported.

Similar to acute infection, postacute COVID-19 syndrome affects multiple organs, with various symptoms observed among patients.[5] Symptoms following recovery from the initial COVID-19 infection include cough and dyspnea (pulmonary sequelae), fatigue and myalgia (musculoskeletal sequelae), and chest pain and myocarditis (cardiovascular sequelae).[5] Alterations in laboratory findings, such as transaminitis, electrolyte imbalance, hematological abnormalities, and elevation of cardiac markers, can also be observed among patients with postacute COVID-19.[5,7] Moreover, neurological symptoms, such as headache, reduced concentration, and memory, psychiatric manifestations (anxiety, mood disorders, and insomnia), and alterations in the olfactory have been reported among these patients.[5]

Very often, patients continue to take medications to address postacute COVID-19 syndrome. Several papers documented the management of patients with postacute COVID-19, including symptomatic relief medications, such as paracetamol, and nonsteroidal anti-inflammatory drugs, for fever and proton-pump inhibitors for reflux.[8] Anticoagulant treatment has also been continued in patients with a thrombotic event during COVID-19, similar

***Corresponding author:**
Farida Islahudin
Faculty of Pharmacy, Universiti Kebangsaan Malaysia,
Kuala Lumpur, Malaysia
E-mail: faridaislahudin@yahoo.com

to the use of corticosteroids in individuals with organizing pneumonia.[5,8] Nonpharmacological management, such as aerobic exercises and breathing techniques, have been recommended for patients with respiratory symptoms.[8] However, limited reports are available regarding the treatment options for the management of complications associated with postacute COVID-19, especially in community settings. [9] The extent of patient medication to address the symptoms in the local setting is also unclear.

Determining factors that affect postacute COVID-19 syndrome may aid in the optimization of care for patients. The factors associated with postacute COVID-19 syndrome include gender, body mass index, and smoking status. [10] Female patients with a high body mass index and are smokers have a high risk of developing postacute symptoms. Moreover, existing comorbidities, previous admissions to critical care, and lack of vaccination predispose patients to postacute COVID-19 condition.[9,10] Regardless, studies demonstrating the factors associated with postacute COVID-19 syndrome among the local population are lacking. Patients at risk of post-COVID-19 infection must be identified to ensure continuous patient-centered care. Failure to address such issue can lead to further deterioration among patients, as observed in previous reports.[5] Therefore, the urgent need to address the continuous management of patients post-COVID-19 is important to ensure positive outcomes and reduce social and economic burden to the healthcare system.[5] As such, determining factors will allow for the improved management of newly diagnosed COVID-19 patients in the long run. Therefore, this study aimed to identify the occurrence, types of medication, and factors associated with postacute COVID-19 syndrome among the local population.

METHODS

Before conducting this study, approval was obtained from the Medical Research and Ethics Committee, Ministry of Health Malaysia and University Kebangsaan Malaysia (UKM PPI/111/8/JEP-2022-190). This study was registered to the National Medical Research Registry (NMRR-21-754-59611) and conducted in accordance with the ethical standards mentioned in the 1964 Declaration of Helsinki. All patients included in the study provided an informed consent. Confidentiality was maintained throughout the study without any reference to a particular individual.

The study was conducted in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology guidelines. Patients admitted in two COVID-19 hospitals between June 1st, 2021, and November 30th, 2021, were recruited in a prospective cohort study. The inclusion criteria were age 18 years and above, admission with a positive polymerase chain reaction test for COVID-19, being contactable during the 6-month study period, and informed consent. Patients with preexisting psychiatric illnesses determined based on the clinician's diagnosis of incomplete medical data and lost to follow-up were excluded from the study. A stratified sampling method was used to reduce bias. Patients were randomly selected and stratified based on their wards. Randomization was performed using a random number generated using Microsoft Excel (Microsoft Corporation 2018). Cochran's sample size formula was used to calculate the sample size.[11] A minimum of 384 patients was needed based on a population size of 169 000 infected patients over six months in Malaysia (reported in MySejahtera, an application created by the Malaysian government to track COVID-19 patients in Malaysia), with 95% confidence interval (CI), 5% margin of error, and 50% response distribution.

Prior to data collection, the patients were initially screened in accordance with the inclusion criteria during ward admission. Those who had pre-existing psychiatric illness, as diagnosed by a clinician, and incomplete medical data were excluded. Data collection was then conducted in two stages: data collection for patients during hospitalization for stage 1 and follow-up of the same patients following discharge for stage 2. In stage 2, patients who were uncontactable during follow-up were subsequently excluded from the study. The demographic data collected comprised age, ethnicity, and gender. Secondary data from medical records of patients documented during hospitalization were used to collect information on obesity, vaccination status, the number of comorbidities, the number of medications taken by patients before hospitalization, the number of medications used during hospitalization, stages of COVID-19 infection, and symptoms that arose as results of COVID-19 infection.

Following discharge, the patients were followed up monthly for six months. The researchers collected the primary data of patients using standard questions in phone interviews. During each follow-up, the patients were interviewed to determine whether symptoms that were noted during admission lingered. The questions were answered with either a "Yes" or "No." The patients were then asked regarding any medications they were taking to address their symptoms. Responses were the name of the medication taken for each symptom.

The clinical outcome of the study was the incidence of postacute COVID-19 symptoms, postacute COVID-19 syndrome, and medications taken for postacute COVID-19 syndrome. Postacute COVID-19 symptoms were defined as symptoms lasting from 1 to 3 months. Postacute COVID-19 syndrome was defined as symptoms persisting beyond three months.[5]

Statistical Package for Social Science (version 28; IBM Corp., Armonk, N.Y., USA) was used for data analysis. Data on patient demographics, symptoms, and medication

were presented as frequencies and percentages. Simple and multiple logistic regression analyses were performed to determine the factors associated with postacute COVID-19 syndrome. Variables included in simple logistic regression with a *p*-value of <0.25 were included in multiple logistic regression. A *p*-value of <0.05 was considered significant.

