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TABLE OF CONTENTS

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Assessing Community Readiness and Benefits of a Nursing Program: Implications for Healthcare and Education

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Abstract

Assessing Community Readiness and Benefits of a Nursing Program: Implications for Healthcare and Education. In response to recent policy shifts allowing the establishment of new nursing programs in the Philippines, this study assesses the perceived readiness of Sorsogon, a geographically underserved province, to implement a bachelor of science in nursing program. It also explores the anticipated benefits that such a program may offer to students and the local community. A cross-sectional survey of 375 stakeholders, selected through purposive sampling, was conducted using a validated instrument developed through expert consultation. Quantitative data were analyzed using descriptive statistics, while qualitative responses were examined through thematic analysis. The findings reveal widespread support for the proposed program, emphasizing its potential to enhance clinical competence, promote holistic health, and expand access to healthcare services in the region. However, respondents also cited institutional limitations, including inadequate infrastructure and a shortage of qualified faculty. While limited by its reliance on self-reported data and geographically concentrated sampling, the study offers timely, place-based insights that can inform educational planning and equitable health workforce development in rural Philippine settings. The findings highlight the need for faculty and infrastructure investments, offering a basis for policymakers and institutions to implement nursing programs that address regional healthcare gaps.

Keywords: community health, educational access, healthcare needs, nursing education, perceived benefits, professional growth

Abstrak

Menilai Kesiapan Komunitas dan Manfaat Program Pendidikan Keperawatan: Implikasi bagi Pelayanan Kesehatan dan Pendidikan. *Sejalan dengan perubahan kebijakan terbaru yang memungkinkan pendirian program pendidikan keperawatan baru di Filipina, studi ini mengobservasi persepsi tentang kesiapan Provinsi Sorsogon sebagai wilayah yang kurang diperhatikan secara geografis untuk menyelenggarakan program sarjana keperawatan. Studi ini juga mengeksplorasi manfaat yang diharapkan dari program tersebut bagi mahasiswa dan komunitas lokal. Survei* cross-sectional *menggunakan instrumen tervalidasi yang dikembangkan melalui konsultasi pakar, kemudian disebarkan kepada 375 pemangku kepentingan yang dipilih melalui* purposive sampling*. Data kuantitatif dianalisis menggunakan statistik deskriptif, sedangkan respons kualitatif ditelaah melalui analisis tematik. Hasil menunjukkan adanya dukungan luas terhadap program yang diusulkan, dengan penekanan pada potensinya untuk meningkatkan kompetensi klinis, mempromosikan kesehatan holistik, dan memperluas akses terhadap layanan kesehatan di wilayah tersebut. Namun, responden juga menyoroti keterbatasan institusional, termasuk infrastruktur yang tidak memadai dan kurangnya tenaga pengajar berkualifikasi. Meskipun penelitian ini bergantung pada data yang dilaporkan sendiri dan pengambilan sampel yang terkonsentrasi secara geografis, studi ini menawarkan hasil penelitian berbasis lokal untuk mendukung perencanaan pendidikan dan pengembangan tenaga kesehatan yang berkeadilan di wilayah pedesaan Filipina. Temuan ini menegaskan perlunya investasi pada tenaga pengajar dan infrastruktur sebagai langkah awal bagi pembuat kebijakan dan institusi untuk menerapkan program keperawatan yang mampu menjawab kesenjangan layanan kesehatan regional.*

Kata Kunci: *akses pendidikan, kebutuhan layanan kesehatan, kesehatan masyarakat, manfaat yang dirasakan, pendidikan keperawatan, pengembangan profesional*

Introduction

Sorsogon's lack of locally trained nurses has long strained the provincial healthcare system, a situation that intensified during the COVID-19 pandemic. While midwifery programs are offered, the absence of a bachelor of science in nursing (BSN) program forces aspiring nurses to pursue training outside the province, resulting in financial strain, geographic barriers, and continued workforce attrition. Studies from Sorsogon and Albay provinces have highlighted persistent manpower gaps, particularly in nursing, due to inadequate staffing, limited equipment, and insufficient facilities (Cruz-Lisay, 2023; Rojas & De Castro, 2023). Although exact local nurse-to-patient ratios are not always reported, national data indicate that ratios can reach as high as 1:50 in some public hospitals, far exceeding the Department of Health's recommended 1:12 standard (Alibudbud, 2023; de la Cruz, 2023). These challenges raise serious concerns about healthcare accessibility, service quality, and long-term workforce sustainability. They also underscore the urgency of establishing a local BSN program that can improve access to nursing education and strengthen healthcare delivery in the province.

Globally, the COVID-19 pandemic exposed and intensified chronic shortages in the nursing workforce. According to the World Health Organization (WHO) (2020), the world faces a deficit of approximately 5.9 million nurses, which significantly hinders healthcare delivery and emergency response capacity. Nurses play an essential role in hospitals and communities, administering vaccinations, managing chronic illnesses, and providing frontline care during crises (Buchan et al., 2022; Chan et al., 2021; Mentis et al., 2024). The shortage results in increased workloads, professional burnout, and a decline in the quality of patient care (Falatah, 2021).

In the Philippines, the COVID-19 pandemic underscored the urgent need for more nurses (Ancheta et al., 2021; Buchan & Catton, 2020). The country's already resource-limited healthcare system was overwhelmed during the crisis (De Castro et al., 2021). In response, the Commission on Higher Education (CHED) lifted its decade-long moratorium on new undergraduate nursing programs—a policy originally imposed to control graduate oversupply (Sevillano, 2022). As of 2022, the country had 90,205 nurses, far below the estimated requirement of 300,470 (Rita, 2022). While this national decision aims to address workforce gaps, its local implications must be carefully considered. In provinces like Sorsogon, where no BSN program currently exists, the lifting of the moratorium raises critical concerns about institutional readiness, infrastructure, and the ability to sustain quality nursing education (Rita, 2022; Sevillano, 2022). Lifting the moratorium marks a major shift in nursing education policy. For over a decade, the restriction aimed to control the oversupply of nurses. However, the shortage necessitates urgent measures to increase the supply of qualified nurses (Sevillano, 2022). This policy reflects the government's commitment to addressing the gaps exposed by the pandemic.

The Bicol region has been identified as a high-priority area for new nursing programs due to its significant healthcare needs (Rita, 2022). Sorsogon, as part of this region, reflects many of the Philippines' broader health challenges. Sorsogon State University (SorSU) is poised to play a vital role in addressing these challenges by offering a BSN program. According to SorSU's (2024) institutional data, the university serves 14,454 students, including 13,821 bachelors'-level learners, supported by 467 full-time academic staff members. This indicates a substantial educational and faculty capacity to introduce a nursing program. The initiative aligns with the university's vision of contributing to regional and national development. Offering a local BSN program would create more opportunities for students and help alleviate the regional nursing shortage. By training nurses locally, graduates would be better equipped to address community health needs within Sorsogon's sociocultural context.

Studies examining nursing education and health-care access in underserved regions highlight how geographic isolation, limited institutional capacity, and workforce migration affect health outcomes and student access. For example, Bautista et al. (2019) identified stark disparities in licensure outcomes among Philippine nursing schools, with lower-performing institutions often concentrated in rural areas. International research also emphasizes the importance of preparing nurses to serve rural and underserved populations, as shown by Rutledge et al. (2014), who advocated for educational models tailored to these contexts. Drawing from these perspectives, this study explores how a localized BSN program in Sorsogon may address similar structural and geographic challenges.

This study aims to assess the perceived community readiness for and potential benefits of a nursing program in Sorsogon, Philippines. The objectives of this study include: (1) understanding the needs of the community from a range of perspectives; (2) gauging their perceptions of the local community's readiness to implement the program; and (3) identifying the perceived benefits of such an initiative for the students and the local community.

Methods

This study employed a cross-sectional survey research design to assess the perceived readiness for and potential benefits of introducing a nursing program in Sorsogon, Philippines. The design allowed for the collection of data at a single point in time, offering a comprehensive snapshot of stakeholders' perceptions regarding the feasibility and value of the proposed academic offering (Setia, 2016).

A total of 375 respondents participated in the study, comprising 126 college students, 121 senior high school (SHS) students, 63 parents, and other relevant stakeholders. Participants were selected through purposive sampling, targeting individuals who were readily accessible and willing to participate in the survey. This approach was chosen due to practical constraints such as limited time and resources, and because the study was exploratory in nature.

The primary instrument used was a structured survey questionnaire designed to gather information across three key areas. The first section consisted of four items collecting demographic information: sex, age, educational background, and role in the community. The second section focused on perceived readiness, comprising four dichotomous (yes/no) items assessing the sufficiency of local resources and institutional capacity to offer a BSN program. An example item is "Is there a need to offer a local BSN program?" The third section assessed perceived benefits using a checklist format with 19 items divided into three sections: perceived benefits of offering a nursing program (nine items), benefits of the nursing program to students' professional growth (five items), and perceived benefits of a nursing program to the community (five items). Respondents were asked to select the expected benefits of the program. A sample item is "Train and produce graduates equipped with leadership and clinical skills." This format enabled categorical data collection and frequency analysis to better understand stakeholder perceptions.

To ensure content validity, the questionnaire underwent reviewers' evaluation. A panel composed of three registered nurses with doctoral-level coursework and the dean of the College of Teacher Education and Midwifery reviewed the survey for relevance, alignment with nursing education goals, and accuracy. Two language experts also reviewed the instrument to ensure clarity, precision, and comprehensibility across diverse respondent groups. The questionnaire was disseminated online via Google Forms and remained accessible for one month. The survey link was distributed through email and social media platforms to reach the intended respondent groups.

In addition to the survey, qualitative data were gathered through semi-structured interviews with

26 rich-case respondents, including senior high school students (n = 3), a college student (n = 1), parents (n = 4), a midwifery student (n = 1), faculty members (n = 6), healthcare professionals (n = 6), community leaders and stakeholders (n = 4), and a university administrator (n = 1). These participants were purposively selected based on their capacity to provide meaningful insights into educational access, local healthcare challenges, and the potential impact of implementing a BSN program in Sorsogon. Participation was voluntary, informed consent was obtained, and all responses were kept confidential. No personally identifiable information was collected. The interviews aimed to explore stakeholder perspectives on institutional readiness, community health needs, and perceived program benefits. Sample guiding questions included "What barriers do you face in accessing nursing education?", "How do you think a local nursing program could improve healthcare in your area?", and "What benefits do you foresee for students and the community?"

The qualitative data were analyzed using thematic analysis, following Braun and Clarke's (2006) six-phase framework. This involved familiarization with the data through transcript review, generation of initial codes, development and refinement of thematic categories, and definition of key themes. Representative quotes were selected to illustrate each theme and reflect the diversity of stakeholder voices. Quantitative data were analyzed using descriptive statistics to summarize demographic profiles and identify patterns in perceived readiness and expected program benefits. Integrated, these methods were deemed appropriate for capturing both measurable trends and deeper meanings in stakeholder responses, enabling triangulation and a comprehensive understanding of support for the proposed BSN program.

Results

The study included 375 respondents, with college students (33.60%) and SHS students (32.27%) forming the majority. These groups, representing current and prospective tertiary-level learners, expressed strong support for the proposed nursing program. As shown in Table 1, among the SHS students, 95% (n = 115) indicated a willingness to enroll if the program were offered locally. Parents accounted for 16.80% of the sample, underscoring broader community interest in expanding local healthcare education options. Other respondents included working professionals (10.93%), government employees in teaching (3.73%) and non-teaching (0.53%) roles, stakeholders (1.60%), and a few midwifery (0.27%) and junior high school students (0.27%).

As summarized in Table 1, support for the program was evident across all groups, although motivations varied. SHS students viewed a local nursing program as a means to access affordable higher education. Parents emphasized long-term benefits such as employment stability for their children and improved healthcare access for the community. College and midwifery students saw the program as an opportunity

Table 1. Profile of Respondents Supporting the Introduction of a Local Nursing Program (N = 375)

Participants	n	%
College students (diploma/bachelor's degree)	126	33.60
SHS students	121	32.27
Parents	63	16.80
Working professionals	41	10.93
Government employees (teaching)	14	3.73
Stakeholders	6	1.60
Government employees (non-teaching)	2	0.53
Midwifery students	1	0.27
Junior high school students	1	0.27

Table 2. Perceived Readiness to Open a Nursing Program (N = 375)

Items	Yes		No	
	f	%	f	%
Is there a need to offer a local BSN program?	373	99.47	2	0.53
Are the local education institutions capable/ready to offer a BSN program?	358	95.47	17	4.53
Will the offering of a BSN program address the healthcare needs of the local community and beyond?	372	99.20	3	0.80
Will the offering of a BSN program strengthen the healthcare delivery system of the local community and the country as a whole?	372	99.20	3	0.80

for career advancement, expressing interest in broadening their professional qualifications. The participation of government employees, stakeholders, and other professionals, though smaller in proportion, indicates a multisectoral interest that may be leveraged for policy support and program sustainability.

Interviews with selected rich-case respondents revealed three recurring themes: 1) accessibility and affordability of nursing education; 2) community healthcare improvement; and 3) career advancement. Respondent 11, an SHS student, stated, "Gusto ko mag-nurse pero hindi namin kaya sa Manila. Sana meron dito." (I want to become a nurse, but we can't afford to study in Manila. I hope it becomes available here.) Respondent 3, a midwifery student, commented, "Maganda ang midwifery, pero mas malawak ang trabaho kung may BSN." (Midwifery is good, but there are more job options with a BSN.)

Respondent 41, a parent, echoed the program's potential to strengthen local healthcare: "Kapag may sariling nurse ang barangay, mas mabilis ang serbisyo." (If our barangay had its own nurse, healthcare services would be faster.) Notably, SHS students emphasized affordability and proximity, while parents focused more on the potential community benefits of having locally trained healthcare providers. Midwifery students expressed aspirations for broader career advancement through a BSN program.

This section presents the respondents' perceptions of the community's readiness to open a local BSN program. The findings reflect a high level of consensus in favor of the initiative and broad recognition of its potential benefits for healthcare and education (Table 2). Notably, 99.47% agreed that there was a need to offer a local BSN program, while 99.20% believed it would address the healthcare needs of the community and strengthen the healthcare delivery system. Although a slightly lower percentage (95.47%) expressed confidence in local institutions' capacity to implement the program, the overall response indicates strong perceived readiness.

As shown in Table 2, these findings suggest widespread support for the program's establishment and its perceived impact on community health systems. However, the relatively lower agreement on institutional readiness (95.47%)—compared to need and impact—may point to reservations about existing infrastructure and faculty capacity, warranting closer attention to implementation logistics.

Follow-up interviews revealed that while most respondents supported the program, some—especially parents—voiced concerns about current resources. For example, Respondent 71, a parent, noted, "Maganda sana ang BSN program dito, pero kulang tayo sa laboratory para sa practical trainings." (The BSN program would be great here, but we lack laboratories for practical trainings.) Similarly, Respondent 154 (also a parent) stated, "Suportado ko ang program, pero kailangan pa natin ng mas maraming qualified na nursing instructors." (I support the program, but we still need more qualified nursing instructors.) These subgroup insights indicate that parents were slightly more

Table 3. Perceived Benefits of Offering a Local Nursing Program (N = 375)

Items	f	%	Rank
Train and produce graduates equipped with leadership and clinical skills	375	100.00	1
Fulfill the opportunity to extend and maximize health services for clientele	372	99.20	2
Tap the vast research potential in the areas of health and health-related programs	369	98.40	3
Establish and strengthen links with other agencies and stakeholders	356	94.93	4
Provide more avenues to disseminate information on local programs and projects	352	93.87	5
Enhance the research, extension/outreach, and instructional capabilities of faculty members in the vast and broad areas of health and health-related programs	331	88.27	6
Potentially facilitate the development of local health-related programs and beyond by producing quality graduates and nurse professionals	328	87.47	7
Strengthen awareness of shared responsibilities between the academe and the community	326	86.93	8
Strengthen local educational institutions	324	86.40	9

concerned about faculty shortages and resource limitations than students, who focused more on access and affordability.

These perspectives suggest that while community support for the BSN program was overwhelmingly positive, successful implementation would depend on strengthening infrastructure and ensuring the availability of qualified faculty.

The perceived benefits of offering a local BSN program reflect the community's strong belief in its transformative potential for both education and healthcare. Despite anticipated resource demands, the respondents expressed overwhelmingly positive views. As shown in Table 3, the top-rated benefit was the training of graduates with leadership and clinical skills (100%), followed by expanding health services (99.20%) and unlocking health-related research opportunities (98.40%). These findings suggest that the program was seen not only as a solution to local workforce needs but also as a catalyst for research, extension work/outreach program, and community health initiative.

The slightly lower agreement on institutional strengthening (86.40%) and shared responsibilities between the academe and community (86.93%) may reflect latent concerns about long-term structural impact and implementation coordination. While the program is seen as highly beneficial, these results point to the need for clear institutional planning and capacity-building to ensure sustainable and collaborative program delivery.

The data reveal a strong consensus regarding the program's capacity to develop graduates with essential leadership and clinical competencies, as reflected by 100% agreement among respondents. As Respondent 21, an SHS student, shared: "Ang programang ito ay makakatulong sa mga estudyanteng maging lider sa healthcare." (This program will help students become leaders in healthcare). Likewise, Respondent 45, a parent, noted, "Yung mga gagraduate dito, may sapat na kakayahan para magbigay ng maayos na serbisyo sa pasyente." (Graduates from this program will have the necessary skills to provide quality patient care).

Beyond workforce development, most respondents believed that the program would enable institutions to serve the community more effectively and support regional research capacity. Respondent 33, a faculty member, stated, "Makakatulong ang BSN para maabot pa namin ang mas maraming miyembro ng komunidad." (The BSN program will help us reach more community members), while Respondent 58, a healthcare professional, emphasized, "Magbubukas ito ng maraming pagkakataon sa pananaliksik sa kalusugan sa ating rehiyon." (This will open up many opportunities for health research in our
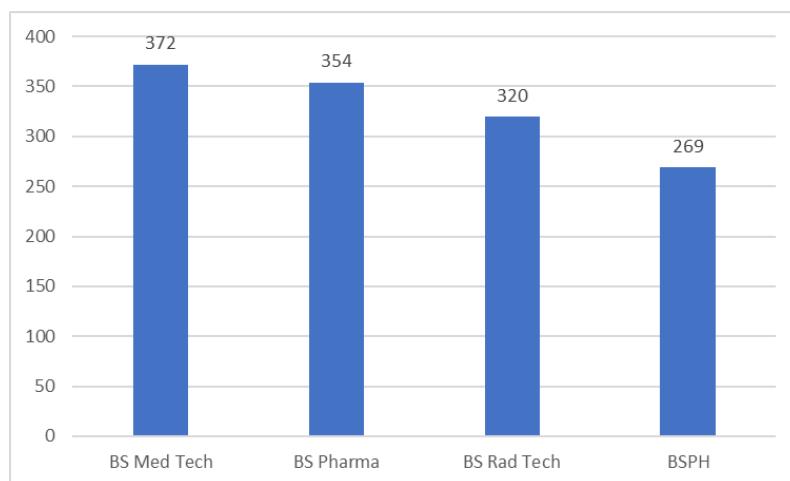
Figure 1. Other health and sciences programs recommended by respondents

region). The program's potential to build partnerships was recognized by 94.93% of respondents. Respondent 72, a community leader, explained, "Makikipagtulungan tayo sa mga ospital at healthcare organizations." (We will be able to collaborate with hospitals and healthcare organizations).

Dissemination of community health programs (93.87%) and faculty development in research and instruction (88.27%) were also seen as key benefits. Respondent 291, a university administrator, shared, "Makakabuti ito sa pagpapalawak ng research at extension work ng unibersidad." (It will help expand our university's research and extension work.). Meanwhile, respondent 47, a faculty member, noted, "Mas maeengganyo ang faculty na gumawa ng pananaliksik at pagbutihin ang pagtuturo." (Faculty will be more motivated to do research and improve teaching).

While still positively rated, benefits related to faculty development (88.27%), institutional strengthening (86.40%), and shared responsibilities between the academe and community (86.93%) ranked slightly lower. These results may reflect a degree of uncertainty about long-term structural capacity and coordination. Some interviewees expressed that a broader portfolio of programs would be more impactful. Respondent 132, a senior academic staff member, re-

marked, "Mahalaga ang BSN, pero hindi sapat para iangat ang buong reputasyon ng paaralan." (The BSN is important but may not be enough to elevate the university's full standing). Respondent 91, a community leader, stated, "Mas makakabuti kung may BS med tech, BS pharmacy, o public health din." (It would be better if there were also BS med tech, BS pharmacy, or public health programs).

Notably, community leaders and academic staff were more likely to raise concerns about institutional reputation and program breadth, while students and parents focused on direct benefits such as employment and service delivery. This suggests that views on long-term structural impact varied according to stakeholders' roles within the education and healthcare ecosystem. As illustrated in Figure 1, a substantial number of respondents strongly advocated for the inclusion of additional health science programs beyond the proposed BS nursing program. The bachelor of science in medical technology (BS med tech) received the most support (n = 372), followed by BS pharmacy (n = 354), BS radiologic technology (n = 320), and BS public health (n = 269). This reflects a pronounced community interest in diversifying local academic offerings within the health sciences.

The strong support for a BS med tech and BS pharmacy indicates that the respondents valued

Table 4. Benefits of a Nursing Program for Students' Professional Growth (N = 375)

Items	f	%	Rank
Enhance the student's value of holistic health and caring	370	98.67	1
Provide more opportunities for the students to attend seminars, colloquia, paper presentations and other similar activities	362	96.53	2
Reorient and strengthen the personal values of the students	353	94.13	3
Promote and strengthen camaraderie among the students	352	93.87	4
Enhance the student's personal convictions through participation in various activities conducted by the department or the college as a whole	329	87.73	5

Table 5. Perceived Benefits of the Nursing Program for the Community (N = 375)

Items	f	%	Rank
Facilitate the promotion of wellness and prevention of illness at the community level	368	98.13	1
Improve the community's economic well-being by reducing health-related costs.	360	96.00	2
Improve the social understanding of health in the community	342	91.20	3
Address the professional needs of the community by providing a more accessible academic community	339	90.40	4
Increase stakeholders' awareness of political, social, and economic aspects of health promotion and disease prevention	335	89.33	5

programs that align closely with laboratory diagnostics and pharmaceutical services, which are seen as essential complements to nursing care. Notably, healthcare professionals were more likely to advocate for these additional programs, citing the need to address community health comprehensively. For instance, Respondent 260, a local healthcare worker, stated, "Including programs like BS med tech and BS pharm alongside the nursing program would significantly enrich the local academic offerings and address the varied needs of both students and the community." Meanwhile, the students highlighted the importance of career diversity and specialization. Respondent 178, a college student, remarked, "Expanding the curriculum to include these additional programs would prepare students for diverse career paths and strengthen the local community's role in regional healthcare." These subgroup-specific views suggest that professionals prioritize systemic health delivery, while students emphasize employment and training opportunities.

The community's recommendations reflect a broader vision for enhancing the institution's academic portfolio and public health contributions. Including multiple health-related programs was seen as a means to provide more comprehensive educational pathways and address evolving regional workforce needs. These findings suggest that long-term academic planning should consider a multi-program approach to effectively align with stakeholder expectations and strengthen the institution's relevance within the local healthcare ecosystem.

The introduction of a local BSN program was anticipated to significantly enhance the professional development of students. Table 4 summarizes how the program was perceived to foster growth across professional, ethical, and interpersonal dimensions. The most highly endorsed benefit (98.67%) was the enhancement of students' appreciation for holistic health and caring. This suggests that the respondents valued a nursing education that goes beyond technical skills to include the humanistic and ethical dimensions of care.

As Respondent 32, a healthcare educator, explained, "Ang pagtutok sa holistic health ay mahalaga sa paghubog ng mga nurse na may malasakit sa kabuuan ng pasyente." (The focus

on holistic health is essential for shaping nurses who care for the whole person.). Similarly, 96.53% supported the program's potential to expand academic exposure through seminars, colloquia, and research presentations. These experiences were seen as key to developing students' competencies and professional identities. As Respondent 147, a healthcare practitioner, noted, "Ang mga ganitong aktibidad ay napakahalaga para sa lifelong learning at professional growth." (Such activities are essential for lifelong learning and professional growth.). In addition, 94.13% of respondents believed the program would help reorient and strengthen personal values such as empathy and ethics. Respondent 258, a community health worker, shared, "Napakahalaga na ang mga nurse ay may matibay na pagpapahalaga at malasakit." (It's important that nurses are grounded in strong personal values and compassion).

The program's role in fostering interpersonal development was also highlighted. About 93.87% agreed that it would promote teamwork and camaraderie among students, a crucial quality for clinical settings. As Respondent 64, a senior faculty member, stated, "Ang pagtutulungan sa klase ay magandang paghahanda para sa mga gawain sa ospital." (Teamwork in class is good preparation for clinical collaboration in hospitals). Finally, 87.73% emphasized the importance of student participation in institutional activities to foster their commitment and identities as nursing professionals. Respondent 189, a faculty member, observed, "Ang pakikilahok sa mga aktibidad ay nagpapalalim ng dedikasyon sa propesyon." (Participation in activities deepens students' commitment to the profession).

These findings affirm that beyond academic instruction, the BSN program was perceived as a platform for forming ethical, collaborative, and purpose-driven professionals. Notably, faculty members and healthcare professionals emphasized professional identity, values formation, and lifelong learning, while students placed more importance on exposure to academic and research opportunities. This subgroup trend reflects how professional stakeholders prioritize internal development, while students focus on external growth and engagement. These insights support the program's role as a catalyst for producing holistic nursing professionals who are prepared to meet both local and global healthcare demands.

The proposed BSN program was widely perceived as a catalyst for improving public health outcomes and community well-being. Table 5 summarizes the respondents' views on the program's anticipated contributions to the broader community, particularly in health promotion, accessibility, and stakeholder engagement.

The most highly endorsed benefit (98.13%) was the program's potential to promote wellness and prevent illness at the community level. These finding underscores how respondents viewed nursing not just as a clinical profession but as a public health intervention. Respondent 2, a local health advocate, emphasized, "Ang pagkakaroon ng BSN program ay magpapalakas hindi lang sa bilang ng health workers kundi pati sa kalusugan ng komunidad." (Having a BSN program will not only increase the number of health workers but also improve community well-being). Moreover, 96% highlighted the program's capacity to enhance the economic aspects of health. Improved healthcare access may lower household out-of-pocket expenses, local government health spending, and productivity losses for small businesses (e.g., fewer costly referrals and missed workdays). As Respondent 74, a local business owner, shared, "Ang mas maayos na serbisyo sa kalusugan ay makakatulong din sa ekonomiya ng lugar." (Improved healthcare services also support local economic growth by reducing health-related financial burdens).

The BSN program was also perceived to foster greater public awareness and understanding of health issues (91.20%). This is particularly relevant in underserved areas, where health literacy gaps often persist. As Respondent 143, a community leader, noted, "Mahalaga ang kaa-
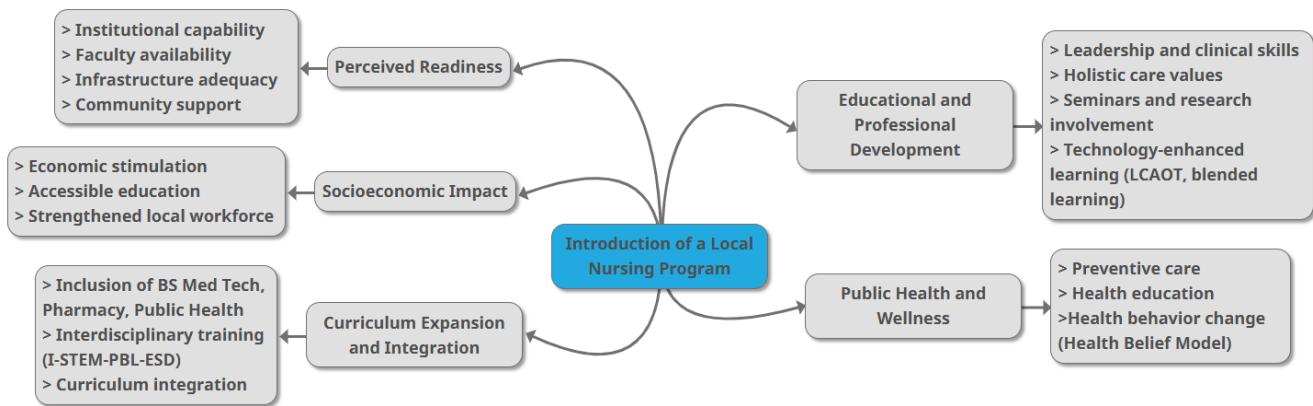
Figure 2. Thematic Framework of Stakeholder Perspectives on the Introduction of a Local Nursing Program

laman ng publiko para sa epektibong health promotion." (Public awareness is key to effective health promotion.). About 90.40% of respondents believed that offering the program locally would help meet academic and professional needs by improving educational accessibility. Respondent 56, a recent high school graduate, shared, "Napakalaking tulong ng local nursing program sa amin na gustong magaral pero walang kakayahang lumayo." (A local nursing program is a big help for those of us who want to study but cannot afford to move away). Finally, 89.33% viewed the program as a way to raise stakeholder awareness of the broader political, social, and economic dimensions of public health. This was seen as important for improving multisectoral coordination. As Respondent 85, a healthcare professional, stated, "Mas magiging coordinated ang mga hakbang sa public health kung may sapat na kaalaman ang lahat ng sektor." (Public health initiatives will be more coordinated when all sectors are well informed).

