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Contents

Review Article

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Enhancing Clinical Training in Nursing Education: Overcoming Barriers and Exploring Innovative Solutions: A Discussion Review

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Abstract

Background: The availability of clinical training sites presents a significant barrier to developing and implementing an effective nursing curriculum. There are several challenges to effective nursing clinical training, affecting both students and healthcare facilities globally.

Method: This study reviews the barriers and challenges related to clinical training in nursing education, examining existing literature on related aspects. Additionally, the paper explores innovative solutions, such as simulation training, inter-professional education, and academic-practice partnerships, to address these issues.

Results: The findings highlight critical obstacles, including insufficient clinical placements, shortage of nurse educators, and inadequate infrastructure. Simulation and inter-professional education models were identified as effective strategies to supplement traditional clinical training and improve student competencies while encouraging collaboration among healthcare professionals.

Conclusion: Addressing training site limitations and adopting simulation-based learning, inter-professional education, and stronger academic-practice partnerships will ensure a more effective, adaptable nursing curriculum that meets the evolving needs of healthcare systems.

Keywords: Clinical training, training sites, challenges, nursing education, recommendations.

Introduction

The availability of clinical training sites presents a significant barrier to developing and implementing an effective nursing curriculum[7,2]. Clinical training sites in nursing are is defined as a "*healthcare facilities or community settings where nursing students apply theoretical knowledge in real-world clinical environments under supervision, developing practical skills, critical thinking, and professional behavior essential for nursing practice*"[3].

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Clinical placement is an essential component of nursing and midwifery education worldwide. Nursing programs rely on clinical placements to provide students with hands-on experience and practical skills development[15]. However, the scarcity of available training sites can restrict the number of clinical placements offered to students. This limitation may result in overcrowded clinical settings, limited opportunities for individualized instruction, and challenges in meeting accreditation standards for clinical education hours[31]. Consequently, hospitals, clinics, and healthcare facilities may face difficulty accommodating the influx of students from various nursing programs, which may affect the quality of training.

Increasing the number of nursing students in universities despite limited clinical areas for practice requires innovative solutions and collaboration between educational institutions, healthcare facilities, and policymakers. American Association of Colleges of Nursing (AACN) highlighted several challenges faced by nursing schools that prevented them from accepting more students. These included a shortage of clinical sites, faculty, and preceptors, as well as budget limitations and other various factors that further complicated the situation [1].Undergraduate Nursing students training in a healthcare setting can face various challenges that impact the quality of education and preparation for future nurses.

In many countries, the shortage of clinical areas for nursing students poses a significant challenge to nursing education. Therefore, the purpose of this paper is to (1) identify the issues of training site availability in curriculum development and implementation and (2) suggest recommendations to enhance the training process.

Issues of Training in Nursing Curriculum

Nursing practice in the 21st century faces many challenges, including increased nursing teaching schools and institutes, inadequate nursing staff, increasing healthcare costs, limited facilities, need for preceptors, and inadequate quality. Clinical practice is vital in nursing education to merge theory and practice, as well as to acquire skills and competencies of critical thinking, decision-making, and problem-solving. Shortage of training sites in hospitals, insufficient space in the ward, lack of educational activities and places, and inadequate training programs were significant challenges in the clinical education environment [28]. Therefore, the authorities have to take necessary actions to compensate for the deficiencies. Here are some of the most common training barriers to effective curriculum implementation related to the training process:

Accessibility Due to Location and Economic Challenges

Location and economic barriers present considerable challenges to the delivery of effective nursing education. In rural and remote regions, the lack of proximity to academic institutions offering nursing programs severely restricts access for students residing in these areas. Additionally, limited public transportation options and underdeveloped infrastructure can hinder students' ability to commute to institutions providing nursing education [23]. In certain regions, inadequate access to technology, including reliable internet connections, further obstructs students' participation in virtual nursing programs, thereby constraining their educational opportunities.

Shortage of Qualified Nurse Educators

The shortage of qualified nurse educators limits the ability of nursing programs to admit and train enough students, which in turn intensifies the nursing shortage in clinical settings and reduces access to education at clinical sites. The lack of professional development programs to prepare clinical nurses to be nurse educators is considered the most important issue in the training process [5].