RESULTS

A total of 500 patients were recruited to participate in the study during hospitalization. From these patients, 112 patients were excluded due to having either passed away (N = 3, 0.6%) or being uncontactable (N = 109, 21.8%). Exactly 388 patients were successfully followed up for 6 months. The majority of recruited patients were Malay (N = 317; 81.7%) and female (N = 261; 67.3%), with an average age of 48.8 (±17.0) years. Slightly more than half were unvaccinated (N = 231; 59.54%), and most recruited patients had comorbidities (N = 320; 82.5%), with an average of two (±2) medications used in the past and eight (±6) medications used during hospitalization. Stage 3 COVID-19 infection was predominant among the recruited patients (n = 141; 36.3%) (Table 1). Table 1 depicts the demographic findings on patients recruited in the study along with the stages of COVID-19 infection diagnosed and the number of medications used by patients.

Postacute COVID-19 symptoms

More than half of the recruited patients (N = 231; 59.53%) showed postacute COVID-19 symptoms between 1 and 3 months (Figure 1). Figure 1 shows the symptoms involving multiple organs and the trend of recovery in patients during the 6-month study period. The reported postacute COVID-19 symptoms were categorized into respiratory, gastrointestinal, neurological, musculoskeletal, and nonspecific symptoms. A total of 168 (43.30%) patients reported respiratory symptoms, of which cough (N = 134, 34.54%) was the most common. Gastrointestinal symptoms were reported in 42 (10.82%) patients, most of whom reported dyspepsia (N = 29, 7.47%). Fourteen (3.61%) patients reported postacute COVID-19 neurological symptoms, with headache (N = 9, 2.32%) as the most common symptom. A total of 28 (7.22%) patients reported postacute COVID-19 musculoskeletal symptoms, among which fatigue (N = 17, 4.38%) was the most common. Other symptoms, including infrequent, low-grade fever in the majority (N = 103, 26.55%), were reported in 117 (45.62%) patients.

Postacute COVID-19 syndrome

Postacute COVID-19 syndrome was reported in 65 (16.75%) patients, with symptoms lasting for more than 3 months. A total of 56 (14.43%) patients reported respiratory syndrome, with cough (N = 41, 10.57%) as the most common symptom. Gastrointestinal syndrome was absent among patients with postacute COVID-19 syndrome. Neurological and musculoskeletal syndromes were reported in 5 (1.29%) and 8 (2.06%) patients, respectively. Other syndromes (N = 10, 2.6%) were also observed, with fever (N = 6, 1.5%) being the most commonly reported in patients with postacute COVID-19 syndrome.

TABLE 1. Demographic characteristics of patients included in the study (N = 388)

Demographic data	N (%)
Age	48.8 ±17
Ethnicity	
Malay	317 (81.7)
Chinese	24 (6.2)
Indian	41 (10.6)
Others	6 (1.5)
Gender	
Male	127 (32.7)
Female	261 (67.3)
Obesity status	
Obese	170 (43.8)
Non-Obese	218 (56.2)
Vaccination status	
Complete vaccination	115 (29.6)
Partial vaccination	42 (10.8)
Unvaccinated	231 (59.5)
Comorbidities	
Yes	320 (82.5)
No	68 (17.5)
Comorbidities	1.63 ± 1.205
No. of medication prior to admission	2 ± 2
No. of medication on admission	8 ± 6
Stages of COVID-19	
1	15 (3.9)
2	82 (21.1)
3	141 (36.3)
4	125 (32.2)
5	25 (6.4)