These results suggest that the BSN program is seen not only as an academic offering but as a community-centered strategy for sustainable development. The high endorsement of economic, social, and educational benefits reveals that the program is valued for its broader systemic impact. Notably, local professionals and health advocates emphasized long-term public health outcomes, while students and recent gra-

duates were more focused on accessibility and economic relief. This subgroup trend highlights how different sectors anticipate distinct yet complementary benefits from the program, underscoring its multidimensional relevance.

Figure 2 presents the key themes derived from thematic analysis, synthesizing stakeholder perspectives on perceived readiness, educational and professional development, curriculum expansion, public health implications, and socioeconomic impact. This framework serves as a conceptual anchor for the ensuing discussion.

Discussion

The findings from this study demonstrate significant support for the introduction of a local nursing program, indicating both the community's perceived readiness and the anticipated benefits that such a program could bring. These findings resonate with established literature indicating that implementing nursing programs in underserved regions enhances healthcare access, strengthens workforce capabilities, and promotes regional development (Rita, 2022; Rutledge et al., 2014). Participants emphasized the program's potential to develop holistic health perspectives, increase professional development opportunities, and reinforce core values and collaboration – attributes aligned with contemporary nursing education that emphasizes both technical proficiency and compassion-

ate care (Nabizadeh-Gharghozar, 2021).

From a policy and geographic standpoint, the province of Sorsogon, where the study was conducted, faces enduring challenges typical of rural higher education settings in the Philippines (Bautista et al., 2019; Funa, 2024). These include a limited pool of licensed nursing faculty, under-resourced laboratories, and inadequate simulation facilities. The respondents emphasized that these issues could hinder the delivery of a credible nursing education program, despite the presence of midwifery program in the province. As Respondent 88, a parent, noted, "Gusto naming magka-nursing program dito, kahit may midwifery na, pero paano kung walang sapat na guro o laboratory?" (We want a nursing program here, in addition to midwifery, but what if there are no qualified teachers or laboratories?). This aligns with Funa's (2024) study, which highlighted limitations in midwifery training and the need for expanded clinical opportunities and support systems. Incorporating a BSN program alongside existing midwifery education could help mitigate these gaps by providing broader clinical exposure and stronger institutional frameworks.

Although policies such as CHED Memorandum Order No. 15, series of 2017, which sets minimum standards for nursing programs, include requirements for qualified faculty, skills laboratories, and clinical affiliations, many rural institutions like those in Sorsogon struggle to meet these without targeted support (CHED, 2017). This aligns with national observations that geographically isolated and disadvantaged areas face systemic constraints in offering healthcare-related degrees (Bautista et al., 2019). These gaps point to the urgent need for regionally responsive implementation of CHED policies, local government support for academic infrastructure, and faculty development programs to build sustainable local capacity. To effectively address these challenges, a phased, policy-driven approach is recommended. This includes forming resource-sharing consortia among educational institutions for faculty and equipment

support, offering CHED- or LGU-led incentive programs (e.g., scholarship-for-service, rural faculty grants), and implementing blended learning and virtual simulation to temporarily offset infrastructural limitations while physical facilities are being developed.

The qualitative insights enrich the quantitative findings by highlighting not only the widespread support for the program but also the distinct expectations among stakeholders related to educational access, public health improvement, and socioeconomic mobility. The thematic analysis revealed a strong sense of hopefulness among respondents, particularly among parents, students, and local health workers. One central theme was "educational and professional development," reflecting the belief that local access to nursing education could anchor professionals in the province. Respondent 13, a midwifery graduate, shared, "Kung may nursing program dito, baka hindi na kailangan umalis pa ng Sorsogon ang mga kabataan para lang makapag-aral." (If there were a nursing program here, young people wouldn't need to leave Sorsogon just to study.). Another recurring theme was "perceived readiness," which captured stakeholders' cautious optimism. While they welcomed the initiative, they worried about implementation gaps. As Respondent 29, a barangay health worker, put it, "Kahit may programa, kulang pa rin kung wala tayong maayos na pasilidad." (Even if there's a program, it won't be enough if we don't have proper facilities.). These voices reflect a shared aspiration for accessible, quality nursing education, tempered by realistic concerns about infrastructure and sustainability. Notably, parents tended to emphasize faculty preparedness as a prerequisite for quality, whereas students highlighted proximity, affordability, and long-term career opportunities. Addressing these concerns will help ensure that the program not only launches effectively but also delivers quality nursing education aligned with professional standards.

Building on these insights, Funa et al. (2023) highlighted how learner-centered, action-ori-

ented, and transformative approaches can address resource limitations such as poor connectivity and inadequate lab facilities. Strategies such as KWL charts, online journals, and peer collaboration helped sustain learning during the COVID-19 crisis. These findings support the use of flexible, technology-enhanced teaching in nursing education, particularly in under-resourced settings.

From a public health standpoint, the nursing program is expected to promote preventive care, health education, and community wellness. This aligns with the study of Wong et al. (2020), which highlights the influence of education on health behaviors. Furthermore, addressing faculty and facility limitations is essential for delivering a credible health education program and ensuring reliable outcomes.

Participants also recommended expanding the curriculum to include medical technology, pharmacy, and public health, reflecting a demand for interdisciplinary health education that meets broader workforce needs. Integrated curricula build holistic, practice-ready competencies and improve knowledge, attitudes, and behaviors, indicating clear applicability to health education (Sengupta, 2023; Funa & Gabay, 2025; Funa et al., 2022, 2024).

Respondents identified key benefits for students and the community. For students, the program promises to promote leadership, research involvement, and clinical skills development—qualities essential to producing competent healthcare professionals (Funa, 2024). These perceptions are consistent with findings from other studies that emphasize the importance of nursing education in preparing graduates to meet the demands of a changing healthcare environment (Harrison et al., 2020; Kavanagh & Sharpnack, 2021). From a healthcare perspective, the nursing program is expected to contribute significantly to improving wellness and preventive care, which is vital to addressing community health challenges.

The potential economic benefits of the program should not be overlooked. Respondents believe that having a locally based nursing program could stimulate economic growth by reducing healthcare costs, improving access to services, and strengthening the local health system (Kang & Kim, 2021). These projected outcomes reinforce the view that investing in health education is not only socially beneficial but also a sound regional development strategy. These findings provide actionable insights for CHED, LGUs, and higher education institutions seeking to equitably expand nursing education in underserved areas, while ensuring that policy decisions are grounded in community needs, institutional capacity, and long-term sustainability.

Although primarily a cross-sectional survey study, this research incorporated selected qualitative responses to contextualize and enrich the interpretation of the quantitative findings. The inclusion of stakeholder narratives added depth to the statistical trends, offering valuable insights into lived experiences and perceptions. This approach provides a practical framework for monitoring and evaluating the BSN program. Continued stakeholder engagement and periodic data collection will be essential for tracking implementation progress. Future research may benefit from participatory strategies, such as stakeholder consultations and alumni tracer studies, to maintain responsiveness to evolving community and workforce needs.

This study focused on participants from Sorsogon, which may limit the generalizability of the findings to other contexts. The survey relied on self-reported data, which may be subject to response bias, and its design was limited to structured items, potentially restricting the depth of the responses. While qualitative interviews provided valuable insights, they were limited in number and scope. Although the authors were affiliated with the study site, the research followed ethical procedures to minimize bias. No conflicts of interest are declared.

Conclusion

This study provides strong evidence of stakeholder support for the introduction of a local nursing program in Sorsogon, Philippines. The program is expected to enhance students' clinical competencies, promote holistic health practices, and create opportunities for research engagement. At the community level, it is viewed as instrumental in improving access to healthcare, supporting preventive care, and stimulating both social and economic development. However, the program's success will depend on overcoming institutional challenges—such as limited faculty availability, underdeveloped simulation facilities, and inadequate access to instructional resources. As such, concrete policy actions are needed, including investment in simulation laboratories, regional faculty partnerships, and CHED support for curriculum development. Support was broadly consistent across stakeholder groups, although parents more frequently raised concerns about institutional capacity. Although primarily a quantitative study, the integration of stakeholder narratives helped contextualize perceptions and aspirations regarding the proposed program. This design allowed grounded insights without full-scale qualitative integration. Future research should consider broader geographic coverage, long-term outcome monitoring, and participatory approaches (e.g., alumni tracer studies or stakeholder consultations) to support responsive and sustainable regional nursing education.

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Determining Factors for Long Term Use of Gadget by Preschool Children

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Abstract

In the digital era, preschoolers spent more time playing on their gadgets than with their peers. The excessive use of gadgets (including laptops, cellphones, tablets, and similar electronic devices) can have negative impacts on preschool-age children. This study analyzes the determining factors that influence the duration of gadget use in preschool children. The study used a correlational design with a cross-sectional approach involving 318 parents who were selected using cluster sampling. The results showed that there was a significant relationship between the duration of gadget use and the gender of the parents ($p = 0.001$), parental education ($p = 0.035$), family economic status ($p = 0.018$), educational media ($p = 0.039$), distraction media ($p = 0.029$), and psychosocial development ($p = 0.001$). The factors that most influence the duration of gadget use in children are family economic status with lower income adjusted odds ratio (AOR) (0.327) 95% CI (0.106–0.947), educational media is to add information AOR (0.367) 95% CI (0.183–0.736), distraction media so that the child doesn't fuss AOR (0.392) 95% CI (0.203–0.758) and children do not have psychosocial disorders AOR (0.348), 95% CI (0.189–0.638). The results of the study can offer a basis for developing the latest nursing interventions in providing education and support to parents and children when using gadgets.

Keywords: factors of gadget use, parents, preschool age

Abstrak

Faktor Penentu Lama Penggunaan Gawai pada Anak Usia Prasekolah. *Pada era digital, anak prasekolah lebih banyak menggunakan waktunya untuk bermain gawai daripada dengan teman sebayanya. Penggunaan gawai yang berlebihan (termasuk laptop, telepon genggam, tablet, dan alat elektronik sejenis) dapat memberikan dampak negatif terhadap anak-anak usia prasekolah. Penelitian ini bertujuan untuk menganalisis faktor penentu yang memengaruhi lamanya penggunaan gawai pada anak usia prasekolah. Desain penelitian korelasional dengan pendekatan* cross-sectional *dengan melibatkan 318 orang tua yang dipilih menggunakan* cluster sampling. *Hasil penelitian menunjukkan adanya hubungan yang signifikan antara lamanya penggunaan gawai dengan jenis kelamin orang tua (p* value= *0,001), pendidikan orangtua (p = 0,035), status ekonomi keluarga (p = 0,018), media edukasi (p = 0,039), media distraksi (p = 0,029) dan perkembangan psikososial (p = 0,001). Faktor yang paling memengaruhi lama penggunaan gawai pada anak yaitu status ekonomi keluarga dengan penghasilan ≤upah minimum kabubaten/kota* AOR *(0,327) CI 95% (0,106–0,947), sebagai media edukasi yaitu menambah informasi* AOR *(0,367) CI 95% (0,183–0,736), sebagai media distraksi supaya anak tidak rewel* AOR *(0,392) CI 95% (0,203–0,758), dan anak yang tidak mengalami gangguan psikososial* AOR *(0,348), CI 95% (0,189–0,638). Hasil penelitian dapat digunakan sebagai dasar dalam menyusun intervensi keperawatan yang terbaru dalam memberikan edukasi dan pendampingan bagi orantua dan anak saat menggunakan gawai.*

Kata Kunci: *anak usia prasekolah, faktor penggunaan gawai, orang tua*

Introduction

Preschool children are at an early stage of very rapid growth and development, especially in cognitive and psychosocial development (Hockenberry & Wilson, 2018). The psychosocial deve-

lopment of preschool children is at a stage of high curiosity, very energetic in learning, playing, and feeling satisfaction and pride in the achievements they have made (Mansur, 2019). However, in the digital era, children spend more time playing with devices than playing outside

with their peers (Sundus, 2018).

Data from the Statistics Indonesia *(Badan Pusat Statistik; BPS)* (as cited in Indonesia Internet Provider Association *[Asosiasi Penyelenggara Jasa Internet Indonesia; APJII]*, 2020) show that the number of internet users in Indonesia in the second quarter rose to 196.7 million, 73% of Indonesia's total population of 266.9 million. A survey by the Indonesian Child Protection Commission *(Komisi Perlindungan Anak Indonesia; KPAI)* (2021) on the COVID-19 pandemic in 34 provinces with a total sample of 25,164 found that most parents (73%) allow their children to use devices; 71.3% of children have personal devices, and 79% of parents do not have rules for their children's device use. According to the survey, the average amount of time spent on the internet by children each day was 1–2 hours (36.5%), 2–5 hours (34.8%), and > 5 hours (25.4%).

The American Academy of Pediatrics and the Italian Pediatrics Association recommend that parents avoid using devices for 2-year-olds because children's brains develop quickly; learning through interaction with others is preferred (United Nations Children's Fund [UNICEF], 2020). The recommended daily screen uses by children aged 2–5 years is < 1 hour per day, and for children aged 5–8 years < 2 hours per day (UNICEF, 2020). In fact, most preschool-aged children use devices > 1 hour per day (Putri et al., 2020). Consistent with research by Tezol et al. (2022), most children aged 2–5 years use gadgets for > 4 hours per day.

Zhu et al. (2020) also found that using devices for > 1 hour per day can increase children's risk of sleep disorders by 12.35%. Neshteruk et al. (2021) observed that excessive use of screen time was also associated with an increase in children's body mass index (BMI) Z-score, while limiting/monitoring screen use was associated with a reduced BMI Z-score and smaller waist circumference. Research by Tezol et al. (2022) showed that the group of children aged 2–5 years who used electronic screens excessively had significantly higher scores on emotional and behavioral problems, peer relationship problems, and ability to deal with difficulties (total $p < 0.01$). Sundus (2018) added that the negative impact of gadget use on children includes speech or language delays, problems in learning, anxiety, depression, and adverse impacts on the child's character. This study aims to analyze the determining factors that influence the duration of gadget use in preschool children.

Methods

The research design used a correlational study with a cross-sectional approach. This design was applied to measure the independent variable (parent and child factors), and the dependent variable (length of gadget use in preschool children). The researcher has obtained ethical approval from the Research Ethics Committee of the Faculty of Nursing Universitas Indonesia under number Ket-50/UN2.F12.D1.2.1/PPM. 00.02/2022.

Participants. The participants in this study were 318 parents. The selection of participants used cluster sampling conducted in Jember district with 31 sub-districts. The researcher selected 10% of the 31 sub-districts in the Jember Regency, obtaining the results for three sub-districts, which were randomized again by 10% in the selection of sub-districts/villages. The results of the randomization of the sub-districts/ villages were the place of research in early childhood education and licensed kindergartens. Furthermore, in selecting parents, the researcher collaborated with teachers whose ages satisfied the study's inclusion and exclusion criteria.

Questionnaire. The data collection tool used was a questionnaire on parents' demographic data—gender, age, education, and parent's job. The parent knowledge questionnaire developed by researchers contained 10 closed statements and was evaluated for validity and reliability with a Cronbach's alpha of 0.711. This questionnaire consisted of four domains: the definetion of gadgets, the use of gadgets, the benefits of gadget use on children, and the impacts of

gadget use on children. Each correct answer was given a value of 1, while the wrong answer was given a value of 0. The score for knowledge was not sufficient if the total result was ≤ 5; the respondent's knowledge was acceptable if the total score was > 6. Family economic status was based on the Jember district minimum wage in 2020. The questionnaire design was based on the Parenting Styles and Dimensions Questionnaire (PSDQ); the questionnaire contained 32 closed statements that had been tested for validity and reliability by Wulandari (2019), with Cronbach's alpha 0.712. The PSDQ measures three parenting styles: authoritative parenting (15 items), authoritarian parenting (12 items), and permissive parenting (5 items).

The assessment used a Likert scale as follows: always = 5, often = 4, sometimes = 3, rarely = 2, and never = 1. The calculation for each parenting pattern was based on the average value of each item; the highest value was categorized as parenting style. The questionnaire regarding child factors (age, education media, distraction media, number of siblings, order of children) provided several short statements that respondents could choose from according to their characteristics. Psychosocial development used the pediatric symptom checklist 17 (PSC-17) patented by Irwanto et al. (2020). It is a short screening questionnaire containing 17 questions that help identify and assess changes in emotional and behavioral problems in children.

The PSC-17 questionnaire contained 17 questions in three subscales: internalization, externalization, and attention. The questionnaire responses were graded based on the total number of results from each subscale: never = 0, sometimes = 1, and always = 2. Unanswered questions were given a value of 0; if ≥ 4 were unanswered, the questionnaire was considered invalid. The results indicated behavioral, emotional, and psychosocial disorders if the total value of the internalization subscale was ≥ 5, the total value of the externalization subscale was ≥ 7, the total value of the attention subscale was ≥ 7,

or the total value was ≥ 15 based on the time devoted gadgets (UNICEF, 2020).

Results

The characteristics of the respondents are summarized in Table 1. The majority of parents were females aged 20–35 with a basic education (elementary/middle school). Most parents did not work; the majority of families' economic status was below the provincial minimum wage. Most parenting styles were authoritative on the PSDQ scale, and most were well-informed. Most children were entering Kindergarten B, most had two siblings, and most were first-born. Regarding educational and distraction media, the reason most parents allowed their children to have devices was to increase their knowledge and play. In terms of psychosocial development, most children in the survey were suspected of having behavioral, emotional, and psychosocial disorders. The majority of children used devices to an extent considered "excessive."

Table 2 analysis of independent variables and length of use of devices in preschool children. The table shows that there is a significant relationship between gender (p = 0.001), parents' last education (p = 0.035), family economic status (p = 0.018), educational media (p = 0.039), distraction media (p = 0.029) and psychosocial development (p = 0.001), with the length of use of devices in preschool children increasing (p < 0.05).

The results of the multivariate analysis in Table 3 show that the economic status of families with income ≤ provincial minimum wage by a factor of 0.327 increased the length of time children used gadgets compared to income > provincial minimum wage after being controlled by other variables. Allowing the use of gadgets for educational media, especially to obtain various information for children, has an influence of 0.367 times influenced the length of time they used gadgets after control for other variables.

Table 1. Characteristics of the Respondents

Variable	n	%
Parental Factors		
Parent's Gender		
Male	29	9.1
Female	289	90.9
Parent Age		
Early adulthood 20–35 years	211	66.4
Middle adults 36–49 years	81	25.5
Late adulthood 49–50 years	26	8.2
Last Education of Parents		
Basic education (elementary/middle school)	148	46.5
Secondary education (high school/vocational school)	130	40.9
Higher education (bachelor to doctoral degree)	40	12.6
Parent's Job		
Does not work	212	66.7
Work	106	33.3
Family Economic Status		
Income ≤ provincial minimum wage	264	83.0
Income > provincial minimum wage	54	17.0
Parenting Style		
Permissive	20	6.3
Authoritarian	5	1.6
Authoritative	293	92.1
Parent Knowledge		
Not enough	28	8.8
Good	290	91.2
Educational Media		
Information facilities	116	36.5
Conduct a task	60	18.9
Increase knowledge	142	44.7
Distraction Media		
Children are not fussy	86	27.0
Play	232	73.3
Child Factors		
Child's Age		
Kindergarten A	109	34.3
Kindergarten B	209	65.7
Number of Siblings		
1 child	103	32.4
Two children	145	45.6
≥ 3 children	70	22.0
Order of Children		
1 child	158	49.7
Two children	111	34.9
≥ 3 children	49	15.4
Psychosocial Development		
There are no behavioral, emotional, or psychosocial disorders	121	38.1
Suspicion of behavioral, emotional, or psychosocial disorders	197	61.9
Length of Time Using the Device		
Normal < 1 hour per day	60	18.9
Excessive ≥ 1 hour per day	258	81.1

Table 2. Relationship of Parent and Child Factors to the Duration of Gadget Use

Variable	Normal		Excessive		Total		OR (95% CI)	p
	n	%	n	%	n	%		
Gender							3,544 (1,590–7,898)	0.001*
Male	12	41.4	17	58.6	29	100		
Female	48	16.6	241	83.4	289	100		
Parent Age								
Early adulthood 20–35 years	39	18.5	172	81.5	211	100		
Middle adults 36–49 years	16	19.8	65	80.288	81	100	-	0.968
Late adults 50–65 years	5	19.2	21	0.8	26	100		
Last Education								
Basic education (elementary/middle school)	23	15.5	125	84.5	148	100		0.035*
Secondary education (high school/vocational school)	33	25.4	97	74.6	130	100	-	
Higher education (bachelor to doctoral degree)	4	10	36	90	40	100		
Parent Job								
Does not work	39	18.4	173	81.5	212	100	0.912	0.761
Work	21	19.8	85	80.2	106	100	(0.505–1.647)	
Family Economic Status								0.018*
Income ≤ provincial minimum wage	56	21.2	208	78.8	264	100	3,365	
Income > provincial minimum wage	4	7.4	50	92.6	54	100	(1,166–9,717)	
Parenting Style								
Permissive	4	20	16	80	20	100		
Authoritarian	1	20	4	80	5	100	-	0.989
Authoritative	55	18.8	238	81.2	293	100		
Parent Knowledge								
Not enough	4	14.3	24	85.7	28	100	0.696	0.692
Good	56	19.3	234	80.7	290	100	(0.232–2.088)	
Educational Media								
Information facilities	30	25.9	86	74.1	116	100		
Doing homework	11	18.3	49	81.7	60	100	-	0.039*
Increase knowledge	19	13.4	123	86.6	142	100		
Distraction Media								
Children do not fuss and cry	23	26.7	63	73.3	86	100	1,924	0.029*
Play	37	15.9	195	84.1	232	100	(1,063–3,481)	
Child's Age								
Kindergarten A	25	22.9	84	77.1	109	100	1,480	0.181
Kindergarten B	35	16.7	174	83.3	209	100	(0.832–2.631)	
Number of Siblings								
1 child	19	18.4	84	81.6	103	100		
Two children	27	18.6	118	81.4	145	100	-	0.963
≥ 3 children	14	20	56	80	70	100		
Order of Children								
1 child	32	20.3	126	79.7	158	100		
Two children	18	16.2	93	83.8	111	100	-	0.676
≥ 3 children	10	20.4	39	79.6	49	100		

Variable	Duration of Gadget Use				Total		OR (95% CI)	p
	Normal		Excessive					
	n	%	n	%	n	%		
Psychosocial Development								
No behavioral, emotional, or psychosocial disorders	34	28.1	87	71.9	121	100	2,570 (1,450–4,555)	0.001*
Suspected behavioral, emotional, or psychosocial disorders	26	13.2	171	86.8	197	100		

Table 3. Final Modeling of the Logistic Regression Model with Variables Related to the Length of Use of Gadget in Preschool Children

Variable	AOR	p value	95% CI
Family Economic Status			
Income ≤ provincial minimum wage	0.327	0.040	0.106–0.947
Income > provincial minimum wage	Ref		
Educational Media			
Add information	0.367	0.05	0.183–0.736
Doing homework	0.882	0.774	0.373–2.085
Increased knowledge	Ref		
Distraction Media			
Children are not fussy	0.392	0.06	0.203–0.758
Play	Ref		
Psychosocial Development			
No distractions	0.348	0.001	0.189–0.638
Suspect interference	Ref		

Children without psychosocial development disorders 0.348 times influenced the length of time they used devices versus being suspected of having psychosocial development disorders after controlling for other variables.

Discussion

Parental Factors and the Length of Time Their Children Use Devices. The parents involved in this study were mostly mothers aged 20–35, had a secondary level of education, spent most of their time as housewives, had an economic status below the minimum provincial wage, and used authoritative parenting styles. Among these characteristics, gender, educational background, and family economic status had a significant relationship with the length of the children's use of gadgets. According to

Tezol et al. (2022), the average use of gadgets by children with mothers at home is excessive because mothers are too focused on housework, thereby neglecting the responsibility of supervising and accompanying children in using gadgets (Novianti & Garzia, 2020). According to Çaylan et al. (2021), mothers with low levels of education and children > 1 cannot spend quality time with their children because they must juggle housework and caring for their children; they choose to keep their children busy by watching devices. Economic factors influence on how long children use gadgets because parents must work. They cannot supervise and monitor how long children use gadgets, increasing the risk of addiction to playing games and behavioral problems (Sholihah et al., 2022).

Authoritative parenting style has no relationship with the length of time children use gad-

gets, which is consistent with Suherman et al. (2021). Parents with authoritative parenting patterns have children with mild and moderate dependence on gadget use, whereas those with permissive parenting patterns exhibit heavy gadget dependency. Parents who provide autonomy (permissive parenting) to their children in using gadgets have a higher level of addiction than children who are not given full autonomy in using gadgets (Sholihah et al., 2022).

The most prevalent reasons why parents give gadgets to children as educational media are increasing knowledge and providing distractions. In such devices, there are several applications to increase children's knowledge, such as colors, learning to read, and watching child-friendly videos (Zaini & Soenarto, 2019). Sundus (2018) found that gadgets are more fun because they contain applications such as puzzles, races, and simple games characterized by cause-and-effect and action-reaction. Harsela and Qalbi (2020) stated in qualitative research that kindergarten children who use devices < 30 minutes per day have good cognitive abilities. In contrast, children who use devices > 3 hours per day exhibited declining cognitive abilities, such as reduced concentration in learning, loss of focus, decreased motivation to study and write, and reduced achievement.

The Relationship between Child Factors and the Duration of Gadget Use. Most of the children were in Kindergarten B. The age of the children was not related to the length of time they used a device. Kulakci-Altintas (2020) observed that most children start using devices at the age of four months with low intensity use, and 36 months with higher intensity. Waller et al. (2021) stated that children aged > 4 years use devices excessively. Mulyantari et al. (2019) found that the highest use of gadgets was at the age of 6. Most children use gadgets because their parents or guardians allow them to or they have their own device.

Most of the children in this study had two siblings, although the number of siblings was not related to the length of time the child used the

devices. Good parental knowledge and time management regarding caring for and supervising children in using devices prevent excessive use (Irmayani et al., 2021). Parents also apply rules and limit gadget use to certain times, such as mealtimes, before bed, and during family time. Although the rules and limits regarding the use of technology vary from parent to parent, the aim is to help children stay connected to the present and strengthen relationships with the people around them (Johnson & Hertlein, 2019).

Most of the children in this study were first born in their families, although order of birth was not related to the length of time they used a device. Children's use of electronic screens cannot be separated from parents' knowledge about children's use of devices, such as supervision and assistance to prevent excessive use of devices (Sholihah et al., 2022). Tezol et al. (2022) observed that the use of gadgets in the eldest children was within normal limits; therefore, older siblings could be role models for younger siblings regarding the use of electronic devices.

The characteristics of adverse child development observed in this study were mostly behavioral, emotional, and psychosocial disorders. Psychosocial development has a significant relationship with the duration of device use. Research by Tezol et al. (2022) showed that a group of children aged 2–5 years who used electronic screen devices excessively had significantly higher scores on emotional, behavioral, or peer relationship problems, and in dealing with difficulties. A systematic review conducted by Oktafia et al. (2022) found that excessive use of devices can affect a child's personal and social development.

Factors Influencing the Length of Time Children Spend Using Gadgets. Based on this research, the economic status of families with income ≤ the provincial minimum wage influenced the length of device use by children. De Lepeleere et al. (2018) showed that parents from families with a lower socioeconomic status are inconsistent in applying rules regarding

gaming, which is associated with higher screen time use. The Ministry of Education and Culture, Republic Indonesia (2019) stated that the costs of using devices by students in one month were approximately IDR 50,000–100,000 per month, requiring additional costs for internet packages. In their research, Neshteruk et al. (2021) observed that work schedules did not always make it possible for parents to monitor their children's screen use.

Apart from that, most parents, especially housewives, focus more on taking care of the household, putting aside their responsibilities for supervising and accompanying their children by using gadgets; technological media becomes their children's companion and entertainer (Novianti & Garzia, 2020). Oliveira et al. (2021) added that poor parents' socioeconomic status, authoritarian parenting style, and low education level resulted in the highest scores for behavioral problems, gaming addiction, and sleep disorders in children.