Accommodating Cultural Diversity in Nursing Education

In today's increasingly diverse society, nursing education programs must prioritize cultural sensitivity and inclusivity. Nurses routinely care for patients from a wide range of backgrounds, making it crucial to equip them with the skills to provide culturally competent care. Creating an educational environment that values and respects cultural diversity while promoting inclusivity and understanding of human needs requires deliberate action and ongoing cultural awareness. To achieve

this, nursing schools should integrate cultural competency training into their curricula and ensure that faculty members are knowledgeable about diverse cultural practices[39].

Merging Technology and Clinical Practice for Compassionate Care

Technological advancements have the potential to transform nursing education, offering significant benefits to both students and educators. For instance, incorporating technology into clinical practice can enrich students' learning experiences and improve patient care. Virtual reality (VR) simulations, for example, allow students to engage in realistic scenarios that help develop critical thinking and decision-making skills. However, integrating technology in a way that preserves the essence of compassionate, patient-centered care requires a careful balance. This involves creating educational strategies that ensure technology supports, rather than diminishes, the human connection inherent in nursing practice. Moreover, comprehensive training in the use of advanced medical equipment and healthcare technologies necessitates access to state-of-the-art resources and continuous professional development for faculty to stay abreast of technological innovations[37].

Constantly Evaluating and Updating the Nursing Curriculum

Ongoing assessment, evaluation, and revision of the nursing curriculum present significant challenges in providing relevant and effective nursing education. As the healthcare system evolves with rapid changes in clinical practices, technologies, and policies, it is essential for nursing curricula to be updated accordingly. However, ensuring that these updates align with emerging trends while maintaining the overall coherence and structure of the curriculum can be difficult. Furthermore, the process of continually evaluating and updating the curriculum demands considerable time, expertise, and financial resources. These are some of the predominant challenges that academic institutions with limited funding and support may struggle to overcome. At the same time, balancing the preservation of core nursing knowledge with the integration of new technologies and evidence-based practices requires careful deliberation and collaboration among academic institutions and other stakeholders. This process must also account for the need to meet accreditation and regulatory standards [4].

Lack of Preceptors Nurses

The unavailability of preceptors significantly impacts both nurse educators and nursing students. The ongoing nursing shortage has led to understaffed nursing units, with staff-to-patient ratios that are higher than usual. Preceptors, who serve as mentors for hands-on training and provide consistent guidance to nursing students in clinical settings, are essential to the learning process. When there is a shortage of preceptors, inadequate staffing, or insufficient preparatory courses, it can negatively affect the quality of education for nursing students and the transition of new nursing graduates into practice[30].

Developing Clinical Training Sites in Resource-Constrained Settings

In resource-constrained settings, the development of nursing clinical training sites often evolves through collaborative partnerships between educational institutions, local healthcare facilities, and international organizations. Due to limited infrastructure, staffing shortages, and high patient loads, traditional clinical placements may be insufficient or inconsistent. To address these gaps, nursing programs frequently rely on memorandums of understanding (MOUs) with regional hospitals and clinics, and integrate community-based care settings to expose students to diverse health needs. Faculty members often take on dual roles as clinical supervisors and healthcare providers to compensate for limited human resources. Moreover, support from non-governmental organizations (NGOs) and international donors has facilitated the establishment of basic training facilities and mentorship programs to strengthen the quality and consistency of clinical education [40].

In such contexts, simulation-based education serves as a vital complement to traditional clinical training. Simulation allows students to practice clinical skills and decision-making in a controlled, risk-free environment, making it particularly valuable where patient safety and exposure to varied clinical

conditions may be compromised due to limited access. Low- and medium-fidelity simulations, including mannequins and role-playing, are cost-effective and adaptable to resource-limited settings, enabling institutions to reinforce essential nursing competencies without reliance on fully equipped hospitals [33]. Simulation also helps standardize clinical experiences, reduce variability in training, and prepare students for high-stakes scenarios they may rarely encounter in real practice, thus improving readiness and confidence in under-resourced health systems.

Recommendations to Enhance the Training Process

Simulation: The Future of Nursing Education

In recent years, simulation training has gained global prominence, driven by factors such as the shortage of nursing educators and preceptors, along with patient-related challenges in hospital environments. As a result, simulation has emerged as a highly effective educational strategy that can improve patient outcomes and foster a culture of safety among nurses. Studies from various countries have demonstrated that nursing students' participation in simulation exercises leads to notable improvements in clinical skills, including identifying deteriorating patient conditions, accurately triaging emergency patients, managing stroke cases, and collaborating effectively with multidisciplinary teams [6].