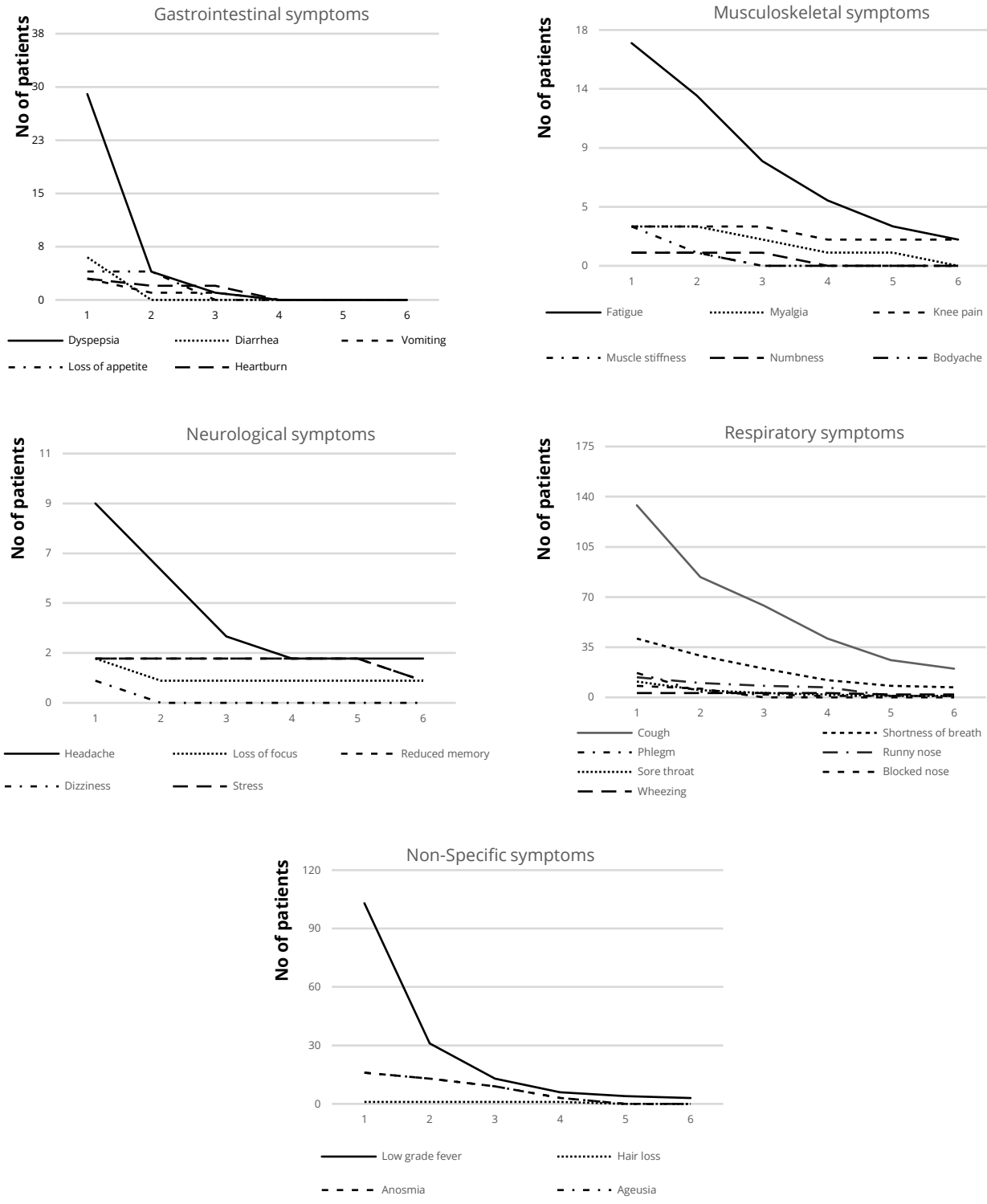

FIGURE 1. Symptoms of postacute COVID-19 over 6 months

TABLE 2. Medications used for the management of postacute COVID-19 (N = 388)

Characteristics	Months, N (%)					
	1	2	3	4	5	6
Respiratory symptoms						
Diphen-hydramine	47 (12.12)	19 (4.90)	13 (3.35)	6 (1.55)	5 (1.29)	3 (0.77)
Cough mixtures	19 (4.90)	15 (3.86)	11 (2.84)	3 (0.77)	2 (0.52)	2 (0.52)
Chlorpeniramine	5 (1.29)	4 (1.03)	2 (0.52)	2 (0.52)	1 (0.26)	1 (0.26)
Prolase	4 (1.03)	3 (0.77)	3 (0.77)	2 (0.52)	1 (0.26)	1 (0.26)
Turbuhaler budesonide/fenoterol	1 (0.26)	1 (0.26)	1 (0.26)	1 (0.26)	1 (0.26)	1 (0.26)
MDI salbutamol	8 (2.06)	8 (2.06)	7 (1.80)	7 (1.80)	5 (1.29)	5 (1.29)
MDI budesonide	4 (1.03)	4 (1.03)	4 (1.03)	4 (1.04)	3 (0.77)	3 (0.77)
MDI ipratropium/fenoterol	1 (0.26)	1 (0.26)	1 (0.26)	1 (0.26)	1 (0.26)	1 (0.26)
Neurological symptoms						
Paracetamol	8 (2.06)	4 (1.03)	1 (0.26)	1 (0.26)	1 (0.26)	1 (0.26)
Musculoskeletal symptoms						
Paracetamol	2 (0.77)	1 (0.26)	1 (0.26)	1 (0.26)	1 (0.26)	0 (0.00)
Other symptoms						
Paracetamol	87 (22.42)	27 (6.96)	11 (2.84)	6 (1.55)	4 (1.03)	3 (0.77)

TABLE 3. Factors associated with postacute COVID-19 syndrome (simple logistic regression)

Variables	OR (95% CI)	*p*
Age	1.02 (1.00, 1.04)	0.01
Male (Female)	1.15 (0.66, 2.01)	0.62
Ethnicity (Malay)		
Indian	0.93 (0.41, 2.28)	0.93
Chinese	0.42 (0.10, 1.85)	0.25
Others	0.00 (0.00, 0.00)	1.00
Obese (Non-obese)	0.36 (0.20, 0.66)	0.00
Vaccination (Vaccinated)		
Partially vaccinated	1.57 (0.61, 4.02)	0.35
Nonvaccinated	1.49 (0.79, 2.82)	0.22
Comorbidities (No comorbidities)	0.43 (0.23, 0.80)	0.01
No. of medication prior to admission	0.97 (0.86, 1.09)	0.60
No. of medication on admission	1.03 (0.99, 1.08)	0.16
Stages of COVID-19 (Stage 1)		
Stage 2	1.34 (0.27, 6.60)	0.72
Stage 3	1.14 (0.24, 5.41)	0.87
Stage 4	1.38 (0.29, 6.60)	0.68
Stage 5	2.05 (0.36, 11.80)	0.42

TABLE 4. Factors associated with postacute COVID-19 syndrome (multiple logistic regression)

Variables	AOR (95% CI)	*p*
Age	1.02(1.01, 1.04)	0.00
Comorbidities (No comorbidities)	2.87 (1.51, 5.48)	0.00

Medications for postacute COVID-19 symptoms

Table 2 shows the medications taken for the first 3 months of postacute COVID-19 symptoms. The most common medications were diphenhydramine for respiratory symptoms (N = 47, 12.12, month 1) and paracetamol (N = 8, 2.06%; N = 2, 0.77%; N = 87, 22.42%, month 1) for neurological, musculoskeletal, and other systems.