In educational media, the use of gadgets as a means of information influence the length of time children use gadgets. A 2020 survey by the Indonesian Child Protection Commission showed that the reason parents give gadgets to their children is as a means of information so that children can write and edit videos, or engage in other productive activities (Novianti & Garzia, 2020). Devices often have several features for recognizing colors, learning to read, and watching videos for children (Zaini & Soenarto, 2019). Children can access educational websites and obtain detailed information on the required topics. Technology makes everything better, making it easier to access certain materials.

Educational videos, interactive programs, study tutorials, and various books available around the clock on the internet have revolutionized education for the better. Children learn with advanced tools and methods at their own pace. Educational games, such as online quizzes, online tutorials, and puzzle games, help children excel in their studies (Sundus, 2018). The use of gadgets as educational media is not consistent with the level of digital competence of parents. Most parents are still at the basic level or can only use simple internet content, while children's digital competence is more rapid in using digital media (Rahayu & Haningsih, 2021).

In terms of emotional development, children who do not experience psychosocial development disorders reflect the length of time they use their devices. According to Erik Erikson (as cited in Hockenberry and Wilson, 2018), the psychosocial task of preschool age is to develop a sense of initiative versus guilt. At this age, children's curiosity is very high, and children are very enthusiastic about learning new things. A preschool child feels proud when he or she succeeds in conducting an activity, thereby helping the child use initiative. However, when a child expands his or her abilities further but is unable to complete a task, the child may feel guilty. In their research on psychosocial development, Agustia et al. (2021) found that children aged 3–4 who have a close relationship with their parents are able to control their feelings, have active imaginations, and engage in activities with their peers.

The results of this study have implications for the length of time children use gadgets, which are influenced by several factors related to both children and parents. Children who excessively use gadgets can experience several negative impacts, one of which is gadget addiction. This can affect children's concentration in learning and emotional control and decrease children's academic achievement. As a result, nurses are expected to function as educators to provide guidance and supervision of gadget use directly or to provide counseling to parents and children.

The limitations of this study include the unbalanced participation of fathers and mothers when the study. Measurement of gadget use duration did not differentiate between workdays and holidays. Furthermore, because most parents were not accustomed to filling out ques-

tionnaires online, their questionnaires were completed using paper forms.

Conclusion

Factors that influence the duration of gadget use < 1 hour per day include parent's gender and education, family economic status with Income ≤ provincial minimum wage, children's educational media, distraction media, and psychosocial factors. While the factors influencing the duration of gadget use by children include family economic status with provincial minimum wage, educational media, distraction media, and psychosocial factors.

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Development of A Telenursing-Based Self-Assessment Questionnaire for Diabetic Foot Ulcer Risk

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Abstract

Development of a Telenursing-Based Self-Assessment Questionnaire for Diabetic Foot Ulcer Risk. Early identification of the risk of diabetic foot ulcers (DFU) is crucial in preventing ulcers. Caring for diabetic patients, including early detection of the risk of DFU with telenursing, will improve accessibility to health facilities and also help the work of nurses. Currently, there are many instruments or tools to detect the risk of DFU, but instruments that apply telenursing and can be used independently and easily by patients are still limited. This study aimed to develop a digital self-assessment questionnaire for DFU risk in type 2 Diabetes Mellitus (DM) patients and conduct validity and reliability tests. This study was carried out in three stages. The first stage was the planning stage by conducting a literature study; the second stage was the construction by determining the questionnaire items and testing the content validity index (CVI) by six experts; and the final stage was the validation stage by conducting a psychometric test in the form of a construct validity test with factor validity and internal consistency reliability with Cronbach-alpha on 40 respondents who had type 2 DM. The CVI score by the expert was 0.93, making it included in the very high validity category. The validity and reliability test results for the DM patients obtained a Cronbach alpha score of 0.83 and a validity of 0.43-0.68. Two items were deleted due to invalid results. The self-assessment tool for DFU risk has good validity and reliability values. This questionnaire is simple and easy for DM patients to use independently.

Keywords: diabetic foot, primary prevention, self-assessment, self-report, telenursing

Abstrak

Pengembangan Instrumen Deteksi Dini Mandiri Berbasis Telenursing terhadap Risiko Ulkus Kaki Diabetes. *Deteksi dini risiko ulkus kaki diabetes dapat memudahkan perawat dalam mencegah komplikasi ulkus pada pasien. Saat ini telah banyak instrumen atau alat untuk mendeteksi risiko ulkus kaki diabetes namun instrumen yang dapat diaplikasikan secara mandiri dengan mudah oleh pasien masih terbatas. Penelitian ini bertujuan untuk mengembangkan kuesioner deteksi dini mandiri risiko ulkus kaki diabetes berbasis digital pada pasien diabetes melitus tipe 2 (DMT2) dan melakukan uji validitas dan reliabilitas. Pengembangan kuesioner dilakukan melalui tiga tahapan. Tahap pertama yaitu perencanaan dengan melakukan studi literatur dan menentukan definisi operasional; tahap kedua yaitu konstruksi dengan menentukan item-item kuesioner dan uji* content validity index (CVI) *oleh enam orang pakar yang terdiri dari tiga perawat berpengalaman dalam merawat pasien diabetes, dua dosen keperawatan dengan area penelitian diabetes, dan dokter spesialis penyakit dalam yang berpengalaman mengobati pasien diabetes; tahap terakhir yaitu validasi dengan melakukan uji psikometrik berupa uji validitas dan reliabilitas konsistensi internal dengan Cronbach-alpha kepada pasien DMT2. Terdapat 13 item yang disusun berdasarkan studi literatur. Skor CVI yaitu 0,93 dan termasuk dalam kategori validitas sangat tinggi. Hasil uji validitas dan reliabilitas kepada pasien DM didapatkan skor* Cronbach alpha *sebesar 0,83 dan validitas sebesar 0,43-0,68. Dari total 13 item, dua item dihapus karena tidak valid.* Self-Assessment Tool for DFU Risk *memiliki nilai vailidtas dan relibilitas yang baik, sehingga dapat digunakan untuk deteksi dini secara mandiri risiko ulkus kaki diabetes. Kuesioner ini sederhana dan mudah digunakan secara mandiri oleh pasien DM.*

Kata Kunci: *deteksi mandiri, laporan mandiri, pencegahan primer, telenursing, ulkus kaki diabetes*

Introduction

Diabetic foot ulcers (DFU) are the most common complication of poorly controlled diabetes. DFU can occur due to poor glycaemic control, neuropathy, peripheral vascular disease, or

inadequate foot care in diabetes mellitus (DM) patients. Untreated DFU can lead to osteomyelitis and amputation (Armstrong et al., 2023). Globally, as many as 40 to 60 million DM patients experience DFU (International Diabetes Federation [IDF], 2021). The IDF (2021) states that diabetic patients have a risk of experiencing DFU 10 to 20 times more than non-diabetic patients. In addition, an amputation due to ulcers occurs every 30 seconds for all diabetic patients worldwide. The prevalence of DFU globally was 6.3%, and the highest prevalence was in North America at 13%, followed by African countries at 7.2%, Asia at 5.5%, and Europe at 5.1%. The lowest prevalence was in Oceania at 3% (Zhang et al., 2017). In Indonesia, the prevalence of type 2 Diabetes Mellitus (T2DM) patients with DFU was 7.3% (Syahrul & Narmawan, 2021). Meanwhile, other data showed that DFU patients were primarily over 50 years old (75.6%) and confirmed with T2DM for 5 years, with poorly managed diabetes (82.7%) and peripheral neuropathy (91.3%). Ulcers were predominantly detected on the front of foot (62.5%) and resulted from physical trauma (46.2%) (Yunir et al., 2021).

DFU affects DM patients, physically, mentally, and financially. DM patients with foot ulcers have an average length of hospitalization of 13 days, for 21 days if accompanied by minor amputation, and 60 days if accompanied by major amputation (Lo et al., 2021). DFU has an impact on the patient's mental condition, specifically, DFU is closely related to anxiety and depression experienced by patients (Al-Ayed et al., 2021). In terms of the financial impact of DFU, on average, it costs USD 1782.6 per year per patient. These costs are used for inpatient costs (45.6%), debridement (14.5%), and intensive care costs (10.4%) (Alshammary et al., 2020).

Prevention of diabetic foot complications is an important diabetes intervention to improve glycaemic control (McDermott et al., 2023). One study in Indonesia showed that DFU prevention behavior was still relatively low, especially in-dicators of nail care and wound care in DM patients (Oktorina et al., 2019). Early detection of the risk of DFU is a top priority in preventing diabetic foot complications. Currently, several instruments can be used as screening modalities for the risk of DFU, but in their application, patients must come to a health facility, and these instruments can only be implemented by health workers (Akila et al., 2021; Al-Mohaithef et al., 2022). This contradicts the current reality that the number of DM patient visits to healthcare facilities is still relatively low (Rachmawati, 2017). To increase the number of patients that receive health services, telenursing can be a solution to improve health outcomes and behavior change, especially in patients with diabetes mellitus (Rosyida et al., 2023).

Telenursing is used by implementing technology and making it easier for patients to get treatment or for health workers to provide health services (AkbariRad et al., 2023; Mamaghani et al., 2021). Telenursing could be defined as the utilization of telecommunication technology in nursing care to enhance patient care and is designed to provide an intervention that is accessible anytime and anywhere. Although it cannot substitute direct services and physical examination by nurses, it may reinforce patient-nurse relationships, save costs and time, and help patients accomplish their health outcomes (Yang et al., 2019). There are several kinds of telenursing, while the best-known one requires both the nurse and the patient to communicate in real-time via a computer or mobile device, including the telephone. The configuration of telenursing is known as synchronous (or live) telenursing. Other configurations could be asynchronous telenursing in which the nurse and the patient do not connect in real time but via e-mail or other similar means. Telenursing assists nurses in monitoring health parameters in distant areas, making the analysis, and helping them determine the best care needed by patients (Navarro-Martínez et al., 2024).

Since the COVID-19 outbreak, Indonesia has developed a telehealth program to enhance the

quality of care for patients. Accessibility is the main benefit, especially for remote areas (Ministry of Health, Republik Indonesia, 2022). However, the program still focuses on telemedicine, which involves only physicians giving a treatment remotely. To support comprehensive tele-health in Indonesia, some studies have evidenced that telenursing is effective in improving both physical and behavioral outcomes, including blood glucose, HbA1C, self-efficacy, self-empowerment, and self-care behaviour in DM patients (Rosyida et al., 2023). Giving a health education remotely is effective in increasing foot care behavior in DM patients (Mutiudin et al., 2025). To facilitate DM patients in conducting foot ulcer risk screening, it is necessary to develop an early detection questionnaire for the risk of DFU that can be applied independently by diabetic patients by implementing telenursing. This study aimed to develop an independent early detection questionnaire for the risk of DFU based on telenursing in T2DM patients, and conduct validity and reliability tests on the developed questionnaire. The instrument was developed in the planning phase, i.e., creating the contents of the instrument, followed by the construction phase which involved the diabetes experts, and lastly, the validation phase for obtaining data from the patients themselves.

Methods

This study aimed to develop an independent early detection questionnaire for the risk of DFU digitally. Ethics approval was obtained from the Ethics Committee (reference: DP.04.04/F.XXV /2615/2024), and all the participants gave an informed consent before the start of the study. The questionnaire developed was a digital questionnaire using the Google Form platform. The research stages followed the stages in developing research instruments or questionnaires (Kishore et al., 2021; Willis, 2020), specifically:

The planning phase consisted of selecting the target group, namely DM patients who could operate smartphones, conducting a literature review, and then formulating the questionnaire items. In the construction phase, the researcher compiled initial items with YES or NO questions assessed by six experts to obtain the CVI score. The experts involved were nurses who were experienced in treating diabetes patients (3 experts), nursing lecturers with diabetes research areas (2 experts), and an internal medicine specialist who was experienced in treating diabetes patients (1 expert). The experts provided objective assessments individually and filled out an assessment form using a 4-point scale with the following provisions: score 1 (irrelevant), score 2 (quite relevant), score 3 (relevant), and score 4 (very relevant) for each questionnaire item. Objective assessments were based on three things: relevance, clarity, and representativeness. The experts provided objective assessments of the questionnaire items and provided recommendations on whether the questionnaire items could be used, improved/changed, or removed. Some recommendations for the instruments were: adding a picture to clearly describe the physical condition of the feet, giving a specific foot region, for instance, left or right foot, and giving a detailed explanation on the method for examining the sensation of the foot.

Next, in the validation phase, the researcher conducted a pilot test on the T2DM patients using the questionnaire items with 40 respondents. Consequently, the psychometric test was a factor validity test with Pearson Product-Moment and an internal consistency reliability test with Cronbach's alpha. The inclusion criteria for the respondents were: diagnosed with T2-DM and able to operate a smartphone.

Results

This study designed a self-assessment questionnaire based on literature discussing the detection and risk of ulcers in diabetic patients. Several formulas were obtained for the questionnaire, including 1) Medical history: medical history that can be assessed includes a history of previous ulcers and amputation; 2) Foot examination: In diabetic patients, a physical examination of the foot is important. Some physical examinations of the foot that can be done inde-

Table 1. Characteristics of Respondents (n = 40, CI = 95%)

Characteristics		N	%
Gender	Male	13	32.5
	Female	27	67.5
Occupation	Self-employed	7	17.5
	Public employee	2	5
	Retired	4	10
	Housewife	20	50
	Private sector employee	2	5
	None	3	7.5
	Other	2	5
Footwear	Slippers	35	87.5
	Shoe	5	12.5
	Barefoot	0	0
	Other	0	0

n: sample size; CI: confidence interval

Table 2. Description of Respondents' Foot Conditions (n = 40)

Characteristic			n	%
History of foot problems	History of ulcers	No	38	95
		Yes	2	5
	History of leg amputation	No	40	95
		Yes	0	0
Physical description of the foot	Deformity	No	38	100
		Yes	2	5
	Abnormal nails	No	39	97.5
		Yes	1	2.5
	Callus	No	38	95
		Yes	2	5
	Dry foot skin	No	21	52.5
		Yes	19	47.5
	Foot erythema	No	37	92.5
		Yes	3	7.5
	No palpable pulses	No	26	65
		Yes	14	35
	Narrow footwear	No	38	95
		Yes	2	5
	Often not using footwear	No	38	95
		Yes	2	5
	Difficult/painful toe joints when moved	No	34	85
		Yes	6	15
Foot sensation	Numbness/burning/tingling sensation	No	21	52.5
		Yes	19	47.5
	The tip of the toe is not palpable to the touch	No	36	90
		Yes	4	10

n: sample size

pendently by diabetic patients include: a) Patients need to assess the shape of the foot, whether it is normal or there are protrusions. Protrusions on the foot increase pressure on the skin or tissue integrity, which correlates with DFU risk; b) Abnormal nail growth, specifical-ly ingrown, is one of the DFU risks; c) The formation of calluses on the feet causes hardening of the skin on the feet, thereby reducing skin elasticity. Inelastic skin increases the risk of wounds. Calluses usually appear on the heels and sides of the toes; d) Erythema are associa-

ted with skin integrity problems that are at risk of becoming ulcers; e) Peripheral artery disease is one of the risk factors for ulcers, and pulse examination is one of the indicators of peripheral artery disease problems; f) The use of footwear that is too narrow and made from hard materials triggers pressure on the feet, which can increase the risk of DFU; 3) Foot sensation: Based on the literature, foot sensation is one of the indicators of the risk of DFU. Sensations that need to be checked include numbness, burning, and tingling; 4) It is recommended to get foot sensation examinations; one that can be done easily and independently by patients is the Ipswich touch.

Content Validity Index. In this study, the questionnaire testing by experts to obtain the CVI score was conducted by three nurses who had experience in caring for diabetes patients, two nursing lecturers with research experience on diabetes, and one internal medicine specialist who had experience in treating diabetes patients. The CVI score obtained based on the calculation was 0.93, or included in the very high validity category (> 0.80).

Validity and Reliability Test with Respondents: Pilot Study. There were 40 respondents in this study. The average age of respondents was 60 years (SD = 9.5), and the respondents suffered from diabetes for an average of 4.5 years

(SD = 4.2). There were more female than male respondents; more respondents who work-ed as housewives than in other occupations; more respondents used slippers to carry out daily activities. More complete characteristics of the respondents are shown in Table 1.

A description of the respondents' foot is shown in Table 2. All the respondents had no history of amputation; 5% (n = 2) of the respondents had a history of foot ulcers, deformities, calluses, wearing narrow footwear, and not wearing footwear during daily activities. In addition, 2.5% (n = 1) had abnormal nail shapes (growing inward and thickening), 47.5% (n = 19) had dry skin around the feet, 7.5% (n = 3) had erythema on the feet, 35% (n = 14) had impalpable pulses, and 15% (n = 6) of the respondents had complaints of difficulty or painful toe joints when moved. In addition, the assessment of the sensation function in the feet showed that 47.5% (n = 19) felt numbness, burning, and tingling in the feet, and 10% (n = 4) complained that the tips of the toes were numbed when touched with the Ipswich Touch examination.

The initial validity test was performed on 30 respondents, and the reliability test results were obtained based on the Cronbach alpha value of 0.70, making it included in the high-reliability category. The validity test results obtained a score between -0.01 and 0.8. There were several

Table 3. Validity and Reliability of the Self-Assessment for DFU Risk

No. item	Item	r	Result	Cronbach alpha
1	History of right or left leg ulcer	0.58	Valid	0.83
2	History of right or left leg amputation	0.00	No valid	
3	Abnormal right or left leg shape (there is a bulge)	0.64	Valid	
4	The right or left foot has an ingrown nail.	0.58	Valid	
5	The skin of the right or left leg has calluses	0.58	Valid	
6	Dry skin around the right or left leg	0.59	Valid	
7	Reddish right or left leg	0.68	Valid	
8	The right or left leg does not have palpable pulse.	0.43	Valid	
9	Too narrow footwear for the right or left foot.	0.11	No valid	
10	Often not wearing footwear when performing an outdoor activity	0.64	Valid	
11	The right or left toe joint cannot move freely	0.61	Valid	
12	Numbness, burning, tingling sensation in the right or left leg	0.59	Valid	
13	No sensation at ≥2 points of the right or left foot touch location	0.53	Valid	

r: correlation coefficient

invalid items (< 0.3), specifically item numbers 2, 5, 6, 8, 10, and 12. From these results, the second validity and reliability tests were conducted by increasing the number of respondents to 40. The reliability test results with Cronbach's alpha were obtained at 0.83 and were included in the high-reliability category. The validity test result was 0.43-0.68 (> 0.3). There were 2 invalid questionnaire items, specifically items 2 and 9, so the items were deleted. Based on the test results, the questionnaire items were valid and reliable for screening DFU risks. The results of the validity and reliability test for the 40 respondents can be seen in Table 3.

Discussion

Along with an increasing prevalence of diabetes mellitus, the prevalence of DFU complications also continues to rise (Sorber & Abularrage, 2021). Regarding this phenomenon, it is important that nurses involve the patients actively in the screening for the DFU preventive strategy. Therefore, the telenursing-based questionnaire that can be applied by patients independently is crucial to develop. This study focused on the development of a self-assessment questionnaire that can be filled out independently by diabetic patients. To the best of our knowledge, this has not been previously undertaken.

Questionnaire Design. The questionnaire was designed based on the literature on the early detection of DFU and the risk factors of DFU (Collings et al., 2020; Reardon et al., 2020; Rehman et al., 2023; Schaper et al., 2024; van Doremalen et al., 2019; Zhou et al., 2018). This self-assessment questionnaire is useful for early detection of ulcer risk in diabetic patients to prevent DFU. Patients complete a questionnaire by providing "YES" or "NO" responses. The yes/no responses were one of the types of responses that were appropriate to gather a definite answer with no need for an opinion (Taherdoost, 2022). The questionnaire items covered information on a history of foot problems, physical condition, and sensations in the feet. Once the questionnaire had been filled out completely,

the patient could see the assessment results in the form of either DFU risk or no risk and information regarding recommendations for foot examination at healthcare facilities. The questionnaire used simple sentences that were easy to understand for the community. As of the secondary survey, most respondents found it easy to understand and complete all the questionnaire items. For the sensation examination, Ipswich Touch was selected because it is easy, has high specificity, and offers a simple method of assessing the sensation of the foot in diabetic patients (Hu et al., 2021; Sharma et al., 2014). Patients were trained by health personnel during the initial implementation of Ipswich Touch until they could practice appropriately and independently. This online questionnaire also attached some images about the steps of performing the Ipswich Touch test for patients as a reference.

Validity and Reliability. The self-assessment questionnaire in the online version had a high reliability and good validity. Validity measures the extent to which the questionnaire assesses what it states to be assessed. When a questionnaire is reliable, it yields consistent results when measured repeatedly, even by different researchers, and when there are any discrepancies among the respondents (Ranganathan & Caduff, 2023). This study showed two invalid items, specifically items about amputation history and information on narrow footwear. Based on the results of the study, there were no respondents with amputation history and these respondents wore comfortable footwear. This result affected the diversity of the questionnaire results.

The telenursing-based questionnaire was designed using an online form and made accessible by patients at home. In the first implementation of the self-assessment, patients may need mentoring from health personnel. The mentoring session includes completing the questionnaire, checking the pulse of the legs, and performing sensation examination using the Ipswich touch. Due to limited resources, some respondents ex-

perienced poor internet connection and found difficulties in accessing the online questionnaires using Google Forms. In addition, some diabetic patients are elderly with limited technological literacy; hence, they may need assistance of their relatives. Other challenges found in other developing countries include limited internet access and lack of technological literacy in society (Bali, 2018; Ye et al., 2023).

This questionnaire consists of simple questions and examination of images of the pulse and sensation foot; therefore, it can help patients to be actively involved in efforts to prevent diabetic ulcers. Health personnel can assist at the beginning of self-assessment before patients conduct the self-assessment regularly. Health personnel should follow up and remind patients to carry out the self-assessments regularly. This questionnaire is simple and easy to use by diabetic patients, and it can help health personnel prevent DFU. Some interventions can be made to overcome barriers in the implementation of the self-assessment, such as to improve technology literacy, or at least, involve families or relatives with good technology skills. In addition, the development of internet facilities should be carried out in remote places so this self-assessment can be used properly for DM patients.

This research has several limitations. First, the telenursing-based self-assessment has not been fully implemented due to the limited literacy of respondents to technology. Second, the sample size was small, thus it needs to be refined with a larger number of respondents. Third, the telenursing was not fully implemented due to the need for assistance during the initial use. Fourth, during the research process, some of the respondents faced limited internet access and poor connection quality, negatively influencing their ability to complete the online questionnaire easily. Lastly, this pilot study needs a further study design to validate the findings.

Conclusion

The self-assessment questionnaire for early de-

tection of DFU risk has a high validity and reliability result. It is a simple questionnaire that can be used easily by diabetic patients. Patients have the time and place flexibility to do the self-assessment, and health personnel can monitor the result remotely. This questionnaire is beneficial for preventing DFU risk and improves patient outcomes, treatment costs, and quality of life. Further research needs to be conducted to optimize the implementation of self-assessment with a larger sample and determine factors that can support the implementation of early detection of DFU risk independently based on telenursing, especially in developing countries with limited resources and technological literacy.

Acknowledgements

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Effectiveness of Intradialytic Resistance Training on Muscle Mass and Strength in Patients on Hemodialysis

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Abstract

Hemodialysis (HD) patients with chronic kidney disease (CKD) lose muscle mass and strength due to protein energy wasting (PEW). The purpose of this study was to test the effectiveness of intradialytic resistance training (IRT) in increasing muscle mass and strength. It used a pre-experimental, one-group pretest-posttest design. Based on a sample size estimate using G*power software, 33 CKD patients undergoing HD at a private hospital in Bali were included. The patients were selected using purposive sampling. Muscle mass was measured using Bioelectrical Impedance Analysis (BIA), while muscle strength was measured using the Medical Research Council Muscle Scale. The Wilcoxon test evaluated IRT's efficacy on muscle strength, while the dependent samples t-test evaluated its impact on muscle mass. The results of this study found that IRT had no effect on muscle mass, with a mean difference of -0.330 (p = 0.274). On the contrary, IRT significantly improved muscle strength (p = 0.018). In conclusion, IRT proved beneficial for strengthening muscle but not for gaining muscle mass. Therefore, to improve muscle strength, patients with CKD undergoing HD are advised to actively perform IRT under supervision for a minimum of 30 minutes per day.

Keywords: intradialytic resistance training, muscle mass, muscle strength, protein energy wasting

Abstrak

Efektifitas* Intradialytic Resistance Training *Terhadap Massa dan Kekuatan Otot Pasien dengan Hemodialisis. *Pasien hemodialisis* (HD) *dengan Penyakit Ginjal Kronis* (PGK) *kehilangan massa dan kekuatan otot yang disebabkan oleh* Protein Energy Wasting (PEW). *Tujuan penelitian ini adalah untuk menguji efektifitas* Intradialytic Resistance Training (IRT) *terhadap peningkatan massa dan kekuatan otot. Penelitian ini menggunakan* pre-experimental one-group pretest, post-test design. *Berdasarkan perhitungan besar sampel menggunakan* G*Power Software, 33 *pasien* PGK *yang menjalani* HD *di sebuah rumah sakit swasta di* Bali *terlibat dalam penelitian ini. Pasien dipilih menggunakan teknik* purposive sampling. *Massa otot diukur menggunakan* Bioelectrical Impedance Analysis (BIA), *sedangkan kekuatan otot menggunakan* Medical Research Council Muscle Scale. *Uji efektifitas kekuatan otot menggunakan* Wilcoxon test, *sedangkan* t-test *digunakan untuk menguji efektifitas massa otot. Hasil penelitian menunjukan* IRT *tidak efektif dalam meningkatkan massa otot, dengan* mean -0,330 (p = 0,274). *Namun,* IRT *terbukti efektif dalam mening-katkan kekuatan otot,* (p = 0,018). *Kesimpulannya,* IRT *bermanfaat untuk meningkatkan kekuatan otot, tetapi tidak untuk meningkatkan massa otot. Oleh karena itu, untuk meningkatkan kekuatan otot, pasien* PGK *yang menjalani* HD *disarankan aktif melakukan* IRT *dengan pengawasan minimal* 30 *menit dalam sehari.*

Kata Kunci: intradialytic resistance training, *kekuatan otot, massa otot,* protein energy wasting

Introduction

Protein energy wasting (PEW) ranges from 20-–80% in hemodialysis patients with chronic kidney disease (CKD) (Chen et al., 2013). PEW contributes to morbidity and mortality, especially among CKD patients. PEW results from various mechanisms that occur in patients with CKD, such as malnutrition, systemic inflammation, comorbidities, hormonal disorders, dialysis procedures, and other consequences of uremic toxicity (Radjen et al., 2018). PEW syndrome is a simultaneous loss of body protein and energy reserves, contributing to decreased muscle mass in patients with CKD on hemodialysis (HD) and negatively impacting muscle

strength (Cheng et al., 2022).

Decreased muscle mass can lead to reduced physical activity, impaired muscle function, a lower quality of life, an increased risk of hospitalization, and falls. Several factors contribute to a decrease in muscle mass in patients with CKD on HD. First, protein intake decreases as CKD progresses. Second, fluid restrictions can cause a simultaneous decrease in calorie intake (Bakaloudi et al., 2020). Inadequate food intake leads to malnutrition associated with PEW syndrome in patients with CKD (Cheng et al., 2022). A private hospital in Bali conducts monthly malnutrition assessments of patients on HD, but it does not yet conduct assessments of their muscle mass. The researchers hope that, like malnutrition, muscle mass will be routinely assessed in patients on HD because decreased muscle mass is associated with decreased survival (Radjen et al., 2018).

Besides decreased food intake, the third factor causing decreased muscle mass in patients with CKD on HD is the HD procedure, which contributes to increased catabolic status, causing decreased protein synthesis and increased proteolysis. The fourth is catabolic factors, such as acidosis, comorbidities, inflammation, corticosteroid use, and a sedentary lifestyle (Bakaloudi et al., 2020). In addition, HD has direct side effects, primarily related to the time required for HD therapy; during HD therapy, the patient is in a sitting or supine position for 4–5 hours with little or no physical activity, which occurs 2–3 times a week, and they have dietary restrictions. Furthermore, food causes the patient to reduce their physical activity, contributing to a decline in their function. Functional decline in patients on HD can be minimized by implementing specific exercise programs during HD therapy (Cheng et al., 2022).

Intradialytic exercise is a typical recommendation to encourage patients to be physically active (Young et al., 2018). Intradialytic resistance training (IRT) effectively prevents functional muscle loss in patients on HD (Hendriks et al., 2019). Kato et al. (2021) showed that IRT changed patients' physical performance and increased their body weight, but through increased fat mass, not muscle mass. Zelko et al. (2022) showed that IRT did not significantly affect muscle strength in the trained muscles, but this contrasts with Lopes et al. (2019), who showed that IRT increased mus-cle mass and muscle strength. These studies reported inconsistent results regarding the effectiveness of IRT in increasing muscle mass and strength in patients with CKD on HD. There has been scarce research on IRT in Indonesia.