Simulation training is a dynamic approach that combines both the art and science of reimagining clinical practice, making it an essential tool in nursing education. It is particularly valuable because it allows for the assessment of cognitive, psychomotor, and practical learning competencies [35]. Through simulation, nursing students have the opportunity to practice and refine their skills until they reach a level of proficiency that ensures safe patient care [13]. Looking ahead, the future of nursing education may see an increased use of high-fidelity simulation, which involves the use of computerized mannequins capable of mimicking a wide variety of patient conditions and symptoms, much like real patients. This type of simulation training has proven to be an efficient and effective way for nurses to practice the critical competencies needed to manage complex clinical situations; something that traditional training methods cannot fully replicate [6].

Develop and Test Innovative Program Models/ Technology Models

Developing and testing innovative program models and technology-based solutions can significantly improve nursing education. Information technology plays a crucial role in enhancing the delivery of course materials, making course management more accessible to both students and faculty, reducing costs, and ultimately improving educational outcomes [19]. The integration of technologies in nursing programs has a wide range of applications, including e-learning platforms, simulations, blogs, and access to online scholarly and research journals. Tools like clinical simulations and virtual learning environments enable educational institutions to invest in resources that expand and enrich teaching materials, offering students a more dynamic and comprehensive learning experience.

Inter-Professional Education (IPE)

Koh and Baker emphasized that nursing education in the 21st century must prioritize inter-professional education (IPE) for nursing students[22]. There is widespread consensus that improving the quality of care requires the collaboration of healthcare professionals, with each recognizing and understanding the roles of others in the care process. IPE is an educational approach that brings together advanced practitioners or students from various healthcare and social care disciplines in a shared space, encouraging the exchange of competencies and knowledge across different specialties[26]. As such, IPE is seen as a crucial strategy for bridging gaps among healthcare providers, enhancing communication, and improving patient care outcomes. Accreditation bodies and professional organizations have recognized IPE as essential for achieving safe, secure, and high-quality patient services.

Interdisciplinary team education enables nursing students to collaborate with healthcare professionals from various fields, allowing them to benefit from shared educational experiences and diverse perspectives. This approach not only fosters increased inter-professional engagement but also promotes a clearer understanding and stronger cooperation in future work environments[14]. The International Nursing Association for Clinical Simulation Learning

(INACSL) and The National League for Nursing (NLN) have demonstrated that simulation is a powerful tool in training students for inter-professional teamwork, refining clinical judgment for complex cases, and enhancing competencies. Simulation-based inter-professional education (Simulation-IPE) involves the use of healthcare simulation techniques within frameworks designed to deepen understanding of other disciplines, creating comprehensive and transformative learning experiences [34,36].

Simulation-based inter-professional education (Simulation-IPE) allows nursing students and professionals to collaborate effectively as a team in a controlled environment that closely mirrors real healthcare settings. This approach has shown significant improvements in the acquisition of knowledge, skills, attitudes, and team behaviors, all of which contribute to enhanced learning outcomes and, ultimately, better patient care[11]. The goal of simulation-enhanced IPE is to elevate the quality and safety of healthcare services, foster respect and understanding among different professions, strengthen relationships and collaboration, improve information sharing, and enhance problem-solving capabilities. Additionally, it promotes cost-effectiveness, prepares healthcare providers for future system needs, and improves communication across the healthcare team [17].

Academic and Practice Partnerships

Building partnerships with community institutions and healthcare providers can foster shared interests and expand learning and training opportunities for nursing students. While faculty may envision an ideal clinical training experience as one where students work one-on-one with instructors and patients scheduled at set times, collaborating with hospitals and care providers across diverse clinical settings could offer valuable insights for curriculum development and enhancement. This approach allows for a more dynamic and comprehensive learning experience, preparing students for a range of real-world healthcare environments.

Establishing community partnerships within a service-learning framework can provide unique opportunities for students to engage in health promotion, conduct physical and mental health assessments, and intervene with individuals who lack access to healthcare services in a specific community [25]. This collaborative approach between nursing schools and hospitals or clinical practice settings offers a solution to the complex challenges faced by educators and clinicians, enabling nursing students to effectively meet the objectives of their clinical training while contributing to the well-being of underserved populations.