Medications for postacute COVID-19 syndrome

In postacute COVID-19 syndrome lasting for 4–6 months, the most common respiratory pharmacological management involved diphenhydramine cough suppressants (N = 6, 1.55%, month 4) and metered dose inhaler (MDI) salbutamol (N = 7, 1.8%, month 4), which continued until month 6. However, for the first 3 months, the patients were initially on various medications, such as diphenhydramine, cough mixtures, hedera helix, bromhexine, loratadine and its combinations, chlorpheniramine, prolase, lozenges, benzydamine gargle, turbuhaler budesonide/fenoterol, MDI salbutamol, MDI budesonide, and MDI ipratropium/ fenoterol. No medications were used for gastrointestinal syndrome among the study population, although pantoprazole, diphenoxylate/atropine, oral rehydration salts, loperamide, metoclopramide, and vitamin B complex were reported for the initial 3 months of postacute COVID-19 gastrointestinal symptoms. For postacute COVID-19 neurological syndrome, paracetamol (N = 1, 0.26%, month 4) was used until the 6th month and for the first 3 months of symptoms. A few medications, such as methyl salicylate liniments, tramadol/orphenadrine, multivitamins, and vitamins B1, 6, and 12, were initially used for musculoskeletal symptom although only paracetamol was continued for postacute COVID-19 musculoskeletal syndrome (N = 1, 0.26%, month

4) until month 5. Similarly, for other postacute COVID-19 syndromes, patients often reported the use of paracetamol (N = 6, 1.55%, month 4) until month 6 for the management of fever and pain, although diclofenac was also used in the first month.

Factors associated with postacute COVID-19 syndrome

Table 3 shows the results of simple logistic regression analyses of factors contributing to postacute COVID-19 syndrome. A simple logistic regression of patients' characteristics was performed to determine the factors associated with postacute COVID-19 syndrome, which are defined as symptoms that persist beyond 3 months.[5] Advanced age, presence of comorbidities, and obesity increased the odds of developing postacute COVID-19 syndrome ($p < 0.05$). Table 4 shows the results of multiple logistic regression analyses of factors contributing to postacute COVID-19 syndrome. Multiple logistic regression was performed on variables with a $p < 0.25$ in simple logistic regression, and a significant relationship was observed between age and comorbidities. An increase in age by one year increased the odds of developing postacute COVID-19 syndrome by 1.02 (95% CI: 1.01–1.04) times. In the presence of comorbidities, the patients were 2.87 (95%CI: 1.51–5.48) times likely to develop postacute COVID-19 syndrome. The Hosmer and Lemeshow test value for fitness was 0.74 and showed good fit of the model.[12] The results of logistic regression showed statistical significance, with an area under the receiver operating characteristic curve of 0.6, which demonstrates the acceptable capability of the model to predict postacute COVID-19 syndrome occurrence.[13]

DISCUSSION

Postacute COVID-19 respiratory symptoms, such as cough and dyspnea, which eventually progress to respiratory syndrome, were commonly observed among patients in the study population. This finding is similar to those of previous work,[5] with less frequent symptoms, such as runny nose, persistent sore throat, blocked nose, and wheezing.[14,15] Despite the high incidence of persistent cough following discharge, a substantial reduction occurred within 5 months, with other studies reporting an average of up to 11 days and 7 months for cough symptoms to subside.[16] However, other symptoms, such as shortness of breath, phlegm, runny nose, and sore throat, improved considerably within 2–3 months, which is a shorter period compared with the 7 months observed in previous studies.[17] Apoptosis and airway epithelial damage 3–6 months post-COVID-19 infection were observed,[17] consistent with the occurrence of symptoms among patients. As such, many patients continued to seek symptomatic treatment, including the use of antihistamines, antitussive, and anti-inflammatory medications, following discharge, similar to the findings of previous reports.[8] The symptomatic treatment frequently used by patients in the study included diphenhydramine for cough, bromhexine for phlegm, and pseudoephedrine for blocked nose, which are often obtained from community health centers.[18,19]

An increase in age was among the factors associated with postacute COVID-19 syndrome. Elderly patients are at risk for persistent symptoms, which possibly trigger or exacerbate chronic conditions that commonly occur in older people, such as cardiovascular diseases, respiratory diseases, neurodegenerative conditions, and functional decline.[20] The elderly have low levels of T-cells and high levels of memory T-cells, predisposing them to aggravated infection and poor outcomes.[21] Moreover, alterations in immune-mediated inflammatory response during infection with sustained activation of the immune system lead to postacute COVID-19 symptoms.[21] In addition, elderly patients may exhibit a prominent increase in the presence of cellular changes without repair.[21] Aging has been strongly associated with frailty, which leads to postacute COVID-19 syndrome,[21,22] which often reduces the quality of life of patients.[23]

The presence of comorbidities also increased the risk of postacute COVID-19. This result was similar to previous findings.[9,24,25] Patients with multiple comorbidities admitted to critical care developed postacute COVID-19 condition 2.5 times more than their counterparts,[9] similar to that observed in the current work. Preexisting illness has been proposed to aggravate the postacute COVID-19 condition as this results in an increased risk of organ injury caused by immune-mediated sequelae, reduction in virus clearance, exacerbated inflammation, and reduced ability of the patient to tolerate injury to organs.[24,26] Moreover, patients with comorbidities are predisposed to prolonged hospitalization and need intensive care,[26] which in turn leads to postacute COVID-19 syndrome,[27,28] supporting the current findings. As such, patients with comorbidities are often monitored more closely in the event of a COVID-19 infection because of the intense management that may be required.[25]

The current work provides insights into the factors of postacute COVID-19 among patients. After discharge, many still face health challenges for up to 6 months. In some cases, symptoms may persist for longer than the study period. At the time of the study, vaccinations were still in the early stages of implementation, and as such, a high number of patients were still not fully vaccinated. Regardless, vaccination status was not a factor of postacute COVID-19 syndrome occurrence, similar to previous reports;[23] this finding highlights the importance of continued postacute COVID-19 monitoring in the population. Among the limitations of the current study was the duration of follow-up for up to 6 months, in which some symptoms may have not fully resolved. In addition, a few patients did default on their follow-up, which required them to be excluded from the study. These

patients either did not respond to phone calls, changed their number or passed away during the data collection. The collected data of the patients were removed and data was not included into the findings. Notably, despite their high number, the different comorbidities present in the study population could not be categorized into appropriate groups due to the low numbers in each category. As such, the use of comorbidities present in the analysis limited our ability to determine those that were most associated with postacute COVID-19 syndrome. Further work using a larger sample size can be performed to determine the association among the types of comorbidities and the risk of postacute COVID-19 syndrome. As with all questionnaire-based surveys, the results of the study were dependent on the honesty of patients throughout the study period and their ability to correctly remember their medications during the interview. The researcher questioned patients on the symptoms that occurred during admission and were still present during the interview and the medications they had taken. However, as the interview was conducted only once a month, some information may have been forgotten, which may have limited our findings. Therefore, generalization should be performed with caution. Despite this issue, the current work demonstrated the need for continuous care of patients post-COVID-19. Postacute COVID-19 demonstrated a multisystem involvement, with patients resorting to over-the-counter medication for relief. As such, a multidisciplinary approach is essential as a part of the follow-up process to ensure individualized treatment and address patient needs.