Sulistyaningsih (2014) assessed an exercise program involving patients performing individual movements for 30 minutes twice a week for four weeks. Wodskou et al. (2021) examined motivation, barriers, and suggestions for intradialytic exercise in nurses and patients on HD. Their results showed that patients were motivated by the expected benefits of intradialytic exercise, such as better activity levels and improved quality of life. However, concerns about machine alarms dominated patient barriers. Dialysis disturbs nurses and protects needles and fistulas. In contrast, nurses are generally concerned about patient safety and recommend further study regarding the feasibility and efficacy of intradialytic exercise interventions over time.

Related research on the effect of intradialytic training on muscle mass and strength has provided inconsistent results. Therefore, it requires further investigation regarding its feasibility and efficacy, which has not been widely examined in Indonesia. Researchers are interested in examining the effectiveness of IRT in increasing muscle mass and strength in patients with CKD on HD. This study was conducted at a private hospital in Bali based on IRT guidelines implemented at one hospital in Japan.

Methods

A pre-experimental study with a one-group pretest and posttest design was conducted at a

private hospital in Bali and involved 33 patients with CKD on HD. The required sample size was calculated using G*Power software with a 5% error margin and 85% confidence level. Patients were selected by purposive sampling.

The inclusion criteria were: 1) willingness to participate; 2) undergoing HD at a private hospital in Bali at least twice a week. The exclusion criteria were: 1) unstable heart status (e.g., angina, decompensated congestive heart failure, stenosis severe arteriovenous, and uncontrolled arrhythmia); 2) physical limitations (unable to mobilize); 3) installation of HD access < 3 months ago; 4) any uncontrolled medical condition, including recent (within eight weeks) infection, fever, myocardial infarction, or undiagnosed chest pain; 5) hypertension or other disorders that could be made worse by physical activity, a resting systolic blood pressure of more than 200 mmHg or a resting diastolic blood pressure of more than 110 mmHg; 6) recent systemic or pulmonary embolism, suspected or confirmed aneurysm, current or suspected myocarditis or pericarditis, or thrombophlebitis; 7) symptomatic hyper- or hypo-tension; 8) excessive inter-dialytic weight gain, which has a severe impact on fluid retention indices; 9) dehydration or feeling unwell in patients with diabetes and a current blood glucose level of > 16.7 mmol/L (300 mg/dL) and in those who are in a state of ketosis. Two patients dropped out because they could not follow all IRT guidelines and could not perform IRT twice in one week. Data collection was conducted from October to December 2022.

Bioelectrical impedance analysis (BIA) is an anthropometric tool that measures muscle mass. This study performed BIA using the Tanita BC-418MA Segmental Body Composition Analyzer; muscle mass is shown in kg units and categorized as low, average, and high according to the results of the Tanita BC-418MA analyzer. The muscle strength examination form based on the Medical Research Council Muscle Scale was used to measure muscle strength on a 0–5 scale, with categories of sufficient (score = 3), good (score = 4), and average (score = 5). The study used IRT Guide Use guidelines from the Department of Hemodialysis, Koujukai Rehabilitation Hospital. The Thera-Band resistance band was used to provide a medium load during IRT. IRT was led by researchers trained by physiotherapists and was conducted according to the patient's HD schedule. Researchers also used questionnaires to collect patients' characteristics, including their name, age, sex, education level, and employment, and a checklist form for implementing IRT. Participants performed IRT for 30 minutes during the first two hours of HD twice weekly for eight weeks.

Data analysis was conducted using SPSS (version 25). Univariate analysis was conducted to determine the minimum, maximum, mean, frequency, and proportion for each variable. The normality of the data was assessed using the Shapiro–Wilk test. Bivariate analysis was conducted for muscle mass using the dependent samples t-test and for muscle strength using the Wilcoxon rank-sum test. Bivariate analysis was also conducted to assess the effect of IRT on muscle mass and strength in patients with CKD on HD.

Data were collected after obtaining the patient's informed consent. This study was ethically approved by the Ethics Commission of the Bali Institute of Technology and Health (approval number: 04.0532/KEPITEKES-BALI/X/2022; approval date: October 4, 2022).

Results

This study was conducted from October to December 2022. It included 33 patients who met the study criteria, could follow all IRT guidelines, and could routinely perform IRT twice weekly for eight consecutive weeks. Table 1 shows the participants' general characteristics. Most were aged 15–64 years (n = 27; 84.8%), male (n = 26; 78.8%), had a high

school education (n = 17; 51.5%), and current-ly working (n = 17; 51.5%).

Table 2 shows participants' muscle mass and strength changes from before to after IRT. Participants' muscle mass and strength increased after IRT, with mean muscle mass increasing from 44.53 to 44.86 and muscle strength from 4.48 to 4.82. Table 3 shows the results of the dependent samples t-test on the effect of IRT on muscle mass in patients with CKD on HD. The mean difference was -0.330 (standard deviation = 0.297; 95% CI = -0.935-0.275; df = 32; p = 0.274). Therefore, IRT does not effectively increase muscle mass in patients with CKD on HD.

Table 4 shows the results of the Wilcoxon rank-sum test on the effect of IRT on muscle strength in patients with CKD on HD. One participant had a negative rank change (de-creased muscle strength after IRT), eight had a positive rank change (increased muscle strength after IRT),

and 24 had no rank change (un-changed muscle strength) after IRT (p = 0.018). Therefore, IRT effectively increases muscle strength in patients with CKD on HD.

Figure 1 shows participants' BIA-based muscle mass categories before and after IRT. The participants showed changes in muscle mass after IRT. Those with low muscle mass decreased from 11 (33.3%) to 6 (18.2%), those with average muscle mass increased slightly from 17 (51.5%) to 19 (57.6 %), and those with high muscle mass increased slightly from 5 (15.2%) to 8 (24.2%).

Figure 2 shows participants' muscle strength categories before and after IRT based on the Medical Research Council Muscle Scale. Those with Sufficient muscle strength decreased from 4 (12.1%) to 0 (0%), those with good muscle strength decreased from 9 (27.2%) to 6 (18.2%), and those with average muscle strength increased from 20 (60.6%) to 27 (81.8%).

Table 1. Participants' General Characteristics

Characteristic	N	%
Sex		
Male	26	78.8
Female	7	21.2
Age (years)		
Productive (15–65)	27	84.8
Non-productive (> 65)	6	15.2
Education level		
No School	2	6.1
Junior high school	4	12.1
Senior high school	17	51.5
College	10	30.3
Occupation		
Employed	17	51.5
Non employed	16	48.5

Table 2. Participants' Muscle Mass and Strength Before and After IRT

Variable	Before				After				N
	Min	Max	Mean	SD	Min	Max	Mean	SD	
Muscle Mass	29	67	44.53	9.56	27	68	44.86	9.802	33
Muscle Strength	3	5	4.48	0.712	4	5	4.82	0.392	33

Table 3. Dependent Sample T-test of the Effect of IRT on Muscle Mass

Muscle Mass	Mean	SD	SE	95% CI	t	df	p
Before and after IRT	-0.330	1.706	0.297	(−0.935–0.275)	−1.112	32	0.274

Table 4. Wilcoxon Rank-Sum Test of the Effect of IRT on Muscle Strength

		Rank			Test statistic	
		N	Mean rank	Sum of ranks		
Before and after IRT	Negative rank	1a	3.00	3.00	z	−2.373b
	Positive rank	8b	5.25	42.00	p-value	0.018
	Tie	24c				
	Total	33				
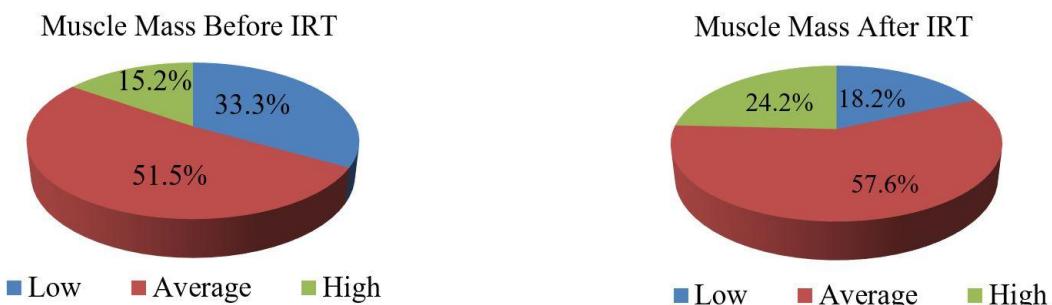
Figure 1. Participants' muscle mass category before and after IRT
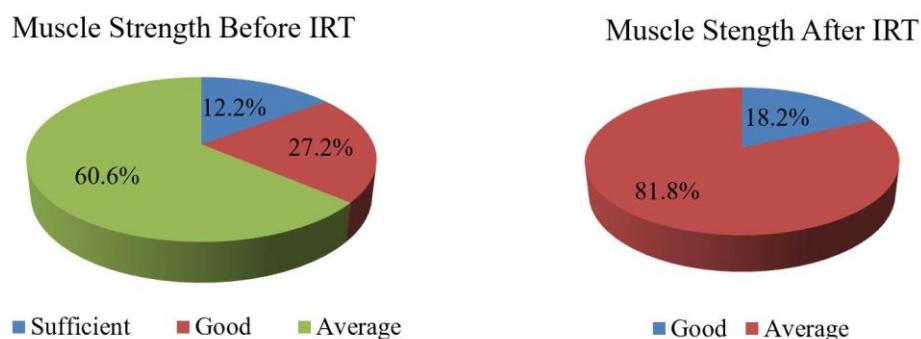
Figure 2. Participants' muscle strength category before and after IRT

Discussion

In this study, most participants had average muscle mass before IRT (n = 17), followed by low muscle mass (n = 11). The condition of nutrition and body composition, particularly muscle mass, are closely related to morbidity, mortality, and quality of life in patients with CKD on HD (Visser et al., 2020). A cross-sectional study by Yohan et al. (2020) showed a positive correlation between muscle mass and the quality of life in patients with CKD on HD. A prospective and longitudinal study by Visser et al. (2020) showed that the average patient with CKD on HD experienced a substantial decrease in muscle mass (-6.4 kg in 20 weeks or -1.3 kg/month). Loss of muscle mass is faster in male patients, related to the inflammation response. Theoretical explanations for the sex difference in muscle mass loss are testostero-

ne's anabolic effects and estrogen's anti-inflammatory effects. This research reinforces the need for regular body composition checks to determine muscle mass.

Decreased muscle mass can be reversed with exercise. However, patients on HD typically have low activity levels, possibly due to the time burden and symptoms associated with their treatment (Lambert et al., 2022). A systematic review and meta-analysis showed that the effectiveness of exercise on physical function and quality of life in patients with CKD on HD was as follows. First, while patients on dialysis have a high-risk status, there are no severe side effects related to exercise, such as post-exercise hypotension, fatigue, myalgia, leg pain, and worsening leg ulcers (Parker, 2016). Adherence to exercise programs ranged from 43% to 100%, and dropout rates from programs range from 15% to 50% (Ashby et al., 2019; Wodskou et al., 2021; Yuguero-Ortiz et al., 2021).

Second, short-term exercise (2–6 months), regardless of type, frequency, and intensity, produced clinically significant and moderate/considerable improvements in cardiorespiratory fitness, with an average increase in peak oxygen consumption rate of 5 mL/kg/minute (Parker, 2016; Yuguero-Ortiz et al., 2021). Third, any exercise prescribed during an HD session resulted in clinically significant and moderate increases in muscle strength (Castro et al., 2021; Greenwood et al., 2020; Parker, 2016). Fourth, any prescribed exercise consistently produced clinically significant and considerable improvements in several functional capacity indices (Valenzuela et al., 2018; Yabe et al., 2021; Zhang et al., 2020). Finally, self-reported physical function improved significantly in patients who exercised, often contributing to improved quality of life scores (Greenwood et al., 2020; Zhang et al., 2020).

Our results showed that IRT was ineffective in increasing muscle mass in patients with CKD on HD, consistent with Kato et al. (2021). However, this finding differs from Sulistya-ningsih (2014), who showed differences in the leg muscles in the treatment group after physical exercise. This difference might reflect differences in the procedures for implementing IRT; our study used the same IRT procedures as Kato et al. (2021), while Sulistyaningsih (2014) used an IRT procedure in which participants performed movements independently for 30–45 minutes.

The difference in results may be explained as follows: while sports training in various program types is a potent stimulus to increase muscle mass in various pathologies and helps fight factors causing muscle wasting (Graham et al., 2021), several factors cause muscle mass loss in patients with CKD on HD. First, in CKD progression, there is a decrease in protein intake and anorexia, which is reported to occur in about one-third of patients on HD. Second, fluid restriction can cause a simultaneous decrease in calorie intake. Third, the HD procedure may contribute to a catabolic state due to decreased protein synthesis and increased proteolysis. Fourth, catabolic factors cause mass muscle loss in patients on HD, including acidosis, comorbidities, inflammation, cortico-steroid use, and a sedentary lifestyle (Bakaloudi et al., 2020; Koppe et al., 2019; Radjen et al., 2018).

Recent studies have shown that the HD process affects energy and protein homeostasis. Protein loss during dialysis sessions combined with low nutrient intake results in low nutrient availability for muscle synthesis (Radjen et al., 2018). Nutritional status, catabolic status, and hormonal factors influence muscle mass. Since muscle mass regulation involves complex biochemical interactions, imbalances significantly affect protein homeostasis (Radjen et al., 2018). Researchers have realized that treating muscle mass loss, such as with IRT, is insufficient for physical activity. However, consideration is also needed in providing therapies that help address factors influencing muscle mass, such as controlling nutritional status, catabolic status, and hormonal status (e.g., insulin resistance), with nutritional supplements and supple-

ments to treat metabolic acidosis (Graham et al., 2021).

Most participants showed Average muscle strength before IRT (n = 20). Muscle mass is closely correlated with muscle function. A prospective study showed that the decline in muscle function was greater than the loss of muscle mass (Koo, 2022). Graham et al. (2021) showed that skeletal muscle mass reduced by 20%–30%, and strength reduced by up to 40%. Muscle strength is one of the most important determinants of physical function for maintaining daily living activities in patients with CKD (Chen et al., 2023). Patients with HD have lower functional capacities, including daily living activities, as a result of reduced muscle mass and strength, which lowers their quality of life (Zhang et al., 2020).

Our study revealed that IRT was effective in improving muscle strength in patients with CKD on HD, consistent with previous studies (Castro et al., 2021; Lopes et al., 2019; Sulistyaningsih, 2014). Rhee and Kalantar-Zadeh (2014) showed that increasing physical activity could address decreased muscle mass and strength in patients with CKD on HD. Structured exercise interacts with several molecular systems that are beneficial for improving contractile function and metabolism (Greenwood et al., 2021; Myers et al., 2021). Structured exercise activates pro-anabolic signaling path-ways, converging on mechanistic target of rapamycin complexes 1/2 (mTORC1/2) to increase ribosome initiation and increase efficiency in protein synthesis. Activation of mTORC1/2 and anabolic pathways helps inhibit the activetion of transcription factors causing muscle atrophy (e.g., the forkhead box O [FOXO] family) by preventing excess protein degradation. Exercise can create long-term changes in the epigenetic profile of muscles, inducing deoxyribonucleic acid (DNA) hypermethylation in the promoter regions of deleterious genes to reduce their expression and DNA hypomethylation in regions regulating beneficial genes to increase their expression, improving neuromascular function,

and helping to protect and increase muscle strength (Graham et al., 2021).

Each dialysis session should include at least 30 minutes of supervised moderate-intensity exercise for all patients with CKD on HD without contraindications, according to the Kidney Association Clinical Practice Guidelines in Hendriks et al. (2019). They also say that when they do not get dialysis, individuals with CKD should be encouraged to exercise. Apart from time, an important factor that determines an exercise's ability to assist muscle maintenance is its kind. Exercise during (intradialytic) or in between (interdialytic) HD sessions is one way that patients with CKD on HD might receive physical activity intervention (Arazi et al., 2022).

In patients with CKD on HD, a meta-analysis found no difference in the effectiveness of intradialytic exercise compared to interdialytic exercise in terms of improving physical function (Hendriks et al., 2019). However, patients with CKD do not adhere well to long-term supervised physical activity intervention programs because of exercise intolerance. Patients with CKD can incorporate supervised physical exercise into their weekly regimen by participating in HD sessions. Compared to interdialytic physical activity, intradialytic physical exercise is safer and exhibits higher compliance. A patient-specific exercise program can also be created by monitoring intradialytic exercise sessions; progressive, resistance-type workouts are thought to be the most efficient in building muscle mass and strength (Arazi et al., 2022; Yuguero-Ortiz et al., 2021).

This study had strengths and weaknesses. Its strength is that IRT research is rarely conducted in Indonesia, and our findings provide updates on the care of patients on HD in Indonesia. Its limitations were its small sample of no randomly chosen patients, lack of a control group, and inclusion of only one intradialytic exercise in the IRT intervention (resistance training).

Conclusion

IRT was effective in increasing muscle strength but ineffective in increasing muscle mass. With abundant benefits and minimal side effects, IRT has preventive implications for fighting muscle wasting. Therefore, it is highly recommended that CKD patients conduct IRT, either during HD sessions or on non-HD days. Future studies should include a larger sample and a control group.

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Enhancing Patient Satisfaction Among Coronary Heart Disease Patients Through Islamic Spiritual Care with *Murottal* in Nursing Practice

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Abstract

Spiritual care is essential in nursing, especially for patients with chronic or palliative conditions such as coronary heart disease. Although medical intervention is crucial, Islamic spiritual therapy using *murottal* has a significant impact on patient satisfaction. This study aims to evaluate the effectiveness of *murottal* in enhancing patient satisfaction among individuals with coronary heart disease. A quasi-experimental pretest-posttest design was used with 52 participants at Siti Khadijah Islamic Hospital, Palembang, Indonesia. Total sampling was applied, and data were analyzed using the paired sample t-test. Patient satisfaction was measured using a Likert-scale questionnaire to assess the impact of *murottal* spiritual care. The results showed that the control and intervention groups had a mean age of 54 ± 6.33 and 56 ± 8.65 years, with a disease duration of 10 ± 6.38 and 9 ± 4.33 years, respectively. Most participants were male (78.8% -control, 73.1% -intervention), had low education levels, and were unemployed. Before the intervention, dissatisfaction was reported by 84.6% of the intervention group and 88.5% of the control group. Afterward, 80.8% of the intervention group expressed satisfaction, while 76.9% of the control group remained dissatisfied. The t-test yielded a p-value of < 0.05 (0.000), indicating that *murottal* significantly increases patient satisfaction. Integrating *murottal* into nursing can enhance spiritual well-being and improve patient satisfaction, particularly in chronic and palliative care settings.

Keywords: coronary heart disease, murottal, nursing care, patient satisfaction, spiritual care

Abstrak

Peningkatan Kepuasan Pasien Jantung Koroner melalui Pelayanan Spritual Islami dengan Murottal dalam Praktik Keperawatan. *Perawatan spiritual sangat penting dalam keperawatan, terutama bagi pasien dengan kondisi kronis atau paliatif seperti penyakit jantung koroner. Meskipun intervensi medis sangat krusial, terapi spiritual Islam menggunakan murottal memiliki dampak yang signifikan terhadap kepuasan pasien. Penelitian ini bertujuan untuk mengevaluasi efektivitas murottal dalam meningkatkan kepuasan pasien pada individu dengan penyakit jantung koroner. Penelitian ini menggunakan desain kuasi-eksperimental dengan* pretest-posttest *pada 52 partisipan di Rumah Sakit Islam Siti Khadijah, Palembang, Indonesia. Teknik total sampling diterapkan, dan data dianalisis menggunakan* paired sample t-test. *Kepuasan pasien diukur menggunakan kuesioner skala Likert untuk menilai dampak dari perawatan spiritual Murottal. Hasil penelitian menunjukkan bahwa kelompok intervensi dan kontrol memiliki rata-rata usia 54 ± 6,33 dan 56 ± 8,65 tahun, dengan durasi penyakit masing-masing 10 ± 6,38 dan 9 ± 4,33 tahun. Sebagian besar partisipan berjenis kelamin laki-laki (78,8% kontrol, 73,1% intervensi), memiliki tingkat pendidikan rendah, dan tidak bekerja. Sebelum intervensi, ketidakpuasan dilaporkan oleh 84,6% kelompok intervensi dan 88,5% kelompok kontrol. Setelah intervensi, 80,8% kelompok intervensi menyatakan puas, sementara 76,9% kelompok kontrol tetap tidak puas. Uji t menghasilkan nilai p < 0,05 (0,000), yang menunjukkan bahwa murottal secara signifikan meningkatkan kepuasan pasien. Integrasi Murottal dalam praktik keperawatan dapat meningkatkan kesejahteraan spiritual dan kepuasan pasien, terutama dalam perawatan kronis dan paliatif.*

Kata Kunci: *kepuasan pasien, murottal, pelayanan keperawatan, pelayanan spiritual, penyakit jantung koroner*

Introduction

Chronic heart disease (CHD), a long-term cardiovascular condition lasting more than six months, significantly affects patients' biological, psychological, sociocultural, and spiritual well-being (Zipes et al., 2019). A common challenge for CHD patients is spiritual distress, which often worsens due to the ongoing nature of the illness. As continuous care providers, nurses are vital in supporting these spiritual needs. However, spiritual care is frequently overlooked, with a focus instead on physical care. Contributing factors include nurses' discomfort with spiritual topics, inadequate training, and the perception that addressing spiritual needs falls outside their responsibilities, often seen as the domain of religious leaders (Fitch & Bartlett, 2019; Sadiq et al., 2019).

Studies have shown that addressing patients' spiritual needs can improve resilience and enhance satisfaction by providing comfort during health challenges (Soylu et al., 2023; Tobin et al., 2022). For instance, listening to *murottal* Qur'anic recitation, known for its calming effects, can improve mood and reduce stress, benefiting emotional stability and heart health (Mutiah & Dewi, 2022). Supporting data demonstrates the effectiveness of such spiritual interventions in enhancing overall satisfaction and well-being among CHD patients (Asrul, 2023).

A preliminary observation conducted on January 23, 2023, at Siti Khadijah Islamic Hospital in Palembang found that seven out of ten nurses had not adequately addressed patients' spiritual needs, particularly those associated with Islamic practices like *murottal*. Only three nurses reminded patients to pray during medication, while none provided spiritual interventions. Furthermore, interviews with five patients revealed a strong preference for the inclusion of spiritual care, such as *murottal*, as part of their treatment. Patients indicated that spiritual reinforcement was crucial for their comfort and saw illness as an opportunity for spiritual growth.

To address this gap, comprehensive spiritual care that includes Islamic practices like *murottal* can be integrated into nursing care to enhance patient satisfaction and health outcomes. Research suggests that when supported by well-trained nurses, such an approach can significantly improve the patient's experience, foster a sense of peace, and enhance satisfaction (Ramadhanti et al., 2022; Wisuda et al., 2024b). This study aims to explore the impact of *murottal*-based spiritual care on the satisfaction of CHD patients, providing evidence for the effectiveness of holistic care in nursing practices.

Methods

This study received ethical approval with exempt status from the Ethics Committee of the Faculty of Medicine, Sriwijaya University, on February 6, 2023, under protocol number 024-2023. The researcher adhered to ethical principles throughout the research process, including obtaining informed consent, respecting human rights, and ensuring beneficence and non-maleficence. Employing a quasi-experimental design, the research used a pretest-posttest control group approach to assess the impact of *murottal* as a form of spiritual care. Participants were divided into two groups: an intervention group that received the *murottal* intervention and a control group that received only standard care. The study aimed to measure changes in patient satisfaction through pre- and post-intervention scores, with statistical significance analyzed via the paired sample t-test.

Study Design. The quasi-experimental, pretest-posttest control group design provided a structured framework to evaluate the *murottal* intervention's effectiveness. This format allowed for a direct comparison of patient satisfaction levels before and after the intervention in both groups, offering insight into the role of spiritual care in improving patient outcomes.

Sampling and Sampling Techniques. A total sampling technique was employed, incorporat-

ing all eligible participants to ensure broad representation. The study involved 104 CHD patients from Siti Khadijah Islamic Hospital in Palembang, Indonesia, with 52 patients allocated equally to both the intervention and control groups. This approach ensured a comprehensive sample reflective of the target patient population.

Variables and Instruments. This research focuses on two main variables: the independent variable, defined as *murottal* spiritual service intervention, and the dependent variable, represented by patient satisfaction with nursing services. Data were collected using a structured questionnaire to assess patient satisfaction with perceived spiritual services. Questionnaire responses were rated on a Likert scale, allowing participants to express their satisfaction with the spiritual services.

Data Collection and Intervention. Both groups were assessed using pretest and posttest. Initial measurements established baseline satisfaction levels. Over one week, the intervention group received daily *murottal* sessions, each lasting 20 minutes, while the control group continued with standard care. After one week, posttest data were gathered to assess any changes in satis-

faction levels attributable to the *murottal* intervention.

Data Analysis. The paired sample t-test was employed to analyze changes in satisfaction scores within each group before and after the intervention. This statistical approach determined whether the *murottal* intervention significantly impacted patient satisfaction compared to the control group, contributing to understanding spiritual care's value in clinical settings.

Results

Table 1 provides a comprehensive overview of the demographic and clinical characteristics of the participants. The average age of participants was 54 years in the control group and 56 years in the intervention group. The average duration of illness was ten months for the control group and nine months for the intervention group. In both groups, most participants were male, with 78.8% in the control group and 73.1% in the intervention group. Additionally, over half of the participants in both groups had low education levels, with 61.5% in the control group and 55.7% in the intervention group. A considerable proportion of respondents in both groups were

Table 1. Demographic and Clinical Characteristics of Participants in Each Group (N = 52)

Characteristics	Control Group		Intervention Group	
	Mean (SD)	n (%)	Mean (SD)	n (%)
Age (years)	54 ± 6.331		56 ± 8.652	
Illness duration	10 ± 6.376		9 ± 4.329	
Gender				
Male		41 (78.8)		38 (73.1)
Female		11 (21.2)		14 (26.9)
Education				
Low*		32 (61.5)		29 (55.7)
High*		20 (38.5)		23 (44.3)
Occupation				
Self-Employed		7 (13.5)		9 (17.3)
Employee		9 (17.3)		6 (11.5)
Trader		6 (11.5)		7 (13.5)
Teacher		8 (15.4)		5 (9.6)
Unemployed		22 (42.3)		25 (48.1)

*Low education = no formal education, elementary school, and junior high school;
*High education = senior high school and higher education.

Table. 2. Patient Satisfaction Level in the Intervention Group and Control Group Pretest and Posttest of the Intervention

Patient Satisfaction	Treatment			
	Pretest		Posttest	
	Intervention Group	Control Group	Intervention Group	Control Group
	n (%)	n (%)	n (%)	n (%)
Not satisfied	44 (84.6)	46 (88.5)	0	12 (23.1)
Less satisfied	8 (15.4)	6 (11.5)	10 (19.2)	40 (76.9)
Satisfied	0	0	42 (80.8)	0
Very satisfied	0	0	0	0

Table 3. Differences in Satisfaction among Coronary Heart Disease Patients in the Intervention Group Before and After Intervention

Variable	Measurement	N	Mean	t	p
Satisfaction	Pretest	52	81.59	-17.540	0.000
	Posttest	52	98.59		

Table 4. Differences in Satisfaction Among Coronary Heart Disease Patients in the Control Group Before and After Intervention

Variable	Measurement	N	Mean	t	p
Satisfaction	Pretest	52	81.32	-2.826	0.010
	Posttest	52	83.14		

Table 5. The Influence of Islamic Spiritual Care with *Murottal* on Patient Satisfaction at Siti Khadijah Islamic Hospital Palembang

Variable	Post Test	N	Mean	t	p
Satisfaction	Intervention Group	52	98.59	15.626	0.000
	Control Group	52	83.14		

unemployed, comprising 42.3% of the control group and 48.1% of the intervention group.

Table 2 shows that the intervention group mainly had patient satisfaction before treatment (pretest), while the control group expressed dissatisfaction. The intervention group had 84.6% satisfaction, while the control group had 88.5%. The majority of patient satisfaction in the posttest in the intervention group was 80.8%, while in the control group, the majority expressed dissatisfaction at 76.9%.

Table 3 shows that the average satisfaction score in the pretest was 81.59, and in the in-

tervention group posttest, it was 98.59. So, the average patient satisfaction score increased in the pretest and posttest. The significance value of 0.000 is less than 0.05. Thus, there is a significant difference in patient satisfaction between the pretest and posttest intervention groups.