Academic-practice partnerships provide the necessary leadership, mentorship, and support within a collaborative framework to implement and integrate the latest evidence-based practices while fostering stronger professional interactions among nurses. These partnerships can be an effective strategy to address workforce shortages, as they equip nurses with the skills needed to be employed directly in institutions involved in these collaborations. Given their potential benefits, such partnerships should receive backing from policymakers and professional organizations [16].

Academic partnerships offer a valuable opportunity for collaboration between academic institutions, hospitals, and healthcare organizations. By working together, they can develop innovative and supportive strategies to prepare nurses and nurse educators while also expanding nursing academic programs. Although these programs may be costly, the potential benefits are substantial. If these advantages are clearly recognized, educational institutions, hospitals, and healthcare providers may be more willing to invest in their success.

Nurse Educators and Preceptors Preparation

The roles of nurse educators and preceptors are vital in shaping the future of nursing. While both contribute to the professional development of nurses, their functions, settings, and required preparation differ significantly. Nurse educators primarily work in academic institutions, focusing on theoretical instruction and curriculum development, whereas preceptors provide hands-on clinical training in healthcare settings [10].

The journey to becoming a nurse educator begins with a strong educational foundation. Most academic institutions require nurse educators to hold at least a Master of Science in Nursing (MSN), while some

prefer a Doctor of Nursing Practice (DNP) or a Doctor of Philosophy (PhD) in nursing [32]. Additionally, certifications such as the Certified Nurse Educator (CNE) credential enhance an educator's credibility and demonstrate a commitment to excellence in teaching [38]. Beyond formal education, clinical experience remains a fundamental prerequisite, as it ensures that educators possess real-world nursing knowledge to integrate into their teaching [8].

Preparation for the nurse educator role extends beyond clinical expertise. The ability to develop curricula, design assessments, and implement evidence-based teaching strategies is essential [9]. Many educators participate in faculty development programs to refine their pedagogical skills and stay current with emerging trends in nursing education [21]. Furthermore, engagement in research and professional organizations allows educators to contribute to the advancement of nursing knowledge [2].

On the other hand, nurse preceptors play a different yet equally significant role. As clinical mentors, they guide nursing students and newly hired nurses through real-world patient care, bridging the gap between classroom learning and clinical practice [29]. Unlike nurse educators, preceptors do not necessarily require an advanced degree but must demonstrate clinical expertise, strong communication skills, and a commitment to mentorship [12].

Preceptor preparation involves specialized training programs, often offered by healthcare institutions, which focus on teaching strategies, leadership, and competency assessment [18]. Understanding adult learning principles is crucial, as preceptors must tailor their guidance to learners with varying levels of experience and knowledge [24]. In addition, fostering a supportive learning environment is a critical responsibility, as new nurses often face challenges in confidence and clinical decision-making [27].

Despite their different pathways, both nurse educators and preceptors share a commitment to fostering nursing excellence. Their preparation ensures that future nurses are equipped with the knowledge, skills, and confidence necessary to provide high-quality patient care. Ongoing professional development remains a cornerstone of both roles, as the healthcare landscape continues to evolve [20].

Summary and Conclusion

All in all, the current study enlightens the key challenges encountered in the training of nursing students. Addressing these issues more effectively can enhance clinical learning and training, ultimately improving the quality of nursing care. Several factors contribute to the problems encountered in nursing student training. One primary reason is the increasing demand for healthcare services, leading to higher enrollment in nursing programs. This surge in student numbers strains resources, such as clinical placement opportunities and faculty availability. Additionally, rapid advancements in medical technology and treatments require nursing curricula to adapt continually, which can create challenges in keeping educational programs up-to-date. Moreover, financial constraints in both educational institutions and healthcare facilities may limit investment in training resources and infrastructure.

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Original Article

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Prevalence and Occupational Determinants of Varicose Veins Among Nursing Students: A Cross-Sectional Study

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Abstract

Background: Varicose veins are dilated, twisted veins most commonly affecting the lower limbs and are often associated with prolonged standing and physical strain. Nursing students, due to the nature of their clinical training, may be vulnerable to developing varicose veins; however, limited data exist on its prevalence in this group.

Objective: This study aimed to assess the prevalence of varicose veins and identify associated occupational risk factors among nursing students.