CONCLUSIONS

Postacute COVID-19 affected more than half of the study population for months after initial infection, with patients requiring various symptomatic approaches to address respiratory, gastrointestinal, musculoskeletal, and neurological symptoms. Patients affected by factors, such as advanced age and the presence of comorbidities, should be given close attention because of their higher risk of developing postacute COVID-19 syndrome. The need for long term care is highlighted in the current work with postacute COVID-19 occuring months after initial infection. As such, healthcare professionals should be aware of the long-term effects of COVID-19 to ensure optimum management of these patients. The role of healthcare professionals should also be extended to primary care, including the need to monitor the use of medications for symptomatic relief. Emphasis should be made on ensuring interactions between multidisciplinary teams to ensure continuity of care is provided.

CONFLICT OF INTEREST

None declared.

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Influenza Prevalence and Risk Factors: A Population-Based Cross-Sectional Study

Kiran Ganesh Balakrishnan
Department of Community Health, Faculty of Medicine, Universiti Kebangsaan Malaysia, Kuala Lumpur 56000, Malaysia, dr.kiranganesh@gmail.com

Mohd Rizal Abd Manaf
Department of Community Health, Faculty of Medicine, Universiti Kebangsaan Malaysia, Kuala Lumpur 56000, Malaysia, mrizal@ppukm.ukm.edu.my

Mohd Rohaizat Hassan
Department of Community Health, Faculty of Medicine, Universiti Kebangsaan Malaysia, Kuala Lumpur 56000, Malaysia, rohaizat@ppukm.ukm.edu.my

Mohd Kamarul Imran Musa
Department of Community Medicine, School of Medical Sciences, Universiti Sains Malaysia, Kelantan 15200, Malaysia, drkamarul@usm.my

Azizul Rahman Mohamad Jamil
Department of Community Health, Faculty of Medicine, Universiti Kebangsaan Malaysia, Kuala Lumpur 56000, Malaysia, azizulrahmanmj@gmail.com

See next page for additional authors

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Influenza Prevalence and Risk Factors: A Population-Based Cross-Sectional Study

Authors

Kiran Ganesh Balakrishnan, Mohd Rizal Abd Manaf, Mohd Rohaizat Hassan, Mohd Kamarul Imran Musa, Azizul Rahman Mohamad Jamil, Norhaslira Abdul Rahim, Umi Kalsom Satariah Ali, and Rahman Jamal

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Influenza Prevalence and Risk Factors: A Population-Based Cross-Sectional Study

Kiran Ganesh Balakrishnan[1], Mohd Rizal Abd Manaf[1*], Mohd Rohaizat Hassan[1], Mohd Kamarul Imran Musa[2], Azizul Rahman Mohamad Jamil[1], Norhaslira Abdul Rahim[3], Umi Kalsom Satariah Ali[4], Rahman Jamal[5]

[1]Department of Community Health, Faculty of Medicine, Universiti Kebangsaan Malaysia, Kuala Lumpur 56000, Malaysia
[2]Department of Community Medicine, School of Medical Sciences, Universiti Sains Malaysia, Kelantan 15200, Malaysia
[3]Klinik Kesihatan Sungai Besi, Kuala Lumpur 57000, Malaysia
[4]Department of Medical Microbiology & Immunology, Faculty of Medicine, Universiti Kebangsaan Malaysia, Kuala Lumpur 56000, Malaysia
[5]Medical Molecular Biology Institute, Universiti Kebangsaan Malaysia, Kuala Lumpur 56000, Malaysia

Abstract

Background: Influenza infection can lead to mortality and morbidity. In densely populated Kuala Lumpur, Malaysia, the transmission of influenza-like illness (ILI) is high. This study assessed the prevalence and epidemiology of influenza in the target population.

Methods: A cross-sectional convenience sample study was conducted in government clinics of Cheras, Malaysia, from November 1, 2022, to February 28, 2023. Consent was sought from patients older than 18 years with symptoms of ILI (fever, cough, and onset within 10 days). A nasopharyngeal swab preceded an influenza rapid test. Logistic regression was used in SPSS 22.0 to evaluate the data.

Results: Among 438 patients, 55 (12.6%) tested positive for influenza type B, 9 (2%) tested positive for type A, and 374 (85.4%) were negative. Patients in the group that was 10 years older than the younger group had 1.47 times the odds of having influenza. The odds of positive influenza rose 1.133 times per unit of body mass index (BMI). Patients with chronic lung illness were 6.7 times (95% confidence interval, 2.742–16.287) more likely to test positive for influenza. Sex and smoking history did not affect the rate of influenza infection ($p > 0.05$).

Conclusions: An association was found between age, BMI, and chronic lung disease with influenza infection but not with sex or smoking.