Table 4 shows that the average satisfaction score in the control group pretest was 81.32, and in the control group posttest was 83.14. Thus, it can be concluded that the average patient satisfaction score increased in the pre-test and post-test. The significance value of 0.010 is less than 0.05. Thus, it can be concluded that there is a significant difference in patient satisfaction

in the control group's pretest and posttest.

Table 5 shows that the average satisfaction score in the posttest intervention group was 98.59, while in the posttest control group, the average score was 83.14. So, there is a difference in the average posttest satisfaction scores of the control and intervention groups. The p-value is 0.000 < α (0.05); Thus, it can be concluded that there is an influence between Islamic Spiritual Care and murottal on patient satisfaction in nursing practice.

Discussion

Patient satisfaction level in the intervention group and control group pretest and posttest of the intervention. The results showed that patient satisfaction before treatment (pretest) was primarily found in the intervention group, and the control group expressed dissatisfaction, the intervention group as much as 84.6%, while the control group as much as 88.5%. Most of the patients who were satisfied in the posttest in the intervention group stated that they were as satisfied as 80.8%, while the control group mainly indicated that they were dissatisfied, as much as 76.9%.

Spiritual assistance is an activity carried out by a person to ask for help and assistance from the Highest. Patient limitations due to hospitalization mean that patients cannot worship, one of which is prayer. *Murottal* is a part of prayer that can be done by following the sound of the holy verses of the Qur'an that are being listened to. This statement is supported by Buhaiti and Sari (2021), who explain that hospital patients experience spiritual distress.

Wisuda et al. (2023) and Thakur (2021) indicate that spiritual suffering is when someone experiences a lack of connection with life and their beliefs. Soylu et al. (2023) confirmed that when someone is sick, pain or loss befalls them, spiritual power can help heal them. Melastuti and Wahyuningsih (2023) said that nurses need to consider certain religious practices that will

influence nursing care, such as patient beliefs about birth, death, dressing, and prayer, and nurses need to support patient spirituality. This explanation shows that religious practices such as one of the times to pray through *murottal* is one of the needs that a person needs as an indicator of satisfaction in spiritual aspects of nursing services during hospital treatment.

Tajbakhsh et al. (2018) explain a relationship between fulfilling spiritual needs and *murottal* and patient satisfaction because it can improve coping behavior and expand the patient's sources of strength. Spiritual needs are critical to maintaining a dynamic personal relationship between a person and God. Helping patients fulfill and support religious practices can help improve coping during a crisis. This statement is supported by research by Somana and Trisnawati (2019). In research on the relationship between spiritual needs and *murottal* and patient satisfaction during treatment, 76% of respondents answered that they were satisfied because there was a religious element in every nursing action. The spiritual needs are beliefs that can provide meaning in life, strength, and coping for patients. Spiritual care with *murottal* is one of the Islamic spiritual options that can be given to patients so that it can increase comfort and strength regarding their disease status and facilitate the therapy process.

Differences in pretest and posttest patient satisfaction in implementing spiritual care at Siti Khadijah Islamic Hospital Palembang. The results showed that the average satisfaction score on the pretest of the control group was 81.32, and on the posttest of the control group, it was 83.14. So, the average patient satisfaction score increased on the pretest and posttest.

The average satisfaction score in the intervention group's pretest was 81.59, and in the intervention group's posttest, it was 98.59. So, the average patient satisfaction score increased on the pretest and posttest. The significance value of 0.000 is less than 0.05. Thus, there is a signi-

ficant difference in patient satisfaction in the pretest and posttest intervention groups.

According to the researchers, there were differences in knowledge level scores in the intervention group due to the intervention in spiritual care with *murottal*. Meeting spiritual needs is essential, but meeting patient needs is still far from what is expected. Analysis of the current situation from several kinds of literature shows that spiritual care, especially *murottal*, has not been provided by nurses competently due to various factors, such as limited hospital infrastructure and nurses' time in providing spiritual care (Ilham et al., 2020; Wisuda et al., 2024a). One of the reasons for the lack of nurses' ability to meet spiritual needs is that nurses have not mastered the concept of spiritual nursing, which they should have acquired since their education (Sadiq et al., 2019).

Service to spiritual needs as part of human needs can only be fulfilled if nurses are equipped with the ability to provide nursing care by paying attention to the spiritual aspects of the client as part of the holistic needs of the patient as a whole and unique being. According to Jakob and Weyel (2020), patients and families need to fulfill spiritual requirements in seeking meaning from life events, including suffering due to illness and feeling still loved by fellow humans and God. This was added by Trisnawati et al. (2021). By implementing spiritual care with *murottal*, nurses can fulfill one of the spiritual needs of their patients. Increasing evidence highlights the significant impact of various social, psychological, and environmental factors on physical and mental well-being, often rivaling traditional risk factors (Sadiq et al., 2019). Specifically, involvement with a religious community, as seen in Islamic spirituality through *murottal*, is associated with positive health outcomes, including reduced mortality rates and reduced incidence of psychological problems, drug abuse, and suicide (Ilham et al., 2020).

Murottal involves the recitation of holy verses from the Qur'an, with an emphasis on proper pronunciation (tajwid) and the rhythmic delivery of the text. Listening to these sacred verses, often called *murottal*, can instill a sense of calm in the listener (Sumarsih et al., 2023). Similarly, music therapy offers a safe and effective method for improving mood satisfaction and managing other mental health disorders. Music can also distract and promote relaxation (Moulaei et al., 2023).

The influence of the Islamic spiritual care with *murottal* on patient satisfaction at Siti Khadijah Islamic Hospital Palembang. The results showed that the average posttest satisfaction score in the control group was 83.14; in the posttest intervention group, it was 98.59. It can be concluded that there was a difference in the average posttest satisfaction score in the control group and the intervention group. The p-value is 0.000 < α (0.05); thus, it can be concluded that there is an influence between the application of Spiritual Care nursing and patient satisfaction.

The provision of interventions in Spiritual Care Nursing shows that the hospital is trying to provide comprehensive and quality nursing care covering biological, psychological, social, and spiritual aspects. This aligns with what Winarti (2016) said. Nursing care affects patient satisfaction during treatment. They explain that the quality of services the hospital provides will significantly influence patient satisfaction, so to provide patient satisfaction, every hospital must provide satisfactory service.

A study by Ruby et al. (2022) involved providing an Al-Qur'an reading as an intervention for 168 respondents who experienced discomfort with services while undergoing therapy. The treatment group showed increased levels of satisfaction after the intervention process. Another study by Hajiri et al. (2019) implemented a spiritual program, including listening to Qur'anic verses, for 64 heart failure patients to increase satisfaction. The treatment group showed a significant increase in mean satisfaction score to 11.09 (8.47) after undergoing the spiritual program (p < 0.001).

The spiritual aspect is one of the most critical aspects nurses must consider. Because nurses are required to be skilled and able to carry out patient worship guidance, it is hoped that when patients can carry out their religious obligations, they will get peace of mind, enlightenment, and a sense of comfort (Cone & Giske, 2022).

Based on research findings, theoretical review, and examination of related literature, researchers observed a consistent pattern indicating an increase in average satisfaction among patients who underwent Islamic spiritual care therapy with *murottal*. This pattern suggests activation of the relaxation response in the patient's body. Patients expressed experiencing a deep sense of calm and comfort after following Islamic spiritual treatment techniques involving *murottal*. These improvements have significant positive implications, especially for individuals undergoing cardiac therapy for coronary heart disease.

Conclusion

This study demonstrates that Spiritual Care through *murottal* significantly enhances patient satisfaction among coronary heart disease patients. Before the *murottal* intervention, many patients experienced spiritual dissatisfaction. However, after receiving this spiritual care, there was a marked improvement in satisfaction levels, with the intervention group showing notably higher satisfaction than the control group. These findings affirm the effectiveness of *murottal* as a spiritual nursing intervention. Future research should explore the long-term impact of this approach and consider other factors that may influence patient satisfaction. Additionally, training healthcare personnel in spiritual care could further maximize the benefits of this intervention.

Acknowledgments

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Promoting Competence and Confidence: Simulation-Based Basic Life Support Training for Jordanian Nurses

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Abstract

Cardiopulmonary arrest is a major health issue that affects healthcare providers. The COVID-19 pandemic has added a new risk to rescuers who may be attempting to resuscitate victims. It is essential to strike a balance between resuscitation and the need to protect oneself from infection. The study aims to evaluate the effectiveness of simulation training in enhancing the Basic Life Support (BLS) knowledge, skills, and confidence levels of newly employed nurses. The study employed a single-masked, prospective, randomized controlled trial design, which consisted of three phases: a pre-test, an immediate post-test, and a post-test conducted three months later. The American Heart Association's BLS test was used to assess knowledge and practical skills of 102 nurses who were randomly assigned to two groups. The nurses' confidence was evaluated through a self-evaluation questionnaire. The control group received the brochure, and the interventional group received a seven-hour BLS training using simulation. Both arms were homogenous in their characteristics, according to Mann-Whitney analysis. Independent T-test reflected homogenous pre-test results in knowledge, practice, and confidence between both arms. The result also showed significant differences between both groups in the post-test-1 in knowledge ($p < 0.001$), practice ($p < 0.001$) and confidence ($p = 0.024$); and significant differences in the post-test-2 between both groups in knowledge ($p < 0.001$), practice ($p = 0.002$) and confidence ($p < 0.001$). BLS training using simulation is an efficient method that enables participants to become more knowledgeable and skilled in BLS, resulting in a high level of confidence. Frequent, short BLS training using simulation helps maintain competence and confidence, ensuring readiness for CPR in case of cardiopulmonary arrest.

Keywords: basic cardiac life support, confidence, knowledge, practice, simulation training

Abstrak

Mempromosikan Kompetensi dan Kepercayaan Diri: Pelatihan Bantuan Hidup Dasar Berbasis Simulasi bagi Perawat Jordania. *Henti jantung paru adalah masalah kesehatan utama yang memengaruhi penyedia layanan kesehatan. Pandemi* COVID-19 *menambah risiko bagi tim penyelamat yang berupaya menyadarkan korban. Penting menyeimbangkan kebutuhan resusitasi dengan perlindungan diri dari infeksi. Penelitian ini mengevaluasi efektivitas pelatihan simulasi dalam meningkatkan pengetahuan, praktik, dan kepercayaan diri perawat baru. Studi ini menggunakan desain* single-masked prospective randomized control trial *yang terdiri dari tiga fase*: pre-test, post-test *segera setelah intervensi, dan* post-test *yang dilakukan tiga bulan kemudian. Tes* Basic Life Support (BLS) *dari* American Heart Association *digunakan untuk menilai pengetahuan dan keterampilan praktik. Selain itu, kepercayaan diri perawat dievaluasi melalui kuesioner evaluasi diri. Seratus dua perawat didistribusikan acak ke dua kelompok; kontrol menerima brosur, intervensi menerima pelatihan BLS tujuh jam menggunakan simulasi. Kedua kelompok memiliki karakteristik homogen dengan analisis* Mann-Whitney. *Uji-T independen menunjukkan hasil pra-tes homogen dalam pengetahuan (p = 0,324), praktik (p = 0,887) dan kepercayaan diri (p = 0,304). Hasil menunjukkan perbedaan signifikan pada* post-test-1 *dalam pengetahuan (p < 0,001), praktik (p < 0,001) dan kepercayaan diri (p = 0,024); serta* post-test-2 *dalam pengetahuan (p < 0,001), praktik (p = 0,002) dan kepercayaan diri (p < 0,001). Pelatihan* BLS *dengan simulasi adalah metode efisien yang meningkatkan pengetahuan, keterampilan, dan kepercayaan diri peserta dalam* BLS. *Pelatihan* BLS *singkat dan sering*

menggunakan simulasi membantu menjaga kompetensi dan kepercayaan diri, memastikan kesiapan untuk CPR *jika ter-jadi henti jantung dan paru.*

Kata Kunci: *bantuan hidup jantung dasar, kepercayaan diri, pelatihan simulasi, pengetahuan, praktik*

Introduction

Cardiopulmonary arrest has become a major health issue facing healthcare providers (HCPs) and has been increasing mortality globally (Abelsson et al., 2020; Mullor et al., 2021). In Europe, cardiopulmonary arrest is the third cause of death (Gräsner et al., 2021). Cardiopulmonary arrest accounted for 80% of deaths inside hospitals (Jang et al., 2021). COVID-19 introduced a new risk to rescuers when resuscitating victims, necessitating a balance between resuscitation and protecting themselves from infection (Goodloe et al., 2021). Globally, the incidence of cardiopulmonary arrest increased to 23% during the first wave of COVID-19 in April 2020, and to 19% during the second wave in December of the same year (Holm et al., 2021).

Nursing educators have utilized simulation since the earliest days of nursing education, dating back to the 1950s (Span, 2015). The World Health Organization (WHO) defines simulations as instructional methods that utilize one or more pedagogical training strategies to positively impact healthcare professionals' (HCPs) motivation to acquire knowledge and skills (Martins et al., 2018). Simulation is suitable for critical training (Alexander, 2020). WHO emphasized that simulation in medical and nursing education improves learning outcomes and ensures patient safety (Ekert et al., 2021). Simulations have become important tools for training medical professionals and improving educational efficiency (Handeland et al., 2021). The use of simulation in training has increased globally over the past two decades and has become widely adopted in nursing education (Alalhareth et al., 2021). The American Heart Association (AHA) strongly recommends incorporating simulation into Basic Life Support (BLS) training (Mullor et al., 2021).

Health institutions must adopt innovative teaching methods, such as simulation (Rushton et al., 2020), especially during the COVID-19 pandemic (Ekert et al., 2021). Simulation training maintains the ethical aspect by allowing nurses to make mistakes while applying invasive and non-invasive procedures in simulation, instead of on real patients (Martins et al., 2018).

BLS is the primary step of first aid that can be administered to victims before an advanced HCP arrives. High-quality cardiopulmonary resuscitation (CPR) requires knowledgeable and skilful rescuers to enhance the victims' survival (Laco & Stuart, 2021). Early and correct CPR is crucial for doubling or tripling the survival rate (Nusser, 2021; Sachdeva, 2020; Zhou et al., 2020). Early CPR initiation within 3-5 minutes increases the survival rate among victims (Chowdhary et al., 2020). On the other hand, one minute late to initiate chest compression reduces a victim's chance of survival by 7-10% (Sharma et al., 2021).

Nurses should continuously work on improving and updating their knowledge and skills in BLS competencies (Rushton et al., 2020); they should apply BLS quickly and correctly (Park & Lee, 2021). Nurses are the primary target audience for BLS training (Qalawa et al., 2020; Roslinda et al., 2022), because they spend a considerable amount of time with patients and they are often the first healthcare professionals to recognize cardiopulmonary arrest (Jang et al., 2021). Victim resuscitation requires immediate action within minutes from the nearest HCPs to the scene of the cardiopulmonary arrest; most available HCPs near patients are nurses (Nusser, 2021).

The nursing profession's development should begin in the first year of employment to instil the building blocks of confidence, knowledge,

and practice. Moreover, simulation training helps newly employed nurses absorb stress and increase their confidence during patient care (Ruslan & Saidi, 2019). Most adverse effects and medical errors occur in the first years of employment due to a lack of exposure to critical situations (Borggreve et al., 2017).

This study aims to evaluate the effectiveness of simulation training in enhancing the BLS knowledge, practice, and confidence levels of newly employed nurses in Jordanian governmental hospitals. Nurses represent the largest group of healthcare providers in Jordan, and the selected hospitals for this study serve a significant portion of the public population (The National Strategy for Health Sector in Jordan, 2020). Additionally, the nurses selected for this study graduated from universities during the COVID-19 pandemic in 2021 and 2022 (Abuhammad, 2020; Sindiani et al., 2020; Suliman et al., 2021). The study hypothesized that there would be no significant differences in the participants' characteristics and pre-tests between the control and experimental groups, while significant differrences would be observed in the post-test results between the two groups.

Methods

The study employed a single-masked, prospective, randomized controlled trial design consisting of three phases: assessment, acquisition, and retention. The pre-test was conducted during the assessment phase. Post-test 1 was administered immediately after the intervention, during the acquisition phase, and post-test 2 was conducted three months later, during the retention phase. The current study was registered with ClinicalTrial.gov (ID: NCT060018 79) in August 2023. Homogeneous inclusion criteria were maintained between the control and experimental groups in this study (Sarvan & Efe, 2022). The researchers selected newly employed nurses with less than two years of experience in nursing (Mante, 2019), specifically those who worked in non-critical care departments, had limited exposure to recogniz-

ing cardiopulmonary arrest, and had not received BLS training prior to the commencement of the study. Researchers excluded participants with intensive care unit (ICU) capabilities from this study (Laco & Stuart, 2021).

G*POWER software was applied to compute the sample size using the following parameters: Power (P = 0.8), Alpha (α = 0.05), and Effect Size (ES = 0.275). The researchers increased the initial participant count by 30% to account for attrition, resulting in a final sample size of 102 participants divided into two groups of 51 participants each. The computer-generated randomization software divided five hospitals in Jordan into two groups. Three hospitals were assigned to the control group, while the interventional group was selected from two hospitals. The nursing office in each hospital prepared a list of eligible participants, and the participants were finally assigned to each group using computer-generated random allocation from the previously prepared list of names. Data collection proceeded in three steps: pre-test, intervention, and post-test. The pre-test is the baseline data before the training session (Oermann et al., 2020). Participants who met the eligibility criteria began filling out the demographic data and the pre-test within 30 minutes as a proactive assessment prior to the interventions. Pre-tests were conducted in multiple sessions, according to the nurses' availability; the response rate for both groups were 100%.

Measurement tools consisted of four assessment parts: demographical data, knowledge, practice, and confidence. AHA's BLS test consisted of two domains, knowledge and practice, and consisted of 23 questions adopted from Yunus et al. (2015); each correct answer was vested one mark, and each wrong answer was given zero. The reliability of AHA's BLS test tool (Cronbach's α = 0.748) reflected the suitability and stability of these tools. The self-evaluation questionnaire for nurses' confidence was adapted from a study (Bissenbayeva, 2019) and used to assess participants' confidence levels in performing BLS. This tool consisted of seven

statements; according to the participants' answers, these statements were rated on a dropdown scale with a percentage value ranging from the lowest value (5%) to the highest value (100%). The survey tools were found to be suitable and stable, with a Cronbach's α of 0.73.

The interventional group participants received the simulation training module, while the nurses in the control group received the standard treatment, which included only a brochure; the researcher followed the 2020 AHA guidelines for BLS training in both groups. Multiple groups of nurses received the intervention until the desired sample size was achieved. Each group consisted of ten nurses and required five to seven hours for the intervention, which was conducted in an education hall (Knipe et al., 2020; Kose et al., 2020). The training module was divided into two parts: a two-hour knowledge session, which utilized a PowerPoint presentation, and a three-hour clinical simulation training session. The facilitators prepared adult and paediatric manikins for BLS training, which featured chest inflation and deflation for rescue breathing, a palpable carotid pulse, and a spring to allow for chest recoil during chest compressions. A low-fidelity manikin is convenient for BLS clinical training (Cura et al., 2020). The facilitator should be highly qualified from the AHA as a BLS trainer to perform the training session (Nusser, 2021).

Two post-tests were performed in this study. Post-test 1 was administered immediately after the intervention, and all participants from both groups completed it. Completing both the pre-test and post-test is essential in clinical training to compare the means and determine the effectiveness of the training program (Leighton et al., 2020). Post-test 2 took place three months after the intervention. Forty-eight participants (94%) in the experimental group and 45(88%) in the control group completed post-test 2. All the quantitative data were coded and transferred to IBM SPSS version 27. The analysis included descriptive demographic features and illustrated the homogeneity of participants' character-

istics in the control and experimental groups using the Mann-Whitney test. The researchers interpreted p-values and compared the means ± standard deviations (SD) of pre-tests and post-tests, using the normality assumption of the sample and the central limit theorem (Kwak & Kim, 2017). An Independent T-test was performed to identify the homogeneity between pre-tests and heterogeneity between post-tests of control and experimental groups.

The researchers selected results that were significant at the $p < 0.05$ level. This study has been approved for conduct by the IRB committee at Universiti Sains Malaysia (USM/JEPeM/22110 681), which complies with the Helsinki Declaration. Moreover, this study was authorized for conduct by the Jordanian IRB committee in the Ministry of Health (MOH/REC/2022/340). The study objectives and risks were discussed with the participants before they voluntarily signed a hard copy of the consent form. All study data and participants' information were kept in a secure and confidential area; only the researchers can access these data for this study. The study did not involve administering the medicine and posed no hazard to participants.

Results

The overall sample size consisted of 102 participants, divided into two arms; the first arm comprised the experimental group (n = 51). The second arm was the control group (n = 51). All the participants completed the demographic data. The ordinal normality assumption was checked for age, experience, and educational level, and it was found not to be fulfilled. The nonparametric Mann-Whitney statistical test was used to determine whether the median of the experimental group differed significantly from that of the control group (Table 1).

The median and interquartile range (IQR) results for age, education level, and experience indicated that there are no significant differences between the control and experimental groups. The experimental median age (IQ) was

Table 1. Demographical Features of Participants

Demographical Data	Category	Number n = 102	%
Age (year)	20-24	92	90.2
	25-29	10	9.8
Gender	Men	54	52.9
	Women	48	47.1
Education Level	Bachelor's degree	102	100
Experience in Nursing	Less than one year	91	89.2
	From 1 to 2 years	11	10.8

Table 2. Participants' Demographic Characteristics Homogeneity

Score	Median (IQR)		Z-Statistic	Mann-Whitney U	p^a
	Control Group	Experimental Group			
Age	2(0)	2(0)	-0.663	1249.500	0.508
Experience in Years	1(0)	1(0)	-0.318	1275.000	0.751
Educational Level	1(0)	1(0)	0.000	1300.500	1.000

Normality Assumption not fulfilled; Mann-Whitney U-test; a: Significant at a level of 0.05.

2(0), and control median age (IQ) was 2(0), with p = 0.508. Moreover, the experimental median of experience (IQ) was 1(0), and the control median of experience (IQ) was 1(0), with p = 0.751. Finally, the experimental median educational level (IQ) was 1(0), and control median educational level (IQ) was 1(0), with p = 1.000. These results showed that the experimental and control groups were homogeneous and had no significant differences in the demographic characteristics of the participants.

Pre-test analysis results in Table 3 showed, firstly, that Levene's test for the equality of variance in the Knowledge domain yielded an F-statistic = 0.271 and p = 0.604, indicating that the null hypothesis of equal variance was not rejected between the pre-tests of the control group and the experimental group. The T-statistic (df) result was 0.991(100) and p = 0.324. Secondly, in Levene's test for the practice domain equality of variance, with the F-statistic = 0.015 and p = 0.904, the null hypothesis of equal variance was assumed between the pre-test of the control group and experimental group. The T-statistic (df) result was -0.143(100) and p = 0.887.

Finally, in Levene's test for the Confidence do-

main equality of variance, with F-statistic = 2.135 and p = 0.147, the null hypothesis of equal variance was assumed between the pre-test of the control group and experimental group. The T-statistic (df) result was 1.034 (100) and p = 0.304. The data analysis revealed that the pre-test means ± SD of the experimental and control groups were homogeneous, showing no significant differences in knowledge, practice, and confidence. The control group's knowledge, practice, and confidence mean ± SD were 5.61 ± 1.686, 4.67 ± 1.337, and 49.50 ± 17.388, respectively, and the experimental group's mean ± SD were 5.27 ± 1.710, 4.71 ± 1.432, and 45.68 ± 19.824, respectively.

The post-test-1 analysis results, presented in Table 3, included Levene's test for the equality of variance in the Knowledge domain, with F-statistic = 0.869 and p = 0.353. This indicated that the null hypothesis of equal variance between the post-test-1 scores of the control group and the experimental group was not rejected. The T-statistic (df) result was -5.237 (100) and p < 0.001. Secondly, Levene's test for the Practice domain equality of variance yielded an F-statistic = 0.183 and p = 0.669, indicating that the null hypothesis of equal variance was not

Table 3. Independent T-test

Dependent Variables	Mean±SD		Levene's test		T-Statistic (pdf)	p^a
Pre-Test Comparison between Control (n = 51) and Experimental (n = 51) Groups						
	Control Group	Experimental Group	F test	p a		
Knowledge	5.61±1.686	5.27±1.710	0.271	0.604	0.991 (100)	0.324
Practice	4.67±1.337	4.71±1.432	0.015	0.904	-0.143 (100)	0.887
Confidence	49.50±17.388	45.68±19.824	2.135	0.147	1.034 (100)	0.304
Post-Test-1 Comparison between Control (n = 51) and Experimental (n = 51) Groups						
Dependent Variables	Mean±SD		Levene's Test		T-Statistic (pdf)	p^a
	Control Group	Experimental Group	F test	p a		
Knowledge	7.69±2.177	9.80±1.898	0.869	0.353	-5.237 (100)	< 0.001
Practice	5.31±1.667	7.00±1.744	0.183	0.669	-4.992 (100)	< 0.001
Confidence	66.37±17.553	73.52±13.824	2.969	0.088	-2.285 (100)	0.024
Post-Test-2 Comparison between Control (n = 45) and Experimental (n = 48) Groups (Dropout rate for both groups 0.096%)						
Dependent Variables	Mean±SD		Levene's Test		T-Statistic (pdf)	p^a
	Control Group	Experimental Group	F test	p a		
Knowledge	5.93±2.049	8.33±2.137	0.135	0.714	-5.520 (91)	< 0.001
Practice	4.80±1.727	5.90±1.601	0.501	0.481	-3.176 (91)	0.002
Confidence	52.91±22.496	71.71±16.352	5.314	0.023	-4.584 (80.009)	< 0.001

a: Significant at a Level of 0.05

rejected between the post-test-1 of the control group and the experimental group. The T-statistic (df) result was -4.992(100) and p < 0.001.

Finally, Levene's test for the confidence domain equality of variance, with F-statistic = 2.969 and p = 0.088, was used to assess the null hypothesis of equal variance between the post-test-1 of the control group and the experimental group. The T-statistic (df) result was -2.285 (100) and p = 0.024. The data analysis revealed that the post-test-1 mean ± SD of the experimental and control groups were heterogeneous and showed significant differences in knowledge, practice, and confidence. The control group's knowledge, practice, and confidence means ± SD were 7.69 ± 2.177, 5.31 ± 1.667, and 66.37 ± 17.553, respectively. The experimental group's means ± SD were 9.80 ± 1.898, 7.00 ± 1.744, and 73.52 ± 13.824, respectively.

Post-test 2 analysis results are presented in Table 3. Firstly, Levene's test for the equality of variance in the knowledge domain was reported, with F-statistic = 0.135 and p = 0.714. This indicates that the null hypothesis of equal variance between the Post-test 2 of the control group

and the experimental group was not rejected. The T-statistic (df = 91) was -5.520 (p < 0.001). Secondly, Levene's test for the practice domain equality of variance yielded F-statistic = 0.501 and p = 0.481, indicating that the null hypothesis of equal variance was not rejected between the post-test-2 of the control group and the experimental group. The T-statistic (df) result was -3.176 (91), with p = 0.002.

Finally, for the Levene's test for confidence domain equality of variance, the F-statistic (5.314) and p-value (0.023) indicated that the null hypothesis of equal variance was rejected, suggesting that the variance between the post-test-2 of the control group and the experimental group was not equal. The T-statistic (df) result was -4.584 (p = < 0.001). The data analysis highlighted that the experimental and control groups' post-test-2 means ± SD were heterogeneous and showed significant differences in knowledge, practice, and confidence. The control group's knowledge, practice, and confidence mean ± SD were 5.93 ± 2.049, 4.80 ± 1.727, and 52.91 ± 22.496, respectively. The experimental group's means ± SD were 8.33 ± 2.137, 5.90 ± 1.601, and 71.71 ± 16.352, respectively. The research-

ers anticipated a 30% dropout rate; however, the actual dropout rates for both groups were only 0.096%, which was significantly lower than expected.

Discussion

This study involved 102 participants randomly assigned to the experimental group (n = 51) and the control group (n = 51), holding significant implications for the fields of nursing and emergency care. The participants' eligibility criteria were homogenous between the control and experimental groups, with only participants with a bachelor's degree in nursing (n = 102). Ninety-one (89.2%) participants had less than one year of experience, and the remaining participants had experience ranging from one to less than two years. The researchers only included individuals who had not received BLS training prior to the intervention to ensure uniformity between the groups. The age distribution of the participants was narrow, centered between 20 and 24, and only 10 (9.8%) of the participants fell within the 25-29 age range. The gender distribution was also relatively equal, with 54 men and 48 women.

The study confirmed that the participant characteristics and pre-test results were similar across groups. Effective randomization and adherence to inclusion criteria led to significant increases in knowledge, practice, and confidence, as evidenced by the experimental group's post-test 1 and post-test 2 scores, compared to those of the control group. The higher mean ± SD scores in the experimental group indicated that the training module was significantly effective, highlighting the importance of uniformity and consistency, which aligns with previous research (Sarvan & Efe, 2022).