Methodology: A descriptive cross-sectional study was conducted among 60 final-year nursing students from a nursing college in Bangalore, Karnataka, selected through purposive sampling. Data were collected using a self-structured questionnaire covering sociodemographic and occupational factors (e.g., standing duration, physical activity), along with physical examination for varicose vein symptoms. Prevalence was determined through a combination of self-report and visual inspection. Data were analysed using descriptive and inferential statistics (significance set at $p < 0.05$).

Results: Varicose veins were identified in 23 of 60 participants (38%). Among those affected, 70% were female and 30% were male. Prolonged standing (over 6 hours per day) was significantly associated with the presence of varicose veins ($p < 0.05$). In contrast, prolonged sitting and lower levels of physical activity showed weaker, non-significant associations. **Conclusion:** The study highlights a notable burden of varicose veins among nursing students and underscores the need for preventive education and ergonomic interventions during clinical training.

Introduction

Varicose veins are a chronic venous disorder characterized by enlarged, twisted, and dilated superficial veins, most commonly affecting the lower limbs.[1–6] Symptoms typically include leg pain, heaviness, swelling, muscle cramps, and, in advanced

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cases, skin discoloration and ulceration. While non-modifiable risk factors such as age, gender, and genetics contribute to their development, modifiable occupational exposures—particularly prolonged standing, physical inactivity, and inadequate ergonomics—play a significant role in disease progression.[1,2]

Healthcare professionals, especially nurses, are particularly susceptible due to the physical demands of clinical practice.[7–9] Nursing students, although in training, often engage in similar duties-standing for long hours, assisting patient mobility, and performing repetitive leg movements without adequate rest. These challenges are further intensified by limited awareness of ergonomic practices and lack of institutional support during training.

Despite global literature highlighting the occupational risk of venous disorders among healthcare workers, nursing students remain an understudied population, especially in India. A few international studies have begun to acknowledge this risk, but there is a paucity of empirical data on the prevalence and risk factors of varicose veins among nursing students in the Indian context, particularly in urban centres such as Bangalore, where academic and clinical schedules are often demanding and intensive. Most Indian studies have focused on staff nurses or other health workers, leaving a critical knowledge gap regarding vascular health in students during their formative years.[7–10]

Understanding this burden is crucial for early identification and prevention, as varicose veins can lead to chronic pain, reduced mobility, and long-term disability if left unaddressed. Moreover, occupational health interventions and ergonomic education must begin during training to foster long-term protective practices. By focusing on this underrepresented group, this study seeks to provide evidence to inform institutional policies and awareness programs that prioritize vascular health in nursing education.

This cross-sectional study thus aims to estimate the prevalence of varicose veins among nursing students in Bangalore and assess occupational risk factors such as standing duration, walking time, posture, and clinical work patterns. The findings are expected to bridge a key research gap and contribute to developing preventive strategies for a high-risk but overlooked group.

Methodology

A cross-sectional, descriptive study was conducted to assess the prevalence of varicose veins and associated occupational risk factors among final-year nursing students. The study was carried out at a nursing institution in Bangalore, Karnataka, over a period of three months from January to March 2025. A total of 60 students were enrolled using a purposive sampling technique.

Sample Size Calculation

The sample size was calculated using Cochran's formula for estimating proportions, with adjustments for finite population correction (FPC) and a design effect (DEFF) of 1 (for simple random sampling).[11]

$$n = \frac{DEFF * Np(1-p)}{d^2/Z_{1-\alpha/2}(N-1) + p(1-p)}$$

Where:

- n = required sample size
- N = total population size
- p = hypothesized prevalence (assumed to be 50% for maximum variability)
- d = desired margin of error (±5%)
- Z = Z-score for 95% confidence level (1.96)
- $DEFF$ = design effect (1)

Using the above parameters, the minimum calculated sample size was 40. However, to account for potential non-responses or incomplete data, a total of 60 participants were enrolled.

Ethical Considerations

Ethical approval for the study was obtained from the Institutional Ethics Committee, Capitol College of Nursing, Bangalore (Letter No. CCN/2022/MSN/781, dated 10/03/2022), and permission was granted by the university administration and the Director of the participating nursing institution. Written informed consent was obtained from all participants after explaining the purpose and procedures of the study. Participant privacy, confidentiality, and anonymity were maintained in accordance with the Declaration of Helsinki.