Keywords: influenza, prevalence, public health, respiratory infection

INTRODUCTION

Viral respiratory infection is recognized as a public health concern likely to result in an increase in morbidity and mortality. Seasonal influenza–associated respiratory infection accounts for an estimated 300,000 to 650,000 deaths worldwide. Sub-Saharan Africa has the highest estimated mortality rate (EMR) of 2.8 to 16.5 per 100,000 individuals, followed by Southeast Asia, which has the second highest EMR of 3.5 to 9.2 per 100,000 individuals. Age-specific EMR is highest among those >75 years old, in whom rates were found to be 51.3 to 99.4 per 100,000 individuals for the year 2018.[1,2] Common organisms causing respiratory infections are rhinovirus (34%), coronavirus (14%), influenza (9%), bacteria (8%), and respiratory syncytial virus (4%). Although influenza is the third most common organism, 37.9% of influenza patients with the illness require consultation, which is higher than among patients with rhinovirus (17.6%) or coronavirus (17.6%)[3]. Previous studies reported that 26% to 37.9% of patients with influenza presented with influenza-like illness (ILI) to outpatient clinics, and 6% to 14% were admitted due to pneumonia in Southeast Asian countries.[3–5] Environmental and host (nonenvironmental) factors contribute to the spread of infection among humans. Environmental factors that contribute to the increase in the spread of respiratory viral infections include rainfall, humidity, ground temperature, particulate matter, and airflow. Nonenvironmental (host) factors that lead to infectivity and complications after respiratory virus infection include patient age, sex, smoking history, body mass index (BMI), socioeconomic status, underlying comorbidities, and immunocompromise.[4,8,9]

Malaysia is a country in Southeast Asia with a population of 32.6 million. It is a middle-income country with a gross national income per capita of USD 10,209 in 2020.[10] The second most common cause of death in Malaysia is lower respiratory tract infections, with total deaths of 23,477

***Corresponding author:**
Mohd Rizal Abd Manaf
Department of Community Health, Faculty of Medicine,
Universiti Kebangsaan Malaysia, Kuala Lumpur, Malaysia
E-mail: mrizal@ppukm.ukm.edu.my

and an age-standardized death rate of 90.22 in the year 2020. Worldwide, Malaysia ranked 33rd for death due to lower respiratory tract infections in 2020.[11] Studies conducted in Malaysia have shown that influenza A is more predominant, followed by influenza B.[9,12–14] In Malaysia, the H1N1 pandemic of 2009 and the COVID-19 pandemic of 2020–2022 raised awareness among the public and health care workers regarding the severity of respiratory viral illness and the importance of prevention. Kuala Lumpur, being the capital city of Malaysia, has a high population density and therefore higher risk of ILI spread. Unfortunately, only a few epidemiological studies have been conducted on influenza in Malaysia. An adult study was performed in Sarawak, Malaysia, in 2019 and a pediatric study in Sabah, Malaysia, in 2022. Obtaining the most up-to-date data on prevalence is essential for public health workers to carry out control and prevention programs. Thus, to address this gap, we conducted a study investigating the prevalence and epidemiology of influenza among the population of Cheras, Kuala Lumpur, using data from patients with ILI who presented to health clinics. The findings of this study will be useful and applicable to other countries and populations with similar distributions as Cheras.

METHODS

This study was approved by the Ministry of Health Medical Research Ethics Committee (NMRR ID-22-01287). We conducted a cross-sectional study in Cheras, Kuala Lumpur, Malaysia, which is under the administration of the Department of Health of Federal Territory Kuala Lumpur & Putrajaya. Cheras has a population density of 7,913/km^2, making it a suitable site.[10] The population of interest comprised adults who sought treatment for ILI in government clinics of Cheras Health District. The study was conducted for a period of 4 months beginning from November 1, 2022, until February 28, 2023. We calculated a sample size of 163 using a web-based sample size calculator (Statulator) estimating for a single proportion, with a 95% confidence level, precision of 0.05, and expected proportion of influenza of 11.9%.[14] With an add-on 20% drop rate to 163 samples, the sample size required was 196. We performed convenience sampling for patients who presented to these clinics. However, this leads to accessibility bias, as patients who did not present to the government clinics in Cheras were not included in this study.

The inclusion criteria were age greater than 18 years and a diagnosis of ILI by the treating physician. In Malaysia, the diagnosis of ILI is based on the guidelines of the World Health Organization, which include a fever of ≥ 38 °C, cough, and onset within the past 10 days.[11] This study focuses on only adult patients; pediatric patients were not included because their risk factors are different than that of adults. Patients who were not keen to participate in this study were excluded. The patient's influenza vaccination history was not explored in this study.

Informed consent was obtained from the identified patients before the clinical samples were collected. Participants were provided an explanation of the sample collection method (nasopharyngeal swabbing technique), informed of complications of the procedures, and advised how the collected information will be reported. Patients were subjected to nasopharyngeal swabbing, whereby the sample was taken by a health care professional. The sample was then subjected to an influenza rapid test, which was done on site. The kit used was the QuickVue Influenza A+B test, which had 94% sensitivity and 90% specificity for influenza A and 70% sensitivity and 97% specificity for influenza B.[15] For each patient, we gathered information such as age, sex, BMI, smoking history, and presence of an underlying chronic lung disease. The results of these clinical samples were recorded in an Excel spreadsheet.

We then analyzed these data to study the prevalence of influenza virus infection among patients with ILI based on their demographics. The prevalence in this study was defined as the number of patients diagnosed with ILI found to be influenza positive, divided by the total number of patients diagnosed with ILI. Categorical data were described by frequency (%) and continuous variables by mean and standard deviation.

We used the Statistical Package for Social Sciences 22.0 (IBM Corporation, Armonk, NY, USA) to analyze the data. We performed a binary logistic regression to estimate the relationship between variables age, sex, BMI, smoking history, and presence of chronic lung disease with the outcome variable (influenza or noninfluenza). Goodness-of-fit statistics were used to determine whether this model adequately described the data. First, the Omnibus test of model coefficients was used to test the model's fit. The Hosmer and Lemeshow test result of >0.05 indicated a good fit (i.e., no difference between the observed and predicted model). Regression estimates, *p* value, odds ratio (OR), and 95% confidence interval (CI) from large-sample Wald confidence intervals were calculated for each variable. A *p* value of 0.05 (two-sided) indicated statistical significance.