The study's positive outcomes can be attributed to several factors. Firstly, the use of the 2020 AHA BLS guidelines, a key component of the study, was instrumental in achieving positive results. Secondly, the training was guided by two theoretical models focused on simulation

training: Miller's Pyramid and Kolb's Cycle. Thirdly, the newly employed nurses were highly motivated to train to adapt to their new jobs. Fourthly, the facilitator's educational and experience level. AHA updates evidence-based practice for BLS in response to changing circumstances (Kose et al., 2020). The major changes in AHA occurred in 2015, which included modifying the CPR sequence from ABC to Circulation, Airway, and Breathing (CAB) (Sé et al., 2019). A CPR update occurred in 2020 due to the COVID-19 pandemic (Kei & Mebust, 2021; Laco & Stuart, 2021).

The study's positive outcomes might stem from the use of Miller's Pyramid and Kolb's Cycle to enhance clinical training. The WHO endorses these frameworks to enhance the knowledge, skills, and confidence of nurses and midwives when BLS training is delivered through simulation (Briese et al., 2020; Martins et al., 2018). Miller's Pyramid comprises four levels. The initial step focuses on understanding foundational concepts before clinical training (Nash et al., 2019) as conducted when BLS Knowledge was presented through a PowerPoint presentation (Chowdhary et al., 2020). The subsequent levels—"know-how," "show-how," and "does"—address the practical aspects of train-ing. The "know-how" stage relies significantly on the characteristics of the trainers. In this study, BLS instructors held certification from an international organization, and had substantial experience and deep understanding in intensive care units training (Al-Husban et al., 2022; Etlidawati & Ilinia, 2021; Greif et al., 2021).

At the "show-how" level, learners implemented their knowledge through simulation, focusing on repetitive practice to mitigate errors (Kose et al., 2020). Facilitators not only guided learners, but also corrected mistakes, highlighting their vital role in the learning process (Stærk et al., 2021). After the training, trainers gathered participants' observations and reflections on the BLS simulation during a debriefing session. This process is crucial for knowledge retention, as supported by the AHA and prior research

(Laco & Stuart, 2021). The final level, "does," indicates that learners can competently perform BLS procedures independently after the training session (Sarvan & Efe, 2022; Shrestha et al., 2020). Notably, repeated training, along with learner experiences and reflections, aligns with Kolb's Cycle (Nash et al., 2019). Another possible factor contributing to the positive outcomes in this study was the participants' high motivation to use simulation in training. Simulation in training is the key factor in enhancing participant motivation (Umuhoza et al., 2021). Moreover, the facilitator informed the learners that they would receive a completion certification at the end of the BLS session training, as recommended by a previous study that utilized certification rewards to increase learners' motivation (Giacalone, 2017).

Confidence refers to nurses ability to utilize their knowledge and skills to provide the best possible care to their patients (Hamilton, 2020). The results of this study showed that the experimental group had a significantly higher level of confidence than the control group. The confidence level in BLS among healthcare providers increased as they enhanced their knowledge and practice level (Abelsson et al., 2020; Rajaguru & Park, 2021).

Retention is defined as the ability of the participants to recall knowledge and perform practice correctly after training (Lee et al., 2021). The follow-up tests provide evidence for the efficient use of simulation training as a method that retains participants' knowledge and improves their practice scores. While the control group experienced a decline and returned to their initial levels in knowledge, practice and confidence scores three months after training, the interventional group also saw a decrease, but their scores remained significantly higher than their pre-training baseline. Many previous studies have reported that BLS competencies and confidence decrease over time after training (Dick-Smith et al., 2021; Paliatsiou et al., 2021), particularly in hospital departments that infre-

quently encounter CPR situations (Lee et al., 2021). Several studies suggest that brief refresher training sessions are effective in maintaining BLS competencies among HCPs (Abelsson et al., 2020; Wilson et al., 2021). Other studies have suggested that BLS providers should renew their BLS training every two years, as recommended by international institutions (Knipe et al., 2020; Nusser, 2021; Perkins et al., 2021).

Nursing Implications. Simulation manikins in healthcare settings for training have become essential to nursing education, as they provide an effective and valuable learning experience for healthcare professionals (Handeland et al., 2021; Nassar et al., 2021). Simulation training has been instrumental in expanding the scope of nursing education, resulting in the development of specialized fields within nursing, including critical care, emergency care, maternity care, and paediatric care (Curl et al., 2016).

Limitations. The researchers in this study have recognized some limitations. Firstly, the study was carried out across only five hospitals out of 121 hospitals in Jordan. Furthermore, the standardized survey helped participants recall their previous responses, which may impact the results.

Conclusion

BLS training is a vital component of healthcare education, equipping healthcare providers with the effective lifesaving skills necessary for emergencies. Simulation-based training has displayed effectiveness in this context. The generalizability of these findings may be limited. Despite limitations, simulation enables learners to practice and refine their competencies in a controlled environment, particularly for newly employed nurses, followed by regular refresher training sessions every three months to maintain competence and confidence retention. Ultimately, integrating simulation-based training into nursing curricula ensures consistent preparedness among future healthcare professionals, particularly in emergency procedures.

Acknowledgements

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Psychological Distress and Quality of Life Among Infertility Couples Undergoing Infertility Treatment in Malaysia

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Abstract

Infertility often leads to stress, anxiety, and depression, significantly affecting the quality of life of affected couples. This study explored the sociodemographic and psychological factors influencing the quality of life among infertile couples undergoing in vitro fertilization (IVF) treatment in Malaysia, using a cross-sectional design. A total of 126 infertile couples were purposively sampled from three public hospitals offering IVF treatment. The Depression, Anxiety, and Stress Scale (DASS-21) measured psychological distress levels, while the Fertility Quality of Life (Ferti-QoL) scale assessed fertility-related quality of life. Data collection adhered to strict ethical standards, with confidentiality ensured. Participants provided informed consent and completed surveys independently in private settings to ensure unbiased responses. Statistical analyses, including t-tests, chi-square tests, and multiple linear regression, were employed to identify significant patterns and predictors. Results revealed that wives had significantly lower FertiQoL scores compared to husbands ($p < 0.001$). Wives also experienced higher levels of stress, anxiety, and depression as indicated by DASS-21 scores ($p < 0.001$). Regression analysis identified stress ($p < 0.001$), anxiety ($p = 0.04$), depression ($p < 0.001$), and gender ($p = 0.02$) as significant predictors of quality of life. Elevated levels of psychological distress were associated with a notable decline in quality of life, particularly among wives. These findings emphasize the importance of addressing mental health needs among couples undergoing IVF. Healthcare providers should focus on emotional preparedness and develop targeted strategies to reduce psychological distress, ultimately enhancing the overall quality of life during treatment.

Keywords: infertility, psychological distress, quality of life.

Abstrak

Tekanan Psikologis dan Kualitas Hidup Pasangan Tanpa Anak yang Menjalani Pengobatan Infertilitas di Malaysia. *Infertilitas sering kali menyebabkan stres, kecemasan, dan depresi, yang secara signifikan memengaruhi kualitas hidup pasangan yang terdampak. Studi ini mengeksplorasi faktor sosiodemografi dan psikologis yang memengaruhi kualitas hidup pasangan tidak subur yang menjalani perawatan* IVF *di Malaysia, menggunakan desain* cross-sectional. *Sebanyak 126 pasangan tidak subur dipilih secara* purposive sampling *dari tiga rumah sakit umum yang menyediakan layanan* IVF. Depression, Anxiety, and Stress Scale (DASS-21) *digunakan untuk mengukur tingkat tekanan psikologis, sementara skala* Fertility Quality of Life (Ferti-QoL) *menilai kualitas hidup terkait kesuburan. Pengumpulan data dilakukan mengikuti standar etik penelitian dengan menjaga kerahasiaan data dan privasi peserta. Peserta memberikan persetujuan tertulis dan menyelesaikan survei secara mandiri dan terisolasi untuk memastikan jawaban yang tidak bias. Analisis statistik, termasuk uji t,* chi-square, *dan regresi linier berganda, digunakan untuk mengidentifikasi pola dan prediktor yang signifikan. Hasil menunjukkan bahwa skor* FertiQoL *pada istri secara signifikan lebih rendah dibandingkan dengan suami (p < 0,001). Istri juga mengalami tingkat stres, kecemasan, dan depresi yang lebih tinggi seperti yang ditunjukkan oleh skor* DASS-21 *(p < 0,001). Hasil analisis regresi mengidentifikasi stres (p < 0,001), kecemasan (p = 0,04), depresi (p < 0,001), dan jenis kelamin (p = 0,02) sebagai prediktor signifikan kualitas hidup. Tingginya tingkat tekanan psikologis berbanding lurus dengan penurunan kualitas hidup yang nyata, terutama pada istri. Temuan ini menekankan pentingnya menangani kebutuhan kesehatan mental pada pasangan yang menjalani* IVF. *Penyedia layanan kesehatan harus lebih mengutamakan kesiapan emosional dengan mengembangkan strategi yang ditargetkan untuk mengurangi tekanan psikologis guna meningkatkan kualitas hidup selama perawatan.*

Kata Kunci: *infertilitas, kualitas hidup, tekanan psikologis*

Introduction

The World Health Organization (WHO) defines infertility as a reproductive system disorder in which the inability to achieve a viable pregnancy following a minimum of one year of consistent unprotected sexual activity (WHO, 2018). Borght and Wyns (2018) estimated an 8–12% infertility rate worldwide making it a global public health issue. Over the past three decades, the total fertility rate (TFR) per woman decreased from 4.9% in 1970 to 1.8% in 2018, among those aged 15–49. Since 2013, the national TFR has been below the replacement level of 2.1%, indicating that the average number of children born per woman is insufficient to replace the current generation in the future in Malaysia (Department of Statistics Malaysia, 2019).

Infertility is a public health challenge that involves not only biological and medical aspects but also significantly impacts the psychological well-being and quality of life (QoL) of affected couples. In societies that place a strong emphasis on family values, the inability to conceive is often associated with social stigma, cultural pressure, and negative perceptions regarding one's role as a partner or parent. Therefore, research on the quality of life among childless couples must take a holistic view, incorporating both sociodemographic and psychological dimensions.

Several factors, such as age, gender, duration of marriage, race, socio-economic status, and health problems, can affect childless couples' QoL (Ariffin et al., 2020; Maroufizadeh et al., 2017). However, the results of the previous studies are rather inconsistent. Therefore, it is important to determine the socio-demographic factors associated with QoL. Sociodemographic factors such as age, gender, duration of marriage, level of education, income, and ethnic background have both direct and indirect influences on how couples cope with infertility-related stress. For instance, older women or couples who have been married for many years tend to experience heightened emotional distress due to perceived time constraints and mounting societal expectations.

Furthermore, variations in socioeconomic background may determine the level of access to fertility treatments, availability of social support, and resources to manage psychological stress. Infertile couples who fail to meet challenges in achieving conception can expose their mental health to various psychological distress, such as stress, anxiety, and depression (Cheng et al., 2018; Sham et al., 2020). Moreover, there is around 9.4% of suicidal risk among infertile women (Shani et al., 2016). According to Kamaruddin et al. (2020), 22% of divorces or separations are caused by infertility in Malaysia. Additionally, psychological harm, verbal insults, derision, physical abuse, and deprivation have been linked to the experience of infertility in women (Anokye et al., 2017).

The fertility treatment process itself also contributes significantly to mental health challenges. Procedures such as hormonal stimulation, in-vitro fertilization (IVF), and intrauterine insemination (IUI) demand considerable financial, physical, and emotional investment. Hormonal side effects, physical discomfort, and the uncertainty of treatment outcomes can result in repeated disappointment, further affecting psychological well-being and marital relationships. Studies have shown that emotional stress stemming from fertility treatment may lead to symptoms of depression, anxiety, helplessness, and, in more severe cases, suicidal ideation. Physical, mental, emotional, and behavioural health are all negatively impacted by the psychological suffering that childless couples endure. The emotional states such as tension, frustration, anger, and guilt, sociological challenges like stigmatization, self-isolation, and social withdrawal, as well as impacts on their marital and sexual relationships (Hess et al., 2018; Karaca & Unsal, 2015).

Therefore, it is crucial to investigate the interrelationship between sociodemographic factors, psychological distress, and quality of life among

infertile couples. This study aims not only to identify the factors contributing to lower quality of life but also to understand how the interplay between individual backgrounds and treatment experiences contributes to psychological strain. The findings of this research are expected to lay the foundation for developing more targeted interventions, including psychosocial support, fertility counselling, and emotional wellness programs tailored to the specific needs and contexts of these couples. The main objective of this study is to investigate the sociodemographic and psychological distress factors contributing to the quality of life among childless couples undergoing infertility treatment in Malaysia. The main objective of this study is to investigate the sociodemographic and psychological distress factors contributing to the quality of life among childless couples undergoing infertility treatment in Malaysia.

Methods

This cross-sectional study was conducted from June 2022 to April 2023 at three public hospitals in Malaysia providing IVF services. A total of 126 infertile married couples aged 18–49 years who were currently undergoing IVF treatment and fluent in Malay were chosen. Couples were excluded if they had previously biological or adopted children, had previously received psychiatric or psychological treatment, were not undergoing or newly registered for IVF treatment, or were not permanent Malaysian citizens.

Ethical approval was obtained from the Research Ethics Committee of Universiti Teknologi MARA (UiTM) and the Medical Research Ethics Committee of the Ministry of Health Malaysia. A list of eligible couples was prepared by nurses. A purposive sampling technique was used to select participants who met the study criteria.

The researcher approached potential participants in clinic waiting areas and provided both verbal and written information about the study.

After obtaining informed consent, participants completed the questionnaires in a private counselling room. If necessary, participants were allowed to complete the forms after their medical appointment. All participants received forms consisting of an information sheet, consent form, sociodemographic questionnaire, the Depression Anxiety Stress Scale with 21 questions (DASS-21), and the Fertility Quality of Life (Ferti-QoL)-available in both Malay and English. Completing the forms took approximately five to ten minutes.

Psychological distress was assessed using the DASS-21 (Lovibond, 1998), while fertility related quality of life was evaluated using the Ferti-QoL questionnaire (Boivin et al., 2011). The Ferti-QoL comprises core subscales (mind-body, emotional, relational, and social) and one treatment-related subscale (environment and tolerability). Higher sub-scale and total scores indicate better perceived quality of life.

Data were analyzed using SPSS Version 28.0. Descriptive study (mean, standard deviation, and percentage) were used to summarize demographic and clinical characteristics. Chi-square tests were used to compare the couple's psychological distress levels between the couples, and t-tests were employed to assess differences in Ferti-QoL scores.

Univariable analysis applied simple linear regression, whereas multivariable analysis utilized multiple linear regressions. The analyses of independent variables in simple linear regression comprised sociodemographic variables and DASS-21 measured psychological distress. Simple linear regression and multiple linear regression were used together because simple linear regression served as an initial exploratory step to identify the basic relationship, while multiple linear regression was used to build more comprehensive and accurate model by considering various factors. Utilizing both ensured the relevancy, accuracy of the models, and clarity reflection on the relationships between variables. Therefore, these two techniques

complement each other in a comprehensive data analysis process.

Variables with p-value of 0.25 or lower were deemed significant during univariable analysis and included in the multiple linear regression model. A p-value < 0.25 was used in simple linear regression to allow the inclusion of more variables. Besides, even attributes with p > 0.25 were sometimes included if they were known to be important. In this study, any variable with a significance value < 0.25 was included in the model. Clinically significant but statistically insignificant variables were also included into the model. The model was assessed for inter-

action effects and multicollinearity. The initial assumptions of the final model were verified to ensure accuracy. The significance criterion for multivariable analysis was established at a p-value of less than 0.05 (two-tailed).

Results

Table 1 displays the socio-demographic charac-teristics of 252 participants (126 couples). The mean age of the participants was 36.36 years, with a standard deviation of 3.04. Most parti-cipants in this study were Malays (n = 214, 84.9%), Islam (n = 218, 86.5%), graduated with at least a certificate or diploma (n = 98, 38.9%),

Table 1. Demographic Characteristics of Respondents (N = 252)

Variable	Mean (SD)	Range	n	%
Age (years)	36.36 (3.04)	28–41		
< 30			20	7.9
30–39			191	75.8
40–49			41	16.3
Gender				
Male			126	50
Female			126	50
Race				
Malay			214	84.9
Chinese			4	1.6
Indian			26	10.3
Others			8	3.2
Religion				
Islam			218	86.5
Buddhism			4	1.6
Hinduism			22	8.7
Christianity			4	1.6
Others			4	1.6
Educational Level				
Primary/Secondary school			43	17.1
Certificate or Diploma			98	38.9
Degree			86	34.1
Master			22	8.7
Doctor of Philosophy			3	1.2
Household Income				
< RM1000			4	1.6
RM1001–3000			61	24.2
RM3001–5000			112	44.4
RM5001–10000			55	21.8
> RM10000			20	7.9
Duration of marriage				
1–2 years			4	1.6
3–5 years			35	13.9
> 5 years			213	84.5

Table 2. Ferti-QoL Score Among Childless Couples Undergoing Infertility Treatment (N = 252)

Fertility Quality of Life	Husband (n = 126) Mean (SD)	Wives (n = 126) Mean (SD)	Childless couples (N = 252) Mean (SD)	Mean different (95% CI)	t-statistic (pdf)	Effect size	p
Health Rate	3.67 (0.56)	3.40 (0.60)	3.54 (0.59)	0.27 (0.13; 0.41)	3.70 (250)	0.47	< 0.001*
Satisfied QoL	3.67 (0.61)	3.44 (0.64)	3.55 (0.63)	0.23 (0.76; 0.39)	2.93 (250)	0.12	0.04
Core Ferti-QoL	72.67 (6.55)	67.07 (5.26)	70.00 (6.56)	5.60 (4.13; 7.08)	7.49 (250)	0.90	< 0.001*
Mind-Body	76.13 (9.67)	66.00 (8.61)	71.07 (10.45)	10.13 (7.86; 12.41)	8.79 (250)	1.10	< 0.001*
Emotional	70.58 (9.19)	61.94 (6.90)	66.26 (9.20)	8.65 (6.63; 10.66)	8.44 (250)	1.06	< 0.001*
Relational	77.70 (7.66)	74.50 (6.11)	76.10 (7.10)	3.20 (1.48; 4.92)	3.67 (250)	0.46	< 0.001*
Social	67.40 (4.84)	66.02 (4.83)	66.71 (4.87)	1.38 (0.18; 2.58)	2.26 (250)	0.29	0.025*
Treatment Ferti-QoL	73.13 (2.41)	70.32 (3.39)	71.73 (3.26)	2.82 (2.09; 3.55)	7.60 (250)	0.96	< 0.001*
Environmental	73.75 (2.98)	73.15 (3.81)	73.45 (3.43)	0.60 (-0.25; 1.44)	1.38 (250)	0.17	0.169
Tolerability	72.52 (4.53)	67.48 (5.94)	70.00 (5.85)	5.04 (3.73; 6.35)	7.57 (250)	0.95	< 0.001*
Total All FertiQoL	73.06 (4.51)	68.75 (4.17)	70.91 (4.84)	4.31 (3.22; 5.39)	7.87 (250)	0.99	< 0.001*

Note: Data was presented as mean (SD); Independent t-test p-value < 0.05*

Table 3. Stress, Anxiety, and Depression Level Among Childless Couples Undergoing Infertility Treatment (N = 252)

Psychological Distress Status	n (%)			p
	Total (N = 252)	Husband (n = 126)	Wive (n = 126)	
Stress level (Mean [SD])	17.25 (3.55)	15.14 (2.92)	19.35 (2.88)	< 0.001*
Normal	13 (5.2)	12 (9.5)	1 (0.8)	
Mild	159 (63.1)	96 (76.2)	63 (50)	
Moderate	80 (31.7)	18 (14.3)	62 (49.2)	
Anxiety level (Mean [SD])	5.82 (2.97)	4.02 (3.20)	7.61 (1.01)	< 0.001*
Normal	104 (41.3)	77 (61.1)	27 (21.4)	
Mild	148 (78.6)	49 (38.9)	99 (78.6)	
Depression level (Mean [SD])	8.20 (3.40)	5.68 (2.35)	10.72 (2.21)	< 0.001*
Normal	131 (52)	106 (84.1)	25 (19.8)	
Mild	100 (39.7)	20 (15.9)	80 (63.5)	
Moderate	21 (8.3)	-	21 (16.7)	

Note: Data was presented in frequency (%) and mean (SD); chi-square test p < 0.05

and with an average household income of RM 3001–RM 5000 (n = 112, 44.4%). The majority of the participants had been married more than five years (84.5%).

Table 2 displays the QoL scores of infertile couples, categorized by gender. The husbands achieved substantially higher total Ferti-QoL scores (73.06; SD 4.51) than the wives (68.75; SD 4.17; p < 0.001). Most of the core Ferti-QoL

domains on the husbands were found significantly higher than the wives: mind-body (76.13 [SD 9.67] vs. 66.00 [SD 8.61], p < 0.001); emotional (70.58 [SD 9.19] vs. 61.94 [SD 6.90], p < 0.001); relational (77.70 [SD 7.66] vs. 74.50 [SD 6.11], p < 0.001); and social (67.40 [SD 4.84] vs. 66.02 [SD 4.83], p < 0.001). Nevertheless, the score did not show statistical significance in one aspect of treatment tolerability.

Table 4. Associated Factors of Quality of Life (Ferti-QoL)

Total all Ferti-QoL	Simple Linear Regression		Multiple Linear Regression	
	[ba] (95% CI)	p-value	[bb] (95% CI)	p-value
Age	-0.87 (-2.11, 0.37)	0.17*		
Gender	-4.31 (-5.39, -3.22)	< 0.001*	-1.01 (-1.84, -0.91)	0.02**
Race	-0.55 (-1.26, 0.66)	0.13*		
Religious	-0.28 (-0.95, 0.39)	0.41		
Education Level	0.12 (-0.54, 0.79)	0.71		
Household Income	0.38 (-0.28, 1.04)	0.25*		
Duration of Marriage	-1.73 (-3.16, -0.30)	0.02*		
Stress	-1.68 (-1.91, -1.44)	< 0.001*	-0.87 (-1.28, -0.47)	< 0.001**
Anxiety	-3.16 (-3.75, -2.57)	< 0.001*	-0.47 (-0.92, -0.02)	0.04**
Depression	-1.62 (-1.81, -1.43)	< 0.001*	-1.10 (-1.32, -0.89)	< 0.001**

*$p < 0.25$
**$p < 0.05$
a Crude regression coefficient
b Adjusted regression coefficient
Enter multiple linear regression method applied. Model assumptions are fulfilled.
No multicollinearity detected. There were no interaction variables.
Coefficient of determination ($R2$) = 0.635
Final model equation totals all FertiQoL in Quality of Life = 79.99 - (1.01*Gender) - (0.87*Stress) - (0.47*Anxiety) – (1.10* Depression)

Table 3 displays the extent of psychological distress, including stress, anxiety, and depression on the infertile couples. The average means (SD) for stress, anxiety, and depression found on the husbands and wives were: stress: 19.35 vs. 15.14 (p < 0.001); anxiety: 7.61 vs. 4.02 (p < 0.001); depression: 10.72 vs. 5.68 (p < 0.001). Husbands and wives showed significant differences in scores across all three sub-scales of DASS-21. Wives exhibited significantly elevated levels of stress (p < 0.001), anxiety (p < 0.001), and depression (p < 0.001) in comparison to husbands.

The factors pertaining to the quality of life of the infertile couples undergoing the treatment are succinctly outlined in Table 4. Independent variables included sociodemographic for tests such as gender, age, race, religion, educational level, household income, duration of marriage, and psychological distress. The dependent variable was the mean of the total Ferti-QoL scores. In this study, the mean QoL score was 70.91 (SD 4.84).

Five factors were significant at p-value ≤ 0.05 in univariable analysis using simple linear reg-

ression. Gender, duration of marriage, stress, anxiety, and depression were found to be related to total all Ferti-QoL among childless couples undergoing infertility treatment. Three factors were found to be significant at p-value ≤ 0.25. A higher p-value was chosen when selecting variables into multiple linear regression, so more variables could be selected to ensure important variables were not left out. The three other factors include age, race, and household income. Variables were selected for the preliminary main effect model using stepwise, backward, forward, and entered models with a removal p-value of 0.10 and an entering p-value of 0.05. The entered method was used to select the preliminary main effect model, which was then tested for multicollinearity.

The confidence interval was narrow, the standard error was tiny in comparison to each b value, and multicollinearity was not present. This indicates that the regression model is performing well, providing precise and reliable estimates regarding the effects of each predictor variable, and the overall fit of the model is strong. The preliminary final model was developed, and its assumptions were further exami-

ned. Because the samples were independent, the likelihood of each participant being selected for the study was equivalent. To assess the model's overall linearity and equal variance, a scatter diagram depicting residuals against predicted mean values was generated. The residual histogram exhibited a normal distribution. The model fulfilled every single assumption. With an R2 value of 63.5%, the model demonstrates an accuracy of discrimination in 63.5% of the instances.

In the end, the final model was constructed, and Table 4 demonstrated that a factor related to total all Ferti-QoL was gender, stress, anxiety, and depression. A result from multiple linear regression analysis showed a significant linear negative relationship between gender, stress, anxiety, and depression with total all Ferti-QoL. The gender in this study refers to wives with infertility. Wives with infertility decreased total all Ferti-QoL score by 1.01 unit compared to husbands (adjusted β = 1.01; 95% CI -1.84, -0.91; p < 0.02).

A significant linear negative relationship exists between stress and total all Ferti-QoL scores. Those with one stress score have 0.87 units less in total all Ferti-QoL scores (adjusted β = 0.87; 95% CI -1.28, -0.47; p < 0.001). There is a significant linear negative relationship between anxiety and total all Ferti-QoL scores. Those who have 1 score anxiety have 0.47 units less in total all Ferti-QoL scores (adjusted β = 0.47; 95% CI -0.92, -0.02; p < 0.04). There is a significant linear negative relationship between depression and total all Ferti-QoL scores. Those with one score depression have 1.10 units less in total all Ferti-QoL score (adjusted β = 1.10; 95% CI -1.32, -0.89; p < 0.001).

Sixty-three percent (63.5%) of the variations in all Ferti-QoL were explained by gender, stress, anxiety, and depression according to the multiple linear regression model (R2 = 0.635). Overall, the results demonstrate that gender, stress, anxiety, and depression significantly affect Ferti-QoL scores. Wives with infertility have lower Ferti-QoL scores compared to husbands, and in-

creased levels of stress, anxiety, and depression are associated with further reductions in these scores. The multiple linear regression model indicates that 63.5% of the variation in Ferti-QoL scores is explained by the variables gender, stress, anxiety, and depression (R^2 = 0.635). The remaining 36.5% of the variation could be due to other factors not included in the model or due to random variability.

Discussion

This study revealed that the mean Ferti-QoL scores among 126 infertile couples undergoing IVF were lower than those reported in a previous local study by Ariffin et al. (2020), but interestingly similar to Priangga et al. (2017) findings, which may be explained by the shared linguistic and cultural roots between the two populations. In contrast, studies from India and Nepal reported even lower Ferti-QoL scores (Desai & Gundabattula, 2019; Shakya, 2022). The discrepancies may be attributed to several factors such as study settings, participants' characteristics, cultural influences, methodological differences, and timing of data collection such as different study settings, including the quality of healthcare facilities and access to support services which can influence participants' perceptions of their QoL. Moreover, the variations in sample characteristics, such as age, duration of infertility, and socioeconomic status, may affect outcomes.

Additionally, cultural or societal influences, such as the level of community support or stigma surrounding childlessness, can impact psychological well-being and QoL. Methodological differences, such as variations in sample size, data collection methods, and administration of the Ferti-QoL scale, could also contribute to differing results. The timing of data collection may play a role, as changes in healthcare policies and societal attitudes towards infertility over time might influence the findings. The differences in QoL scores obtained in this study compared to previous research may be attributed to several key factors, including study set-

tings, participant characteristics, cultural background, methodological differences, and timing of data collection. A thorough examination of these factors is important to understand the context of the study findings and to identify issues that may affect the comparability of results across different studies.

Firstly, variations in study settings, particularly in terms of the quality of fertility treatment facilities and access to support services such as psychological counselling, may influence participants' treatment experiences and their perceptions of quality of life. This study was conducted within the local healthcare context, which may differ in resources and capacity compared to other countries, thereby affecting how participants perceive the care they receive.

Secondly, participant characteristics such as age, duration of infertility, and socioeconomic background play an important role in shaping emotional resilience and coping mechanisms during treatment. For example, younger individuals or those with higher income levels may be more optimistic and better equipped to manage the financial and emotional pressures of infertility treatment compared to those in more vulnerable situations.