Inclusion and Exclusion Criteria

Inclusion criteria:

- Final-year nursing students
- At least one year of clinical training completed
- Ability to communicate in Kannada, Hindi, or English
- Available during the data collection period

Exclusion criteria:

- Currently receiving treatment for varicose veins
- Diagnosed with other chronic vascular diseases

Tool Development and Data Collection

Data were collected using a self-structured, interviewer-administered questionnaire and physical assessment. The tool consisted of two parts:

- **Part A:** Socio-demographic details including age, gender, religion, father's education and occupation, type of family, and monthly family income
- **Part B:** Occupational risk factors, such as average daily hours of standing, walking, and sitting during clinical shifts. Responses were captured using categorical ranges (e.g., <4 hours, 4–6 hours, >6 hours).

Participants were asked to estimate their routine clinical posture duration, and responses were recorded during face-to-face interviews by the researcher.

Diagnosis of Varicose Veins

The presence of varicose veins was assessed through both self-report and clinical examination. Participants were asked whether they had noticed any symptoms, including visible or bulging veins in the legs, aching or cramping pain, leg heaviness, swelling, or skin changes such as discoloration or ulcers.

A trained investigator performed a physical examination of the lower limbs (anterior and posterior) using visual inspection and palpation to detect signs such as vein tortuosity, dilation, or bulging.

Pilot Testing and Tool Validation

A pilot study was conducted among 10 students at Elegant School of Nursing, Bangalore, using

purposive sampling. The purpose was to evaluate the feasibility and clarity of the questionnaire and data collection process. The tool was validated by five medical experts, and their feedback confirmed content validity. No modifications were required after the pilot study.

The reliability of the tool was assessed using the Karl Pearson correlation coefficient, yielding a reliability score of r = 0.91, indicating high internal consistency. Data from the pilot study participants were excluded from the main analysis.

Health Education Intervention

After data collection, all participants received a Health Educative Pamphlet (HEP) developed by the investigators. The pamphlet included information on causes, symptoms, preventive strategies (e.g., use of compression stockings, leg elevation, calf exercises), and the importance of taking breaks during clinical shifts to reduce venous pressure.

Data Management and Analysis

Data were entered into Microsoft Excel and analysed using SPSS version 25. Descriptive statistics (frequency, percentage) were used to summarize participant characteristics and prevalence data. Inferential statistics, including chi-square tests, were used to explore associations between occupational risk factors and the presence of varicose veins. A p-value < 0.05 was considered statistically significant. Results were presented using tables and figures.

Results

A total of 60 nursing students participated in the study, enrolled between January and March 2025. The sociodemographic characteristics of the participants are summarized in Table 1. The majority (61.7%) were in the age group of 20–21 years, and more than half were female (56.6%). Most participants (80%) belonged to nuclear families, and 73.4% reported a monthly family income of less than INR 15,000.

Table 1: Sociodemographic Profile of Study Participants (N = 60)

Sociodemographic Variable	Category	Frequency (f)	Percentage (%)
Age	Below 20 years	16	26.7%
	20–21 years	37	61.7%
	21–22 years	04	6.6%
	Above 22 years	03	5.0%
Gender	Female	34	56.6%
	Male	26	43.4%
Religion	Hindu	44	73.4%
	Muslim	05	8.4%
	Christian	11	18.2%
Type of Family	Nuclear	48	80.0%
	Joint	08	13.4%
	Extended	04	6.6%
Father's Education	High School	01	1.6%
	Undergraduate	33	55.0%
	Postgraduate	26	43.4%
Father's Occupation	Private Employee	33	55.0%
	Government Employee	20	33.4%
	Self-Employed	04	6.6%
	Farmer	03	5.0%
Monthly Income	< INR 15,000	44	73.4%
	INR 15,000–30,000	16	26.6%

Out of 60 participants, 23 (38%) were identified as having varicose veins based on self-report and clinical examination. This reflects a notable prevalence of the condition among nursing students (Figure 1).

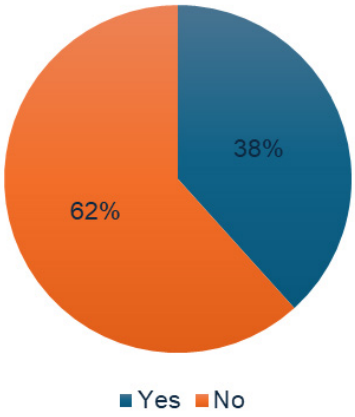

Figure 1. Prevalence of Varicose Veins Among Nursing Students

Among the 34 female participants, 16 (47.1%) were diagnosed with varicose veins, while 18 (52.9%) were not. In contrast, among the 26 male participants, only 7 (26.9%) had varicose veins, and 19 (73.1%) did not. This indicates a higher proportion of varicose veins among female students compared to their male counterparts (Figure 2).