RESULTS

We collected a total of 438 samples from patients who presented with ILI to the government health clinic in Cheras district during the 4-month period from November 1, 2022, until February 28, 2023. Table 1 shows the demographic characteristics of the patients involved in this study. The mean age of these patients was 35.28 years, with a standard deviation of 12.94. There were 223 males, accounting for 50.9% of the total sample, and 215 females (49.1%). The mean BMI of the sampled patients

was 25.67 kg/m^2 with a standard deviation of 4.68. Based on smoking history, 26 (5.9%) patients were active smokers, 86 (19.6%) were former smokers (patients who smoked any form of cigarettes in the past, irrespective of duration, and who had quit smoking at the time of this study), and 326 (74.4%) were nonsmokers. Patients were also asked if they had underlying chronic lung diseases such as asthma, chronic obstructive pulmonary disease (COPD), lung cancer, tuberculosis, lung fibrosis, or other lung conditions. Of the patients, 27 (6.2%) had underlying chronic lung disease, whereas 411 (93.8%) patients did not have any underlying lung conditions (Table 1).

Of the 438 patients, 9 (2%) tested positive for influenza type A, 55 (12.6%) tested positive for influenza type B, and 374 (85.4%) tested negative for influenza. The prevalence (95% CI) for influenza type A was 2% (binomial CI: 0.9%–3.8%; normal approximation CI: 0.7%–3.3%). On the other hand, the prevalence (95% CI) for influenza type B was 12.6% (binomial CI: 9.6%–16%; normal approximation CI: 9.5%–15.7%). The prevalence of no influenza was 85.4% (binomial CI: 81.7%–88.6%; normal approximation CI: 82.1%–88.7%). The mean age of patients with no influenza was 34 years as compared with 43 years for influenza-positive patients. The mean BMI of influenza-positive patients was 28.7 kg/m^2, whereas that of patients without influenza was 25.2 kg/m^2. Among the 64 patients who were influenza positive, 39 (60.9%) were male and 25 (39.1%) were female. Nonsmokers accounted for most of the influenza-positive patients (42 [65.6%]), followed by active smokers (16 [25%]) and former smokers (6 [9.4%]). We also found that 49 (76.6%) of the influenza-positive patients did not have an underlying chronic lung condition, whereas 15 (23.4%) of them did (Table 2).

We performed univariate logistic regression. Using SPSS, patients who tested positive for influenza were classified as 1, whereas patients who tested negative for influenza were classified as 0. The relationship between the predictors and the outcome is shown in the the logistic regression table with the variables in the equation. Age and BMI were kept as numerical variables, as the "linear in logit" assumption was satisfied. Based on the logistic regression table, we found that the variables that had significant value were age, BMI, and underlying chronic lung disease. Sex and smoking history were found to be nonsignificant (Table 3).

Subsequently, we performed multiple logistic regression using the variables age, BMI, and underlying chronic lung disease. The variables sex and smoking history were removed. The deviance of goodness-of-fit was 1.000 (a value >0.05), showing that this multiple logistic regression model was a good fit. Nagelkerke's R^2 showed a value of 0.23, indicating that the 23% change in the criterion variable could be accounted for by the predictor variables in the model. The classification table showed that the specificity for this model was 98.1%. The overall accuracy rate was 86.3%. The model-fitting information then showed lower values of Akaike information criterion (AIC) and Bayesian information criterion (BIC) when the nonsignificant variables (sex and smoking history) were removed (AIC: 293.3, BIC: 309.6) as compared with when all five independent variables were included (AIC: 303.4, BIC: 331.9), which indicates a better fit of the model. We found all three variables to be significant and then calculated their adjusted ORs (Table 4). The group that was 10 years older than the younger group had 1.47 (1.039^{10} = 1.52) times the odds of having influenza. On the other hand, a unit rise in BMI increased the likelihood of having positive influenza 1.133 times. For patients with underlying chronic lung illness, the adjusted OR was 6.683, with a 95% CI of 2.742 to 16.287. A patient with an underlying chronic lung disease had a 6.7 times greater chance of testing positive for influenza than those without lung disease (Table 4).

TABLE 1. Demographic status of the patients

Variable	N	%
Number of patients	438	
Age, years		
Mean ± SD	35.28 ±12.94	
Median (Q1–Q3)	32 (25–42)	
Gender		
Male	223	50.9
Female	215	49.1
BMI		
Mean ± SD	25.67 ± 4.68	
Median (Q1–Q3)	25.5 (22.45–28)	
Smoking history		
Nonsmoker	326	74.4
Former smoker	26	5.9
Active smoker	86	19.6
Chronic lung disease		
Absent	411	93.8
Present	27	6.2

TABLE 2. Descriptive data of the patients with influenza

Variable	Influenza negative	Influenza positive
	N (%)	N (%)
Sample size	374 (85.4)	64 (14.6)
Gender		
Female	190 (50.8)	25 (39.1)
Male	184 (49.2)	39 (60.9)
Smoking history		
Nonsmoker	284 (75.9)	42 (65.6)
Former smoker	20 (5.3)	6 (9.4)
Active smoker	70 (18.7)	16 (25.0)
Chronic lung disease		
Absent	362 (96.8)	49 (76.6)
Present	12 (3.2)	15 (23.4)

TABLE 3. Univariate logistic regression: Variables in the equation

Variable	Wald statistic	Unadjusted OR	95% Confidence interval for unadjusted OR		*p*
			Lower bound	Upper bound	
Age	14.876	1.043	1.021	1.065	<0.001
Sex					
Female	*Ref*				
Male	3.145	1.894	0.935	3.837	0.076
BMI	16.014	1.133	1.066	1.204	<0.001
Lung disease					
No	*Ref*				
Yes	17.290	6.706	2.735	16.443	<0.001
Smoking history					
Nonsmoker	*Ref*				
Former smoker	0.119	1.226	0.384	3.915	0.731
Active smoker	0.070	1.112	0.508	2.435	0.791

TABLE 4. Multiple logistic regression: Parameter estimates

Variable	Wald statistic	Adjusted OR	95% Confidence interval for adjusted OR		*p*
			Lower bound	Upper bound	
Age	13.036	1.039	1.018	1.060	<0.001
BMI	16.328	1.133	1.067	1.204	<0.001
Lung disease					
No	*Ref*				
Yes	17.471	6.683	2.742	16.287	<0.001

Based on the tests performed in SPSS, the model-fitting information showed higher values of AIC and BIC when the interactions were done (AIC: 296.7, BIC: 325.2) as compared with when no interactions with variables were done (AIC: 293.3, BIC: 309.6). The deviance of goodness-of-fit was 1.000 (a value greater than 0.05), showing that this multiple logistic regression model had a good fit. We found that, when these variables interacted, all possible interactions were not statistically significant.