Thirdly, cultural and societal norms also contribute to the variation in QoL scores. In cultures where having children is strongly emphasized as a symbol of marital success and social acceptance, childless couples may face higher levels of psychosocial stress, including stigma, discrimination, or social isolation. These factors directly affect emotional and mental wellbeing, and consequently, impact the QoL domains being measured.

Furthermore, methodological differences between studies such as sample size, data collection methods (e.g., surveys, interviews, or mixed methods), and the administration of tools like the Ferti-QoL scale may also contribute to differing outcomes. This study employed a quantitative approach using structured questionnaires,

which may yield different response patterns compared to qualitative studies that allow for more in-depth exploration of individual experiences.

Finally, the timing of data collection is also relevant in influencing study outcomes. Changes in healthcare policies, increasing awareness of infertility, and advancements in fertility treatment technologies over time can affect how participants perceive their experiences and quality of life. For instance, government support for fertility treatment or greater societal acceptance of IVF may have a positive impact on QoL scores in the current study compared to earlier research.

Consistent with prior research (Ariffin et al., 2020; Ibrahim et al., 2021; Musa et al., 2014), this study found that women generally have lower QoL scores and higher levels of psychological distress compared to men, indicating that women are more impacted both physically and emotionally. This can be attributed to a significant number of female participants exhibiting hormonal imbalances, endometriosis, and other health conditions that increase susceptibility to infertility. This study adds a new dimension to those findings by revealing that a significant number of female participants suffered from hormonal imbalances, endometriosis, and other reproductive health issues, which not only contributed to infertility but also increased the emotional and physical burden throughout the treatment process.

According to Musa et al. (2014), wives reported experiencing these conditions at levels 1.5 to 3 times greater than their husbands. This may be due to the historical tendency to place blame and responsibility on women for unsuccessful conception. In certain countries such as Iran (Taebi et al. 2021), infertility results in societal stigmatization, primarily targeting women. In this study, wives showed significantly lower QoL scores as infertile women in Malaysia face emotional stress, anxiety, depression, and poorer health.

Another significant factor is the age of female

participants, especially those over 40, who are more susceptible to stress, anxiety, and depression due to infertility. The decline in the quality and quantity of eggs in a woman's ovaries becomes more apparent with increasing age. Infertility significantly impacts the psychological well-being and emotional state of couples, leading to concentration difficulties, guilt, and a pessimistic outlook. Female participants display a higher tendency for emotional experiences such as heightened sensitivity, sadness, despair, anger, and jealousy. The issue also affects marital relationships and is influenced by social and environmental factors stemming from family, social, and societal contexts.

Similar to previous studies by Ariffin et al. (2020), Maroufizadeh et al. (2017), and Royani et al. (2019), this study found that age, educational level, duration of marriage, and household income were not statistically significant to QoL. Older women reported higher scores on the core Ferti-QoL, mind-body, emotional, and social subscales. On the contrary, elder women exhibited marginally lower relational scores in comparison to younger women. Overall, since women who are 35 years or older and experience infertility are deemed too elderly to become pregnant, their sexual relationship appears to have less purpose.

The possible explanation from this study is that when the infertile couple get older, social pressure can slowly be overcome, and they may seek out support from family and friends. They realise that infertility is not a disgrace and sometimes happened beyond their control. The difference in results between the current study and Aduloju et al. (2018) regarding age and QoL may be due to cultural, societal, and healthcare factors. Cultural expectations and societal pressure to have children in Nigeria might be more intense, affecting women's QoL regardless of age. Differences in healthcare support, demographic characteristics, and perceptions of age-related fertility could also play roles.

Suleiman et al. (2023) found a significant and

positive correlation between the QoL of infertile women and a higher level of education. It is possible that individuals with a higher level of education experience less embarrassment than those with a lower level of education. In addition, individuals with higher level of education employ superior problem-solving abilities, develop strategies for managing everyday stressors, and employ innovative approaches to address novel challenges.

However, according to Yusuf (2016), depression, anxiety, and stress ratings were greater in infertile females regardless of their level of education. The level of education may not show a statistically significant relationship with QoL due to several factors such as individual adaptation, social and cultural roles, the availability of medical and psychological support, variations in emotional response patterns, and a uniform awareness of infertility. These factors indicate that educational level is not the sole determinant of QoL among infertile women, and other factors like social support, culture, and access to information and treatment play a larger role in influencing QoL.

The duration of marriage does not show a statistically significant relationship with QoL. Studies by Sut and Kaplan (2015) found that women's QoL was negatively impacted by long-term infertility. There is a significant negative correlation between the overall and core Ferti-QoL scores (emotional, mind-body, and social subscales) and the duration of trying to conceive. This outcome may be influenced by social and cultural norms, where a woman is viewed as a failure if a couple is childless. Men can marry multiple wives, causing women to feel insecure and experience a lower QoL. Other research found no correlation between infertile women's quality of life and how long their infertility lasted (Royani et al., 2019).

Household income may not have a significant impact on the QoL among infertile couples because, although the couples are financially stable, other factors such as access to subsidized

healthcare, financial support from family, the couple's adaptability and resilience, as well as cultural norms that prioritize family and community values over financial status, also play important roles. These factors indicate that income alone is not the main determinant of QoL, as psychological and social influences are more influential. Although economic imbalance can cause stress and anxiety among infertile couples, the financial burden usually only occurs during the period of IVF treatment.

The study had multiple limitations. Firstly, it is important to acknowledge the limitations associated with the cross-sectional study design. The precise aetiology of psychological discomfort and the factors associated with psychological distress and quality of life in infertile couples cannot be definitively ascertained. The most optimal study design is a longitudinal case-control study. Furthermore, the study used a limited sample size, which only provided a partial representation of the entire population of infertile couples in Malaysia. The potential for obtaining divergent outcomes exists if the study were replicated within a private hospital or another geographical region within the country. Furthermore, the study is limited by the inability to control several confounding variables, primarily due to constraints in time and insufficient human resources.

The strength of this study lies in its knowledge implications, as it provides important information on the sociodemographic and psychological distress factors that influence the quality of life of infertile couples. By controlling for factors such as previous IVF attempts, duration of infertility, or social support, the impact of psychological distress on quality of life can be better isolated. This helps to reduce bias and offers a clearer picture of the specific factors affecting quality of life. To the best of the authors' knowledge, this is the first local study in Malaysia to examine the relationship between stress, anxiety, and depression with the quality of life among infertile couples undergoing IVF treatment and to attempt to identify the possible associated factors.

Conclusion

The study highlights significant gender-based disparities in psychological and quality of life among infertile couples undergoing IVF treatment in Malaysia. It is found that women have higher level of stress, anxiety, and depression while also suffer from lower quality of life compared to men. These findings emphasize the critical importance of addressing mental health concerns, advocating for nurse's involvement in supporting the emotional well-being of couples throughout the treatment process. Nurses are positioned to provide targeted interventions and understand the bio-psychosocial dimensions influencing these couples.

Future research should focus on using a longitudinal case-control design to explore the long-term effects of psychological distress and quality of life changes of infertility and identify the causative aspects of it. Expanding the study population to include diverse geographical regions and private healthcare settings in Malaysia would provide more comprehensive view of infertility-related psychological issues. Additionally, developing accessible and affordable models for mental health support within fertility clinics should be prioritized to ensure comprehensive medical and psychological support tailored to the couple's needs.

Acknowledgements

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The Relationship Between Socioecological Factors and Resilience Among Urban Workers During the COVID-19 Pandemic

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Abstract

The global outbreak occasioned by the coronavirus disease 2019 (COVID-19) has affected people of working age in urban communities, both socially and psychologically, making resilience an important aspect of efforts to cope with such a crisis. Against this backdrop, this study identified and investigated the socioecological factors associated with the resilience of employable urban residents against the COVID-19 pandemic as part of a conceptual framework that encompasses individual, family, and community resilience. This cross-sectional research involved 368 working-age individuals recruited via simple randomization from communities in seven areas in central Bangkok. Data were collected through a questionnaire survey and examined through path analysis run on AMOS. The hypothesized model was tested on the basis of real data ($\chi^2 = 47.717$, $df = 10$, $p = .06$, RMSEA = .03, RMR .097, GFI .978, CFI .99). The results showed that an individual's mental resilience factors and those of their family were generally more highly correlated with community resilience than were the resilience of working-age people in urban regions ($p < .01$). However, the adaptability of working-age individuals in urban areas more strongly depended on family resilience and individual mental health than on community resilience. The results of this study will serve as a foundation for guiding community nurses in the design and implementation of interventions aimed at promoting mental health among working-age individuals and their families.

Keywords: COVID-19, mental health, resilience, socioecological, working age

Abstrak

***Hubungan antara Faktor Sosioekologis dan Ketahanan di antara Pekerja Perkotaan Selama Masa Pandemi* COVID-19.** *Wabah global yang disebabkan oleh penyakit* coronavirus 2019 (COVID-19) *memberikan dampak pada pekerja di masyarakat perkotaan, baik secara sosial maupun psikologis, sehingga ketahanan menjadi aspek penting dalam upaya mengatasi krisis semacam ini. Studi ini mengidentifikasi dan meneliti faktor-faktor sosioekologis yang terkait dengan ketahanan penduduk perkotaan selama pandemi* COVID-19 *sebagai bagian dari kerangka konseptual yang mencakup ketahanan individu, keluarga, dan komunitas. Penelitian potong lintang ini melibatkan 368 individu usia produktif yang direkrut melalui randomisasi sederhana dari masyarakat di tujuh wilayah di pusat Bangkok. Data dikumpulkan melalui survei kuesioner dan dianalisis menggunakan path analysis pada AMOS. Model yang dihasilkan diuji berdasarkan data nyata ($\chi2 = 47,717$, df = 10, p = 0,06, RMSEA = 0,03, RMR 0,097, GFI 0,978, CFI 0,99). Hasil menunjukkan bahwa faktor ketahanan mental individu dan keluarga umumnya lebih erat terkait dengan ketahanan komunitas dibandingkan dengan ketahanan individu usia kerja di daerah perkotaan (p < 0,01). Namun, kemampuan beradaptasi individu usia kerja di daerah perkotaan lebih bergantung pada ketahanan keluarga dan kesehatan mental individu daripada ketahanan komunitas. Hasil penelitian ini akan menjadi dasar bagi perawat komunitas dalam merancang dan melaksanakan intervensi yang bertujuan untuk meningkatkan kesehatan mental di kalangan individu usia kerja dan keluarganya.*

Kata Kunci: COVID-19, kesehatan mental, ketahanan, sosioekologis, usia kerja

Introduction

In Thailand, Bangkok has suffered the greatest number of infections from the coronavirus di-sease-2019 (COVID-19), with people living and working (aged between 18 to 59 years) in den-sely populated communities in the city center being the most commonly afflicted groups (De-

partment of Disease Control Ministry of Public Health, 2022). The COVID-19 pandemic has affected both the physical and psychological health conditions of the population. However, most working-age individuals who contract COVID-19 suffer psychologically given company shutdowns that prevent them from earning a living, cause families to lose income, and lead to the frequent accumulation of increasing debts (Thailand Development Research Institute, 2020). Most working-age people are the heads of families, responsible for their families' expenses and ensuring their well-being. These individuals may have also suffered the loss of close family members, albeit certain people can endure such hardship as well as adapt and carry on with their daily lives as usual. Moreover, work-from-home policies have weakened relationships with other people at work, and this distance can give rise to stress, anxiety, and emotional exhaustion. Stress, for example, has adversely affected work performance during the global COVID-19 outbreak (Vanchapo et al., 2023). Amid the crisis resulting from COVID-19, however, there is an opportunity to enhance one's psychological condition and cope with stress in life (Sucaromana, 2016).

Generally, people may be confronted with adverse psychological challenges resulting from difficult situations or extreme life events, in which case they will need to develop resilience to restore normal functioning. Resilience or renewed energy comes from within the human soul (Han, 2024), and it involves a balancing act as an individual cope with threatening life situations in a way that enables recovery in a mentally energetic manner. This coping process requires adaptation (Nopa et al., 2024). A highly resilient person develops physical and psychological well-being, enabling them to handle traumatic events, such as the COVID-19 pandemic (Fenxia, 2022). Resilience is also correlated with the elements that constitute multilayered environments, such as families, friends, and communities (Hofgaard et al., 2021). According to ecological systems theory, diverse factors and interactions between individuals and the environment affect the healthiness of lifestyles.

Individual mental health is part of well-being, which is defined by positive psychologists as a person's flourishing, a real awareness of their true self, and the achievement of their highest potential)self-actualization). Therefore, a person's positive thinking, such as optimism, hope, self-efficacy, post-traumatic growth, and increased academic levels can engender considerable resilience (Robles-Bello et al., 2020). Resilience among individuals is substantially supported by a psychologically stable family (Charoensap-Kelly et al., 2021), who can provide the emotional support crucial for an individual to withstand the impact of the COVID-19 pandemic (Ferreira et al., 2020; Nopa et al., 2024). Such a state is also favorably influenced by social support from the community (Fuller & Huseth-Zosel, 2021). The community supports by fostering a sense of belonging and trust among members. In turn, strong community support enhances resilience. Especially, participation in disaster alleviation and public activities can increase attachment to the community. In turn, strong community support enhances life resilience.

A multilevel ecological framework indicates that individual mental health (individual level), family resilience (interpersonal level), and community support (community level) are interrelated with health behaviors and the resilience of working-age individuals. Although numerous reports have been published on resilience in the time of COVID-19, few studies have examined this state during the global crisis in the context of urban areas. The literature has also been unclear as to whether the aforementioned framework is applicable to a pandemic that has substantially impacted the resilience of employable populations.

To address these deficiencies, the current study investigated the effects of the relationships between the individual, family, and community variables on life resilience in the socioecological model of resilience. More specifically, it identified and examined the direct effects of the fa-

mily and the community on the mental health and resilience of employable individuals in the urban communities of Bangkok amid the COVID crisis. The results can serve as a reference for community nurses in their provision of services that include lunch interventions to promote mental health and strength among working-age people in the workplace, thereby enhancing the cognitive and emotional well-being of working-age populations.

Methods

This cross-sectional research was approved by the Human Research Ethics Committee of the Faculty of Medicine at Ramathibodi Hospital, Mahidol University (COA.MURA2022/387). It adhered to the Helsinki Declaration regarding the involvement of human subjects in studies. We collected data by distributing self-report questionnaires to the participants.

The statistical recommendations in the Analysis of Moment Structure (AMOS) software indicate that the sample for a cross-sectional study should be 20 times the number of parameters used in path analysis (i.e., 20×16 in our case), which corresponds to 320 participants (Memon et al., 2020). This initial value was increased by 10% to avoid the risk of missing data, enabling us to recruit a final sample of 368 individuals living in urban Bangkok. Specifically, we invited prospective respondents from seven communities chosen out of 53 on the basis of the following inclusion criteria: working-age individuals (1) between the ages of 18 and 59 years; (2) living in the selected communities for more than a year; (3) able to read, write, and listen in Thai; and (4) consenting to participation in the research. A list of prospects were obtained from the community leaders, after which a simple random sampling of 50 to 53 residents per community was conducted. In each community, we contacted the prospects individually to introduce ourselves and explain the objectives of the research. They were assured that the information obtained from them would be kept confidential and would have no impact on community life.

The participants voluntarily signed informed consent forms, and then they were asked to complete the questionnaires independently. They were informed that they could ask us for more information should they fail to understand a question. The respondents completed all of the questionnaires in approximately 20 to 30 minutes, for which they received a token of appreciation.

To determine the descriptive statistics of the participants, we used the Statistical Package for the Social Science for Windows (SPSS 25.0, 3001359390) to calculate frequencies, percentages, means, and standard deviations. SPSS was also used to examine the assumptions of path analysis, including normality, multicollinearity, and linearity. Path analysis with maximum likelihood estimation was carried out in AMOS to inquire into the influence of socioecological factors on life resilience. The model was verified on the basis of χ^2, χ^2/df, the goodness of fit index (GFI < .9), the comparative fit index (CFI = 0.90–1.00), the root mean square error of approximation (RMSEA < .05) and, root mean squared residual (RMR < .05)

The research instruments were analyzed for reliability and construct validity using AMOS 25.0 (IBM). We developed the Personal Factors Questionnaire to obtain general information related to the sample, namely, age, gender, religion, COVID-19 infection status and the interval since infection. Individual mental health was measured using the Mental Health Continuum-Short Form (MHC-SF) questionnaire (Perugini et al., 2017), which had three sections, namely, emotional well-being, social well-being, and mental well-being, each comprising 14 items rated on a six-point scale: 0 = *never*, 1 = *once or twice*, 2 = *once a week*, 3 = *two to three times/week*, 4 = *almost every day*, and 5 = *every day*:

Cluster 1: Items 1–3 = hedonic, emotional well-being
Cluster 2: Items 4–8 = eudaimonic, social well-being

Respondents can obtain a total possible score between 0 and 70 on the MHC-SF. It had a content validity of 1.0, and a Cronbach's alpha was .93.

A measurement form comprising Sixbey's questionnaire (Chow et al., 2022) was used to determine family resilience. The form comprised three sections containing 31 items: (1) beliefs of family members, (2) family management, and (3) communication and problem-solving in the family. The items were rated on a four-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The content validity index of the form was 1.0, and its Cronbach's alpha was .91.

Community resilience was ascertained using the Conjoint Community Resiliency Assessment Measurement (CCRAM10) developed by Leykin

Table 1. Number and Percentage of Subjects Classified by Individual Factors

Individual Factors	*n*	%
Gender		
Female	194	52.7
Male	174	47.3
Age)years(		
18–29	70	19.0
30–39	67	18.2
40–49	80	21.8
50–59	151	41.0
COVID-19 infection		
No	206	56.0
Yes	162	44.0
Education		
Elementary school	143	38.9
Secondary school	79	21.5
High school/vocational certificate	67	18.2
Diploma/higher vocational certificate	24	6.5
Bachelor's degree	55	14.9
Occupation		
General employee	151	41.0
Business owner	70	19.0
An employee of a private company	37	10.2
Unemployed	79	21.4
Government officer	18	4.9
Income (baht/month)		
<15,000	312	84.8
15,001–30,000	50	13.6
>30,000	6	1.6
During the COVID-19 pandemic, were there any work problems? (specifying more than 1 item allowed)		
No	109	29.6
Yes	259	70.4
Stopped working temporarily	167	64.5
Unemployed	44	17.0
Difficulty commuting to work	43	16.6
Working from home	26	10.0
Laid off	9	3.5
During the COVID-19 pandemic, were there any financial problems? (specifying more than 1 item allowed))cont.(		
Decrease in income	202	66.2
Being in debt	130	42.6
Paying for medical care	14	4.6

Table 2. Means and Standard Deviations of Individual mental health, Family and Community Resilience

Factors	Min–Max	Mean	Standard Deviation (*SD*)
Individual mental health	0–70	52.96	11.70
Hedonic well-being)emotional well-being(	0–15	11.33	2.90
Eudaimonic)social well-being(	0–25	18.17	4.83
Psychological well-being	0–30	23.46	5.17
Family resilience	1.10–3.94	2.92	.32
Belief systems	1.09–4.00	3.11	.44
Organizational patterns	1–4	2.84	.33
Communication/problem-solving	1.14–4.00	2.79	.38
Community resilience	1–5	3.81	.72
Place attachment	1–5	3.93	.83
Leadership	1–5	3.85	.83
Social trust	1–5	3.79	.84
Preparedness	1–5	3.77	.82
Collective efficacy	1–5	3.71	.84

et al. (2016). It consisted of five sections: (1) leadership, (2) efficiency in the community, (3) readiness in the community, (4) commitment to the community, and (5) trust in society. The 10 items under each section were rated on a five-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). High scores indicate a considerable awareness of community adaptation. The content validity index of CCRAM10 was 1.0, and its Cronbach's alpha was .95.

Life resilience was measured in terms of psychological resilience, which covered flexibility, self-efficacy, emotion regulation, optimism, and maintaining attention under stress. For this purpose, we used Connor Davidson's (Gras et al., 2019) Strength Test Life Resiliency 10 (CD-RISC 10), which is a 10-item questionnaire that measures a person's ability to adapt to, or cope with, stress or life events. A five-point scale was used to rate the items: 1 = *not true at all*, 2 = *rarely true*, 3 = *sometimes true*, 4 = *often true*, and 5 = *on almost all days*. The total score possible on this questionnaire ranges from 0 to 40, with a high score meaning a strong ability to adapt. The content validity of CD-RISC 10 was 1.0, and its Cronbach's alpha was .95.

Results

Among the 368 participants, 52.7% were female with an average age of 42.92 years, and most were Buddhists (77.4%). A total of 56.0% had never been infected with COVID-19, while 44.0% had been afflicted with the disease. Of those contracting COVID-19, 38.9% had been infected once, and 16.8% were infected four to six months prior to the study. Of the respondents, 38.9% completed elementary education, and 41.0% were employed. During the COVID-19 pandemic, 70.4% experienced work-related issues, while 82.9% grappled with financial difficulties (see Table 1).

All the participants reported a level of family and community resilience, with the following average scores: place attachment: mean = 3.93 ± 0.83; leadership: mean = 3.85 ± 0.83; social trust: mean = 3.79 ± 0.84; preparedness: mean = 3.77 ± 0.82; and collective efficacy: mean = 3.71 ± 0.84. The results showed the following average scores for hedonic, eudaimonic, and overall psychological well-being: mean = 11.33 ± 2.90, 18.17 ± 4.83, and 23.46 ± 5.17, respectively (see Table 2).

The analysis of individual mental health revealed that 73.9% of the sample had considerable well-being in this respect. All the participants exhibited strong family resilience, with the following average scores for each component of this variable: beliefs of family members. All the participants reported a moderate level of community resilience (see Table 3).

Table 3. Number and Percentage of the Sample Classified by Individual Mental Health and Family and Community Resilience (*n* = 368)

Factors	*n*	%
Individual mental health		
High level	272	73.9
Moderate level	63	17.1
Low level	33	9.0
Family resilience		
High level	368	100
Moderate level	0	0
Low level	0	0
Community resilience		
High level	0	0
Moderate level	368	100
Low level	0	0

Table 4. Number and Percentage of the Sample Classified by Life Resilience

Life Resilience	*n*	%
Low level (0–29 points(	137	37.2
Moderate level (30–32 points(	131	35.6
High level (33–40 points(	100	27.2
Mean)*SD*(	29.87	(5.76)

The analysis of life resilience showed that 37.2% of the sample had low resilience, 35.6% had moderate resilience, and 27.2 % had substantial resilience (see Table 4).

The results of the preliminary analysis intended to test the assumption of multivariate normality was confirmed by the diagram figure. Although the data on community resilience were normally distributed, the variables for individual mental health, community resilience, and life resilience exhibited slight positive skewness and moderate kurtosis, indicating that these were nonnormally distributed. Multicollinearity was assessed using the correlation coefficients of the variables, with values below 0.85 suggesting the absence of multicollinearity. The linearity and coefficients of correlation between the variables were statistically significant, showing that the assumption of linearity was satisfied.

Causal relationships were found between life resilience, individual mental health, and family and community resilience. The hypothesized model explained 40% of the variance in life resilience. The results show how the different measured parameters affect working. The model also showed satisfactory fit with the data, as evidenced by the following values: $\chi^2 = 47.717$, *df* 34, *p* = .06, RMSEA = .03, RMR .097, GFI .978, CFI .995 (see Figure 1).

All the paths shown were statistically significant ($p < .01$). Our exploration of individual mental health, family resilience, and community resilience demonstrated that individual mental health and family resilience were affected by life resilience, with this relationship being statistically significant ($p < .001$). The family resilience path exerted the greatest effect on resilience (.36, $p < .001$), while belief systems were most strongly correlated with family resilience (.98, $p < .01$) (Table 5). At the same time, individual mental health affected resilience (.32, $p < .001$), and the hedonic aspects of such health showed the highest correlation with individual psychological well-being (.99, $p < .05$). The community resilience path exhibited the
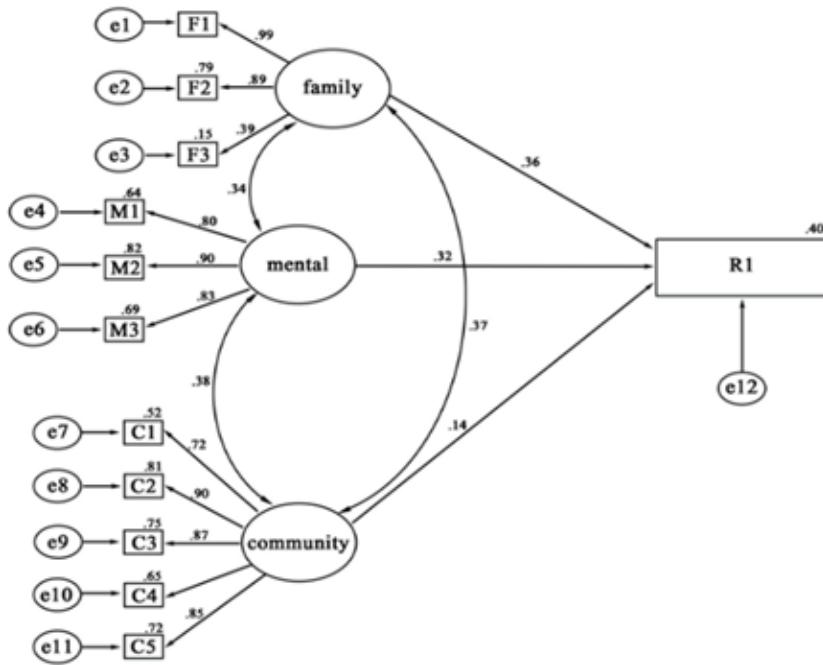
Figure 1. Model of Resilience Among Working-Age People in Urban Thailand During the COVID-19 Pandemic

$\chi^2 = 47.717$, *df* 10, *p* = .06, RMSEA = .03, RMR .097, GFI .978, CFI .995

Note: F1 = Family communication and problem-solving, F2 = Organizational patterns, F3 = Belief systems, M1 = Hedonic, M2 = Eudaimonic, M3 = psychological well being, C1 = Leadership, C2 = Collective efficacy, C3 = Preparedness, C4 = Place attachment, C5 = Social trust, R1 = Life Resilience

Table 5. Squared Multiple Correlations

Variable	Standardized Coefficient	Unstandardized Coefficient
Family		
Family communication and problem-solving	.833**	.985**
Organizational patterns	.903**	.793**
Belief systems	.799**	.154**
Individual mental health		
Hedonic (being happy, interested in life, life satisfaction)	.993**	.638**
Eudaimonic (social well-being)	.891**	.815**
Psychological well-being	.392**	.694**
Community		
Leadership	.521**	.521**
Collective efficacy	.809**	.809**
Preparedness	.750**	.750**
Place attachment	.648**	.648**
Social trust	.715**	.715**

**p* <.001

Table 6. Standardized Regression Weights

Variable	Standardized Coefficient	Unstandardized Coefficient
Life resilience ← Individual mental health	.318**	.796**
Life resilience ← Family	.360**	4.732**
Life resilience ← Community	.136**	1.311**
Individual mental health ←→ Community	.376**	.518**
Individual mental health ←→ Family	.342**	.34**
Family ←→ Community	.373**	.098**

$\chi^2 = 47.717$, *df* 34, p = .06, RMSEA = .03, RMR .097, GFI .978, CFI .995
p < .001**

weakest correlation with resilience, with a path coefficient of .14 ($p < .01$) (Tables 5 and 6). Preparedness was most strongly correlated with family resilience (.98, $p < .01$) (see Figure 1).

Discussion

Our causal model addressed the relationships between life resilience, individual mental health, and family and community resilience. The model of resilience among working-age individuals showed a satisfactory fit with the data collected from the sample. However, a model identified as showing a slight fit with data using the chi-square statistic may be influenced by sample size (>250 participants) and the number of observed variables (Gras et al., 2019). Our model explained 40% of the variance in resilience, which is lower than the 60% recommended by Moksony (1990, as cited in Hair, 2022). However, in the sciences and the humanities, it is acceptable for the *R*-squared to be lower than 50% or even below 20% in some cases. An ecological model encompasses four essential elements, namely, intrapersonal, interpersonal, community, and organizational factors, but our model lacked a consideration of organizational factors, making its coverage incomplete. A more comprehensive model can explain a greater proportion of variance in data, as the *R*-squared tends to increase with the inclusion of more variables (Chen & Sriphon, 2021). The absence of organizational and policy factors in our representation may explain why we were unable to fully account for variations in the phenomenon of interest.

We found that family resilience had the greatest influence on working-age people's psychological resilience. Two-thirds of the participants exhibited moderate to high resilience. In Thai culture, most families are extended so that they often have members of different generations, such as parents, grandparents, and children—all of whom live together and normally espouse the same beliefs (Karch, 2020). When families or members have problems, they tend to consult and talk with each other as well as share their feelings, resulting in good family interactions and a predilection for encouraging one another; that is, they work together to solve problems (Barton et al., 2023; Fadmawaty & Wasludin, 2021). Therefore, the family is instrumental in helping individuals survive various crises and increasing individual resilience (Firman et al., 2025; Thomas et al., 2017).