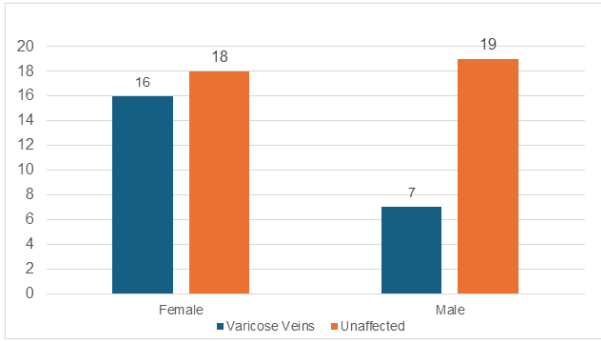

Figure 2. Gender-wise Distribution of Varicose Veins (N = 60)

Table 2 presents the association between selected occupational risk factors and the presence of varicose veins. A statistically significant association was found between prolonged standing (>6 hours/day) and the presence of varicose veins [$\chi^2(1) = 4.50$, $p = 0.03$]. No statistically significant associations were observed for sitting duration or physical activity levels.

Table 2. Association Between Occupational Risk Factors and Varicose Vein Prevalence N = 60

Risk Factor	Varicose Veins Present (n = 23)	Not Present (n = 37)	X^2 (df) p-value
Prolonged Standing	19	12	4.50(1)0.03*
Sitting Duration	06	04	0.75(1) 0.38
Physical Activity	03	02	0.56(1) 0.45

These findings underscore the role of prolonged standing as a major occupational risk factor for varicose veins in nursing students, while other factors such as sitting duration and physical activity showed weaker, non-significant associations.

Discussion

This study identified a 38% prevalence of varicose veins among final-year nursing students, which is notably high and aligns with international trends reported among healthcare professionals. For example, Bass et al. observed a 25%–45% prevalence among nurses working in clinical settings, attributing it primarily to prolonged standing.[12] Similar results were observed in several studies in which varicose vein prevalence ranging from 20% to 30% among healthcare workers who are engaged in long hours of standing.[13,14] These findings support the current study's results, indicating that nursing students—despite being in training—are equally vulnerable to developing venous disorders as their professional counterparts.

A gender-based analysis in this study revealed that 70% of those affected by varicose veins were female, a pattern consistent with previous research. A higher prevalence of varicose veins among women, attributing this to hormonal influences such as those occurring during menstruation, pregnancy, and menopause, which contribute to venous dilation.[7,15] These physiological factors, along with increased venous pressure in females, likely explain their greater susceptibility compared to males.[15]

Among the occupational factors assessed, prolonged standing (defined as standing for more than six hours per day) emerged as the most significant risk factor. Eighty percent of the participants reported such exposure, which was significantly associated with the presence of varicose veins. These results are in agreement with findings from several studies who identified extended standing duration as a primary contributor to venous insufficiency in healthcare workers.[12–15] Our findings further underscore the need for workplace and institutional interventions aimed at limiting standing time and promoting ergonomic support during clinical practice.

In contrast to some studies that have identified prolonged sitting and reduced physical activity as risk factors for venous disorders, this study found these associations to be weak and statistically non-significant. While sitting may contribute to venous stasis and pooling, the current evidence reinforces that standing—particularly without adequate movement or rest—is the more dominant occupational hazard in clinical environments such as nursing education.[10,16]

The global literature consistently indicates that nurses are at elevated risk of developing varicose veins due to the physically demanding nature of their profession. Nurses who stand for long hours have a significantly higher risk compared to other professions. Similarly, the widespread burden of venous diseases among healthcare workers, supporting our study's observation that even students at the beginning of their careers are already exposed to occupational hazards contributing to venous disorders.

A key strength of this study lies in its specific focus on nursing students—a group often overlooked in varicose vein research. While the risks faced by professional nurses have been widely documented, few studies have examined how these risks manifest during the training phase. Prior studies highlighted a lack of awareness among healthcare students about occupational hazards, particularly related to vascular health.[8,9] Our findings support this gap, revealing that many nursing students were unaware of the long-term consequences of prolonged standing and lacked knowledge about preventive practices.