DISCUSSION

In this study, we found that age, BMI, and underlying chronic lung conditions were associated with influenza infection among adult patients. These findings are consistent with other studies, in which older persons were found to be at a higher risk of getting infected by respiratory infections and of ending up with complications and mortality. The age-specific EMR was highest among the population older than 75 years, whereby the rates were found to be 51.3 to 99.4 per 100,000 individuals for the year 2018.[1,2] In one study, the authors reported that influenza-associated hospitalization among patients older than 75 years was 47 times higher than that among patients who were aged 25 to 44 years.[16] Adults' immune systems deteriorate as they age, making them more vulnerable to illnesses such as influenza. This drop in immune function could be related to a decrease in immune cell generation or a decrease in the ability of immune cells to operate appropriately.[17] According to the Centers of Disease Control and Prevention, older people are more likely to develop complications, have severe and prolonged disease, and have a higher mortality rate.[8] However, we did not explore those outcomes in this study.

One of the key findings of this paper was that an increase in BMI causes an increase in the odds of having an influenza infection. Research has been conducted on the association between obesity and rate of respiratory infection. In a study conducted in Italy during the COVID-19 pandemic, the authors found that a BMI of >30 kg/m^2 was associated with a higher rate of severe illness. A BMI of >30 kg/m^2 was also associated with a higher rate of mortality following complications of COVID-19.[18] This finding was similar for other respiratory infections, whereby a BMI of >30 kg/m^2 was associated with higher morbidity and hospitalization following respiratory tract infections.[19] A systematic review and meta-analysis found that obese people had a considerably increased risk of influenza infection and hospitalization due to influenza.[20] In addition, according to another study, obese vaccinated persons also had an increased risk of influenza infection as compared with nonobese vaccinated persons.[21]

In this study, we found that the odds of a patient with an underlying chronic lung disease testing positive for influenza were 6.7 times higher than those without a lung disease. These findings were also similar to the results of other studies, which reported that certain medical conditions, such as asthma, COPD, and cystic fibrosis, had a higher association with influenza and that those patients might also develop complications.[8,9,14,22] In a recent study, it was found that, regardless of age or smoking status, patients with COPD had an elevated risk of respiratory

illness–related hospitalization during influenza outbreaks.[23] Many studies have found exacerbations of COPD to be frequently caused by influenza. These exacerbations were linked to worsening airflow obstruction, hospitalization, decreased quality of life, progression of disease, death, and, ultimately, significant health care–related expenses.[24]

The statistical analysis for the present study did not support the hypothesis of previous studies, whereby many studies showed an association between smoking and influenza infection[25,26] and the influence of sex on influenza infection.[11,27] In this study, however, we found no link between sex or smoking and getting the flu. We found that more males (50.9%) were infected with influenza as compared with females (49.1%). However, after we performed logistic regression, we found no significant association between influenza infection rate and sex. On the other hand, based on other previous empirical studies, women of reproductive age have a greater incidence of influenza and influenza-related hospitalizations than men of the same age do, although this pattern reverses before puberty and at older ages.[11] The possible reason why smoking did not exhibit and an association with influenza is that patients self-reported their smoking status, and underreporting or misreporting of smoking behaviors might have occurred, which could lead to bias in these results. In addition, we did not study other confounding variables such as type of housing, income, and number of persons in a household. In addition, patients were not matched in terms of age, BMI, or underlying health conditions to study the effect of smoking and sex, respectively, on influenza infection rates.

This is the first study conducted in Kuala Lumpur, Malaysia, after the COVID-19 pandemic to examine the prevalence of influenza among patients with ILI and their demographics. It allows us to gain a deeper understanding of influenza and facilitates future research, particularly in the area of influenza prevention. This study is limited by the fact that smoking history was self-reported, resulting in bias, and uncontrolled confounding variables such as type of housing, income, and number of persons in a household were not studied here. Because we included only patients who presented themselves to the clinics, there is a potential accessibility bias, thus making it as one of our limitations. We also did not study the patients' other underlying chronic diseases (diabetes mellitus, stroke, and other medical conditions) or history of influenza vaccination. In addition, we selected only those patients who presented to government clinics in the Cheras Health District; patients attending private clinic were excluded. In light of the study's objectives, it is imperative to approach the interpretation of the results with caution, considering the limitations inherent in the convenience sampling method used and other risk factors (patients' underlying medical illness) not being explored. The findings of this study can be used to understand the prevalence of ILI in other countries/areas with a similar tropical climate and population with a similar distribution as Cheras.

CONCLUSIONS

The aim of this study was to determine the prevalence and epidemiological characteristics of influenza among the target population. We found that among this study population, 12.6% tested positive for influenza type B, 2% tested positive for influenza type A, and 85.4% tested negative for influenza. This study provides evidence that influenza contributes to ILI cases in the Cheras population, whereby there is an association between age, BMI, and underlying chronic lung condition with influenza infection; however, there was no significant association between sex or smoking with influenza infection. Findings of this study will also be useful for other countries and populations with similar population distributions as Cheras. Therefore, we recommend the use of rapid influenza testing kits in health care facilities and other private clinics. This will aid in the early detection of influenza and the reduction in morbidity and mortality following influenza infection, especially among those with risk factors. Future surveillance of influenza virus molecular characterization will provide a greater understanding of influenza within the community.

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CONFLICT OF INTEREST

None declared.

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