The findings also demonstrate that individual mental health affects life resilience. Working-age individuals tend to have emotional well-being and optimism, both of which can lead to high levels of resilience (Chen et al., 2021). Although individuals may find themselves in a crisis, they may experience satisfaction and positive feelings, which might decrease their pain (negative emotions). They can adapt to new situations more easily and create good mechanisms with which to address problems. Resilience is related to feelings of value in life and decreased suffering (Özer et al., 2023), and resilient individuals can maintain favorable psychological conditions. These factors, in turn, contribute to community resilience. Furthermore,

unemployed individuals experience tremendous psychological stress and anxiety, whereas those employed and earning high incomes tend to be psychologically healthier than those receiving low wages (Fernández-Alonso et al., 2023).

In this study, the working-age participants experienced moderate community resilience. Communities in Bangkok are densely populated urban regions, with some being slum areas characterized by overcrowding and lacking a good environment. Environmental management is poor due to the unsocial behaviors of residents, contributing to poor hygiene and low quality of life (Coulombe et al., 2020). People living in urban communities tend to live differently and have little interaction with their neighbors (Zhang & Xiang, 2019). They showed little interest in their fellow residents and focused primarily on earning money to survive the COVID-19 situation. This study did not measure actual amounts of money but measured a range of income. During the pandemic, 84% of the sample had a monthly per capita income lower than the national average for Thai citizens (15,000 baht/month or US$463.04 compared with the average of 18,000 baht/month or US$555.65). As a result, community trust and the sense of connection among residents diminished. Additionally, community leaders in urban areas only moderately supported community members. Such communities lacked people who could coordinate with government agencies. In our model, therefore, the resilience of urban communities exerted a relatively small effect on the resilience of working-age individuals. The findings indicate that community nurses are crucial in efforts to promote the mental health of working-age people and support their families (Belanche et al., 2021). They launch an intervention to promote the mental health of working-age people and their families to enhance resilience among these groups.

This study is limited in that it was conducted only in Bangkok, rendering it unrepresentative of the population of the entire country. The study recommends sampling economically im-

portant metropolitan areas to gain greater representation of the working-age population. Subsequent studies should undertake a more in-depth consideration of the factors involved to provide a more exhaustive explanation of variances in resilience. Researchers should also investigate the situations faced by other age groups, such as the elderly and teenagers, or adopt a longitudinal or mixed-methods approach to gain more comprehensive and nuanced insights into the evolving dynamics of resilience over time.

Conclusion

In this work, the causal model of working-age individuals in urban communities addressed individual mental health as well as family and community resilience, and it showed that these aspects directly affected the resilience of the population of interest during the COVID-19 pandemic. The hypothesized model, evaluated against the collected data, showed that the family resilience path had the greatest influence on the resilience of employable individuals in urban areas. It is important to emphasize the significance of incorporating family resilience as a central component into intervention strategies aimed at supporting people of working age. Promoting resilience within families involves building strong relationships, fostering open communication, and creating a supportive environment.

Acknowledgements

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ACKNOWLEDGEMENT

AUTHOR INDEX

All article authors published in Jurnal Keperawatan Indonesia Volume 28 of 2025 are listed below alphabetically, complete with numbers and pages.

SUBJECT INDEX

JURNAL KEPERAWATAN INDONESIA
SUBMISSION GUIDE

Jurnal Keperawatan Indonesia (JKI), or Nursing Journal of Indonesia in English, is a media that can be used to register, to disseminate, and to archive the works of researchers who concern on nursing field in Indonesia. The article published in JKI will also be acknowledged as an intellectual work in the field of nursing. The articles of JKI are categorized based on the sub-fields of nursing science, including basic nursing care, adult nursing care, child nursing care, maternity nursing care, mental-health nursing care, gerontic nursing care, family nursing care, community nursing care, nursing care management, and nursing education. The types of articles accepted by editors are the results of research. The writing of each type of article must follow the JKI Author Guidelines.

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Article Title. Abstract should be written using Times New Roman font, size 10pt, not-italics, right justify, and one paragraph-unstructured with single spacing, completed with English title written in bold at the beginning of the English abstract. It should be around 100–250 words. The abstract should state the problem, the purposes of the study or investigation, basic procedures (research design, selection and size of study subjects; observational and analytical methods), main findings (OR/ RR, CI or themes in qualitative research), and the principal conclusions. Recommendation and implication of the study must be clear. It should not contain any references or displayed equations. For the article in English, Indonesian abstract will be provided by the editors.

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Keywords: up to 6 words/ phrase in English, alphabetically order (10 point font, italics), give commas between words/phrase.

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Abstrak (10 pt, bold, italic)
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Judul Artikel. *Abstrak ditulis menggunakan bahasa Indonesia dan Inggris, dengan jumlah kata sekitar 100–250 kata. Menggunakan tipe abstrak satu paragraf tidak berstruktur, huruf 10 pt, cetak miring, spasi tunggal, rata kanan-kiri, tidak ada kutipan dan singkatan/ akronim. Abstrak harus berisi pendahuluan atau masalah yang diteliti termasuk tujuan penelitian, jika memungkinkan buat dalam satu kalimat. Desain penelitian, cara pengambilan dan besar sampel, cara dan pengumpulan data, serta analisis data. Penemuan utama (OR/ RR, CI atau tema dalam riset kualitatif). Tuliskan satu atau dua kalimat untuk mendiskusikan hasil dan kesimpulan. Rekomendasi dan implikasi hasil penelitian dituliskan dengan jelas.*

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Kata Kunci: *Kata kunci ditulis menggunakan bahasa Indonesia dan Inggris. Berisi kata atau frasa tiga sampai enam kata dan diurutkan berdasarkan abjad (10pt, italics). Antar kata kunci dihubungkan dengan koma.*

(Three blank single space lines, 12 point font, boldface)

Introduction (14 point font, boldface, cap in the first letter of headings)

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Affiliates and address of the authors. Give the number according to the name of the author, for example 1. Department of Maternal and Women's Health Nursing, Faculty of Nursing, Universitas Indonesia, Prof. Dr. Bahder Djohan Street, Depok, West Java – 16424. Correspondence address is email address of the one of the author, for example anandita12@ui.ac.id.

The use of abbreviations is permitted, but the abbreviation must be written in full and complete when it is mentioned for the first time and it should be written between parentheses. Terms/Foreign words or regional words should be written in italics. Notations should be brief and clear and written according to the standardized writing style. Symbols/signs should be clear and distinguishable, such as the use of number 1 and letter l (also number 0 and letter O). Avoid using parentheses to clarify or explain a definition. The organization of the manuscript includes **Introduction, Methods** or **Experimental, Results, Discussion, Conclusions,** and **References**. **Acknowledgement** (if any) is written after **Conclusion** and before **References** and narratively, not numbered. The use of subheadings is discouraged. Between paragraphs, the distance is one space. Footnote is avoided.

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Introduction contains justification of the importance of the study conducted. Novelty generated from this study compared the results of previous studies or the umbrella of existing knowledge needs to be clearly displayed. Complete it with main reference used. State in one sentence question or research problems that need to be answered by all the activities of the study. Indicate the methods used and the purpose or hypothesis of the study. The introduction does not exceed five paragraphs.
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Methods (14 point font, boldface, cap in the first letter of headings)
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Method contains the design, the size, criteria and method of sampling, instruments used, and procedures collecting, processing, and analysis of the data. When using a questionnaire as instrument, explain the contents briefly and to measure which variables. Validity and reliability of instruments should also be explained. In the experimental or intervention studies need to be explained interventional procedure or treatment is given. In this section it should explain how research ethics approval was obtained and the protection of the rights of the respondents imposed. Analysis of data using computer programs needs not be written details of the software if not original. Place/location of the study is only mentioned when it comes to study. If only as a research location, the location details not worth mentioning, just mentioned vague, for example, "... at a hospital in Tasikmalaya."

For the qualitative study, in this section needs to explain how the study maintain the validity (trustworthiness) data obtained. The methods section written brief in two to three paragraphs.
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Results
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The findings are sorted by the objectives of the study or the research hypothesis. The results do not display the same data in two forms namely tables/ images /graphics and narration. No citations in the

results section. The average value (mean) must be accompanied by a standard deviation. Writing tables using the following conditions.

Table only uses 3 (three) row lines (do not use a column line), the line heading, and the end of the table (see example). Table is written with Times New Roman size 10pt and placed within a single space below the title table. Table titles is written with font size 9pt bold, capital letters at the beginning of the word and placed on the table with the format as shown in the examples that do not use the column lines. Numbering tables are using Arabic numerals. The table framework is using lines size 1 pt. If the table has many columns, it can use one column format at half or full page. If the title in each table column is long and complex, the columns are numbered and its description given at the bottom of the table. Mean, SD, and t-test values should include value of 95% CI. Significance value is put with not mention P at first. Example: The mean age 25.4 years intervention group (95% CI). Based on the advanced test between intervention and control groups showed significant (example: p= 0.001; CI= ... - ...).

Images are placed symmetrically in columns within a single space of a paragraph. Pictures are numbered and sorted by Arabic numerals. Captions placed below the image and within one single space of the image. Captions are written by using 10pt font size, bold, capital letters at the beginning of the word, and placed as in the example. The distance between the captions and paragraphs are two single spaced.

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Table and image are not integrated with the contents of the manuscript, put after reference or at the end of the manuscript.

For the qualitative study, the findings commonly are written in the form of participants quotes. Table format is rarely used except to describe the characteristics of the participants, or recapitulation of the themes or categories. If the quote is not more than 40 words, then use quotation marks (") at the beginning and at the end of a sentence and include participants/ informants which give statements without the need to create separate paragraphs. Ellipsis (...) is only used to change a word that is not shown, instead of a stop sign/pause. See the following example.

Due to the ongoing process, the women experiencing moderate to severe pain in the knees, ankles, legs, back, shoulders, elbows, and/or their fingers, and they are struggling to eliminate the pain. To alleviate pain, they look for the cause of the pain. One participant stated that, "... I decided to visit a doctor to determine the cause of the pain is. Now I'm taking medication from the doctor in an attempt to reduce this pain" (participant 3)

Here is an excerpt example of using block quotations if the sentences are 40 or more. Use indentation 0.3"

As discussed earlier, once the participants had recovered from the shock of the diagnosis of the disease, all participants decided to fight for their life. For most of them, the motivation for life is a function of their love for their children; namely child welfare, which being characteristic the pressure in their world. Here is an example of an expression of one of the participants:

I tried to suicide, but when I think of my children, I cannot do that [crying]. I thought, if I die, no one will take care of my children. Therefore, I decided to fight for my life and my future. They (children) were the hope of my life (participant 2).

Discussion

Describe the discussion by comparing the data obtained at this time with the data obtained in the previous study. No more statistical or other mathematical symbols in the discussion. The discussion is directed at an answer to the research hypothesis. Emphasis was placed on similarities, differences, or the uniqueness of the findings obtained. It is need to discuss the reason of the findings. The implications of the results are written to clarify the impact of the results the advancement of science are studied. The discussion ended with the various limitations of the study.

Conclusion

Conclusions section is written in narrative form. The conclusion is the answer of the hypothesis that leads to the main purpose of the study. In this section is not allowed to write other authors work, as well as information or new terms in the previous section did not exist. Recommendation for further research can be written in this section.

Acknowledgement (if any)

Acknowledgement is given to the funding sources of study (donor agency, the contract number, the year of accepting) and those who support that funding. The names of those who support or assist the study are written clearly. Names that have been mentioned as the authors of the manuscripts are not allowed here.

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Use the most updated references in the last 10 years. Reference is written with Times New Roman font size 11 pt, single space, the distance between the references one enter. The references use the hanging, which is on the second line indented as much as 0.25", right justified. The references only contain articles that have been published, and selected the most relevant to the manuscript. It prefers primary references. The references format follows the "name-years" citation style (APA style 7th edition). All sources in the reference must be referenced in the manuscript and what was in the manuscript should be in this reference. The author should write the family/last name of sources author and year of publication in parentheses use, for example (Potter & Perry, 2006) or Potter and Perry (2006). Write the first author's name and "et al.", if there are three or more authors.

Examples:

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Author, A.A., Author, B.B., & Author, C.C. (year). Article title: Sub-title. *Journal Title*, *volume* (issue number), page numbers.

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References with two or more authors (up to 20 authors) write all author's names. If an article has 21 authors or more, list the first 19 authors, then insert an ellipsis (…) and then the last name and first initials of the last author. Example:

Wolchik, S.A., West, S.G., Sandler, I.N., Tein, J., Coatsworth, D., Lengua, L., Johnson, A., Ito, H., Ramirez, J., Jones, H., Anderson, P., Winkle, S., Short, A., Bergen, W., Wentworth, J., Ramos, P., Woo, L., Martin, B., Josephs, M., … Brown, Z. (2005). *Study of the brain. Psychology Journal, 32* (1), 1–15. doi: 10.1037/1061-4087.45.1.11.

Conference Proceeding
Schnase, J.L., & Cunnius, E.L. (Eds.). (1995). Proceedings from CSCL '95: *The First International Conference on Computer Support for Collaborative Learning*. Erlbaum.

Newspaper (no author's name)
Generic Prozac debuts. (2001, August 3). The Washington Post, pp. E1, E4.

It's subpoena time. (2007, June 8). New York Times. https://www.nytimes.com/2007/06/08/opinion/08fri1.html

Book
Author, A.A. (Year). *Source title: Capital letter in the beginning of the subtitle*. Publisher.

Peterson, S.J., & Bredow, T.S. (2004). *Middle range theories: Application to nursing research*. Lippincott Williams & Wilkins.

Book chapter
Author, A.A. (Year). Chapter title*:* Capital letter in the beginning of the subtitle. In Initial, Surname (Author's name/book editor) (eds), *Book title*. Publisher.

Hybron, D.M. (2008). Philosophy and the science of subjective well-being. In M. Eid & R.J. Larsen (Eds.), *The science of subjective well-being* (pp.17–43). Guilford Press.

Translated book
Ganong, W.F. (2008). *Fisiologi kedokteran* (Ed ke-22). (Petrus A., trans). McGraw Hill Medical. (Original book published 2005).

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Rockey, R. (2008). An observational study of pre-service teachers' classroom management strategies (Publication No. 3303545) [Doctoral dissertation, Indiana University of Pennsylvania]. ProQuest Dissertations and Theses Global.

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Borman, W.C., Hanson, M.A., Oppler, S.H., Pulakos, E.D., & White, L.A. (1993). Role of early supervisory experience in supervisor performance. *Journal of Applied Psychology, 78* (8), 443–449. Retrieved from http://www.eric.com/jdlsiejls/ supervisor/early937d

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Online article
Becker, E. (2001, August 27). Prairie farmers reap conservation's rewards. *The New York Times*, pp. 12–90. Retrieved from http://www.nytimes.com

Appendices
Appendices are only used when absolutely necessary, placed after the references. If there is more than one attachment/appendix then sorted alphabetically.
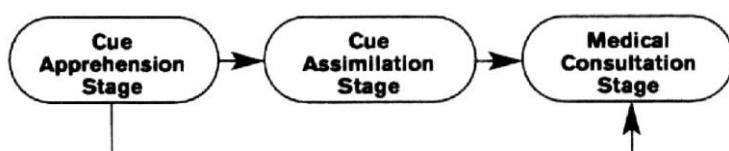
Here is an example of a table

Table 1. The Characteristics of the Respondents (capital letters at the beginning of the word 11 pt, left justify)
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Client's Initial	Age	Major Problem
Mr. BN	56	Aggressiveness
Mr. MA	40	Withdrawal
Mr. AS	45	Swing Mood

*table footnotes (if necessary)

Here is an example of an image

(One blank single space line, 10 pt)
Figure 1. The Process of Cardiac Sensitivity Cues (Capital Letters in the Beginning of the Words, 11pt)

ARTICLE TITLE (all caps, 14-point font, boldface, centered, Maximum 16 words)
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Keywords: This section consists of three to six keywords/phrases representing the main content of the article. It is important for indexing the manuscript and easy online retrieval. It is written in English, alphabetical order (10-point font), and gives commas between words/phrases.

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Abstrak *(10 pt, bold, senter)*
(One blank single space line, 10 pt)

Judul Artikel. Abstrak harus ditulis menggunakan huruf Times New Roman, ukuran 10pt, huruf miring, rata kanan, dan satu paragraf-tidak terstruktur dengan spasi tunggal. Abstrak harus "pendek dan manis". Seharusnya sekitar 100–250 kata. Singkatan atau referensi dalam Abstrak tidak boleh digunakan. Abstrak harus mencakup latar belakang, ilustrasi kasus, dan kesimpulan. Latar belakang mencakup pengantar tentang mengapa kasus ini penting dan perlu dilaporkan. Harap sertakan informasi tentang apakah ini adalah laporan pertama dari jenis ini dalam literatur. Ilustrasi kasus mencakup rincian singkat tentang apa yang pasien sajikan, termasuk usia pasien, jenis kelamin dan latar belakang etnis. Kesimpulan merupakan kesimpulan singkat dari apa yang pembaca harus pelajari dari laporan kasus dan dampak klinisnya. Apakah laporan kasus asli yang menarik bagi area spesialis keperawatan tertentu atau apakah itu berdampak klinis yang lebih luas?

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Kata Kunci*: Bagian ini terdiri dari tiga sampai enam kata kunci/frase yang mewakili konten utama artikel. Kata kunci ini penting untuk indeksasi manuskrip dan pencarian daring dengan mudah. Itu ditulis dalam bahasa Inggris, diurutkan berdasarkan abjad (font 10 huruf, huruf miring), memberikan koma di antara kata-kata/frasa.*

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AUTHOR GUIDELINES: CASE REPORT

The information about the author(s) such as full name (without academic title), affiliates, and address are wrote on the separate file (tittle page). Affiliates and address of the authors. Give the number according to the name of the author, for example 1. Department of Maternal and Women's Health Nursing, Faculty of Nursing, Universitas Indonesia, Prof. Dr. Bahder Djohan Street, Depok, West Java – 16424. Correspondence address is email address of the one of the author, for example anandita12@ui.ac.id.

The use of abbreviations is permitted, but the abbreviation must be written in full and complete when it is mentioned for the first time and it should be written between parentheses. Terms/Foreign words or regional words should be written in italics. Notations should be brief and clear and written according to the standardized writing style. Symbols/signs should be clear and distinguishable, such as the use of number 1 and letter l (also number 0 and letter O). Avoid using parentheses to clarify or explain a definition. The organization of the manuscript includes **Introduction, Case Illustration, Discussion, Conclusions,** and **References**. **Acknowledgement** (if any) is written after **Conclusion** and before **References** and narratively, not numbered. The use of subheadings is discouraged. Between paragraphs, the distance is one space. Footnote is avoided.

This manuscript uses *American Psychological Association (APA)* manual style as citation. When using APA format, follow the author-date method of in-text citation. This means that the author's last name and the year of publication for the source should appear in the text, for example, (Jones, 1998), and a complete reference should appear in the reference list at the end of the paper. Citation can be put at the beginning of the sentence, for example Johnson (2005) states that … or the source put at the end of a sentence for examples … (Purwanto, 2004). See the complete format on this link https://owl.english.purdue.edu/owl/resource/560/02/

The Introduction or Background section should explain the background of the case, including the disorder or nursing problems, usual presentation and progression, and an explanation of the presentation if it is a new disease or disorder. If it is a case discussing an adverse intervention the Introduction should give details of intervention's common use and any previously reported side effects. It should also include a brief literature review. This should introduce to the case report from the stand point of those without specialist knowledge in the area, clearly explaining the background of the topic. It should end with a very brief statement of what is being reported in the article.

The Introduction should be in brief, stating the purpose of the study. Provide background that puts the manuscript into context and allows readers outside the field to understand the significance of the study. Define the problem addressed and why it is important and include a brief review of the key literature. Note any relevant controversies or disagreements in the field. Conclude with a statement of the aim of the work and a comment stating whether that aim was achieved.
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Case Illustration (14-point font, boldface, cap in the first letter of headings)
(One blank single space line, 10-point font)
This should present all relevant details concerning the case. This section can be divided into separate sections presented with appropriate subheading, such as history and presenting conditions, intervention, outcome, etc. This should provide concerned details of the case with relevant demographic information of the patient concealing their identification (without adding any details that could lead to the identification of the patient), medical history, observed symptoms and describe any tests or treatments done on the patient. If it is a case series, then details must be included for all patients. Discuss the significance and rarity of findings with referencing to the previous studies.

If it is need to present table(s) and or image(s), some rules should be followed. Table only uses 3 (three) row lines (do not use a column line), the line heading, and the end of the table (see example). Table is written with Times New Roman size 10-pt and placed within a single space below the title table. Table titles is written with font size 9-point bold, capital letters at the beginning of the word and placed on the table with the format as shown in the examples that do not use the column lines.

Numbering tables are using Arabic numerals. The distance between table and the paragraph is a single space. The table framework is using lines size 1 pt. If the table has many columns, it can use one column format at half or full page. If the title in each table column is long and complex, the columns are numbered and its description given at the bottom of the table. The table is placed in the highest or the very bottom of each page and do not flanked by sentence. Avoid interrupted the table by page.

Images are using a single space of a paragraph. If the size of the image passes through the column width then the image can be placed with a single column format. Pictures are numbered and sorted by Arabic numerals. Captions placed below the image and within one single space of the image. Captions are written by using 10pt font size, bold, capital letters at the beginning of the word, and placed as in the example. The distance between the captions and paragraphs are two single spaced.

Images which have been published by other authors should obtain written permission from the author and publisher. Include a printed image with good quality in a full page or scanned with a good resolution in the format {file name}.jpeg or {file name}. tiff. When the images are in the photograph format, include the original photographs. The image will be printed in black and white, unless it needs to be shown in color. The author will be charged extra for color print if more than one page. The font used in the picture or graphic should be commonly owned by each word processor and the operating system such as Symbol, Times New Roman, and Arial with size not less than 9-pt. Image files which are from applications such as Corel Draw, Adobe Illustrator and Aldus Freehand can give better results and can be reduced without changing the resolution.

Table and image are not integrated with the contents of the manuscript, put after reference or at the end of the manuscript.

Discussion

The discussion section should contain major interpretations from the findings and results in comparison to past studies. The significance of the findings and case presentation should be emphasized in this section against previous findings in the subject area.

This section should evaluate the patient case for accuracy, validity, and uniqueness and compare or contrast the case report with the published literature. The authors should briefly summarize the published literature with contemporary references.

Conclusion

Conclusions section is written in narrative form. This section should conclude the Case reports and how it adds value to the available information. Explain the relevance and significance of their findings to the respective field in a summary briefly. This section is not allowed to write other authors work, as well as information or new terms in the previous section did not exist. Recommendation for further study can be written in this section.

Acknowledgements

References (14pt, boldface, Capital letter in the beginning of the Word)

Use the most updated references in the last 10 years. Reference is written with Times New Roman font size 11 pt, single space, the distance between the references one enter. The references use the hanging, which is on the second line indented as much as 0.25", right justified. The references only contain articles that have been published, and selected the most relevant to the manuscript. It prefers primary references. The references format follows the "name-years" citation style (APA style 7th edition). All sources in the reference must be referenced in the manuscript and what was in the manuscript should be in this reference. The author should write the family/last name of sources author and year of publication in parentheses use, for example (Potter & Perry, 2006) or Potter and Perry (2006). Write the first author's name and "et al.", if there are three or more authors.

Examples:

Journal
Author, A.A., Author, B.B., & Author, C.C. (year). Article title: Sub-title. *Journal Title*, *volume* (issue number), page numbers.

Wu, S.F.V., Courtney, M., Edward, H., McDowell, J., Shortridge-Baggett, L.M., & Chang, P.J. (2007). Self-efficacy, outcome expectation, and self-care behavior in people with type diabetes in Taiwan. *Journal of Clinical Nursing, 16* (11), 250–257.

References with two or more authors (up to 20 authors) write all author's names. If an article has 21 authors or more, list the first 19 authors, then insert an ellipsis (…) and then the last name and first initials of the last author. Example:

Wolchik, S.A., West, S.G., Sandler, I.N., Tein, J., Coatsworth, D., Lengua, L., Johnson, A., Ito, H., Ramirez, J., Jones, H., Anderson, P., Winkle, S., Short, A., Bergen, W., Wentworth, J., Ramos, P., Woo, L., Martin, B., Josephs, M., … Brown, Z. (2005). *Study of the brain. Psychology Journal, 32* (1), 1–15. doi: 10.1037/1061-4087.45.1.11.

Conference Proceeding
Schnase, J.L., & Cunnius, E.L. (Eds.). (1995). Proceedings from CSCL '95: *The First International Conference on Computer Support for Collaborative Learning*. Erlbaum.

Newspaper (no author's name)
Generic Prozac debuts. (2001, August 3). The Washington Post, pp. E1, E4.

It's subpoena time. (2007, June 8). New York Times. https://www.nytimes.com/2007/06/08/opinion/08fri1.html

Book
Author, A.A. (Year). *Source title: Capital letter in the beginning of the subtitle*. Publisher.

Peterson, S.J., & Bredow, T.S. (2004). *Middle range theories: Application to nursing research*. Lippincott Williams & Wilkins.

Book chapter
Author, A.A. (Year). Chapter title*: Capital letter in the beginning of the subtitle.* In Initial, Surname (Author's name/book editor) (eds), *Book title*. Publisher.

Hybron, D.M. (2008). Philosophy and the science of subjective well-being. In M. Eid & R.J. Larsen (Eds.), *The science of subjective well-being* (pp.17–43). Guilford Press.

Translated book
Ganong, W.F. (2008). *Fisiologi kedokteran* (Ed ke-22). (Petrus A., trans). McGraw Hill Medical. (Original book published 2005).

Thesis/Dissertation
If available in the database
Rockey, R. (2008). An observational study of pre-service teachers' classroom management strategies (Publication No. 3303545) [Doctoral dissertation, Indiana University of Pennsylvania]. ProQuest Dissertations and Theses Global.

Gerena, C. (2015). Positive thinking in dance: The benefits of positive self-talk practice in conjunction with somatic exercises for collegiate dancers [Master's thesis, University of California Irvine]. University of California, Scholarship. https://escholarship.org/uc/item/1t39b6g3

If not published
Last-name, A.A. (year). *Dissertation/thesis title.* (Unpublished doctoral dissertation/master thesis). Institution Name, Location.

Considine, M. (1986). *Australian insurance politics in the 1970s: Two case studies*. (Unpublished doctoral dissertation). University of Melbourne, Melbourne, Australia.

Database Article
Author, A.A., Author, B.B., & Author, C.C. (Year pub). Title of article. *Title of Journal*, Volume (Issue), pp–pp. doi: xx.xxxxxxxx [OR] Retrieved from URL of publication's home page

Borman, W.C., Hanson, M.A., Oppler, S.H., Pulakos, E.D., & White, L.A. (1993). Role of early supervisory experience in supervisor performance. *Journal of Applied Psychology, 78* (8), 443–449. Retrieved from http://www.eric.com/jdlsiejls/ supervisor/early937d

Database article with DOI (Digital Object Identifier)
Brownlie, D. (2007). Toward effective poster presentations: An annotated bibliography. *European Journal of Marketing, 41* (11/12), 1245–1283. doi: 10.1108/03090560710821161.

Other online source
Author, A.A. (year). Title of source. Retrieved from URL of publication's home page

Article from website
Exploring Linguistics. (1999, August 9). Retrieved from http://logos.uoregon.edu/explore/orthography/ chinese.html#tsang

Online article
Becker, E. (2001, August 27). Prairie farmers reap conservation's rewards. *The New York Times*, pp. 12–90. Retrieved from http://www.nytimes.com

Appendices

Appendices are only used when absolutely necessary, placed after the references. If there is more than one attachment/appendix then sorted alphabetically.
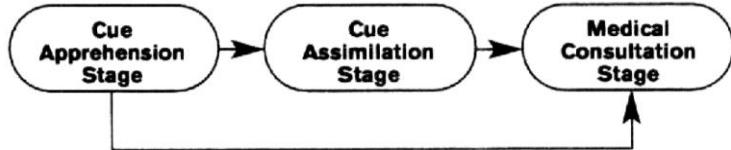
Here is an example of a table

Table 1. The Characteristics of the Respondents (capital letters at the beginning of the word 11 pt, left justify)

(One blank single space line, 10 pt)

Client's Initial	Age	Major Problem
Mr. BN	56	Aggressiveness
Mr. MA	40	Withdrawal
Mr. AS	45	Swing Mood

*table footnotes (if necessary)

Here is an example of an image

(One blank single space line, 10 pt)

Figure 1. The Process of Cardiac Sensitivity Cues (Capital Letters in the Beginning of the Words, 11pt)

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