This lack of awareness may be partially attributed to limited coverage of ergonomic health in nursing curricula. Early professional education often overlooks preventive strategies for occupational conditions such as varicose veins.[14,17]

Implications for Nursing Education

The findings of this study highlight the urgent need to strengthen occupational health education within nursing curricula, particularly in relation to venous disorders such as varicose veins. Given the high prevalence observed and its strong association with prolonged standing during clinical training, nursing programs must incorporate structured, evidence-based interventions to safeguard the vascular health of students.

Ergonomics training should be integrated early in nursing education as a core component of clinical preparedness. This training must go beyond theory and include practical guidance on maintaining correct posture, alternating between sitting and standing, taking structured breaks, and performing mobility exercises during clinical shifts. Studies have shown that even modest ergonomic interventions can significantly reduce the incidence of venous disorders in healthcare workers.[14]

Regular physical activity, particularly lower limb exercises such as calf raises, ankle rotations, and walking, should be actively promoted as part of clinical routines. These exercises are known to support venous return by strengthening the calf muscle pump, which plays a vital role in preventing venous pooling and pressure buildup in the lower extremities.

In addition, the use of compression stockings has been well-documented in literature as an effective strategy for managing and preventing varicose veins. Compression therapy helps maintain venous tone and reduce symptoms in individuals exposed to prolonged standing. As such, their use should be introduced during nursing training, accompanied by practical demonstrations and guidance on proper sizing and usage.[12,14]

To institutionalize these preventive strategies, nursing colleges should consider incorporating dedicated modules or simulation-based workshops on occupational health. These can include scenario-based training, visual learning tools, and supervised

ergonomic drills within clinical postings. By embedding these practices into foundational education, nursing programs can play a proactive role in reducing long-term morbidity and enhancing the well-being of future healthcare professionals.

Limitations of the Study

Although this study provides useful preliminary data on the prevalence and occupational risk factors of varicose veins among nursing students, several limitations must be acknowledged:

1. **Limited Generalizability**: The study was conducted in a single nursing institution in Bangalore with a relatively small sample size. As such, the findings may not be representative of nursing students across different regions or educational settings in India. Future research with larger, multi-centre samples would enhance external validity.
2. **Cross-Sectional Design**: The study employed a cross-sectional design, which captures associations at a single point in time. This limits the ability to infer causal relationships between occupational exposures and the development of varicose veins. Longitudinal studies are needed to observe the progression of venous disorders over time and assess long-term outcomes.
3. **Self-Reported Data and Information Bias**: Part of the data collection relied on self-reported symptoms of varicose veins, which may be subject to recall bias or underreporting. Although visual and physical examinations were conducted, participant-reported data may still introduce bias into the prevalence estimate.
4. **Unmeasured Confounders**: The study did not account for certain potential confounding variables such as body mass index (BMI), family history of varicose veins, type of footwear used, or detailed lifestyle factors (e.g., diet, hydration). These factors could influence both exposure and outcome and should be incorporated in future studies.

By addressing these limitations in subsequent research, the evidence base can be strengthened to guide more comprehensive and generalizable preventive strategies.

Recommendations

Based on the findings of this study, the following recommendations are proposed to address the risk and burden of varicose veins among nursing students and healthcare professionals:

1. Curriculum-Based Educational Interventions

- **Integrate ergonomics and vascular health education** into undergraduate nursing curricula. This should include instruction on proper posture, clinical mobility, the risks associated with prolonged standing, and the importance of regular physical activity.
- **Implement structured workshops or simulation-based sessions** focused on preventive strategies, such as leg exercises, use of compression stockings, and appropriate sitting-standing routines during clinical rotations.
- **Disseminate educational materials**, including pamphlets, posters, and video demonstrations, to enhance awareness and practical understanding of venous health.

2. Institutional Preventive Practices

- **Mandate the use of compression stockings** during prolonged standing shifts, particularly in clinical training environments.
- **Encourage active break policies** during shifts, where students alternate between standing and sitting and perform calf muscle or ankle exercises to promote venous return.
- **Establish ergonomic guidelines** in hospital-based learning environments, including access to supportive footwear, standing desk options, and rest area planning.

3. Research and Policy Development

- **Conduct longitudinal, multi-centre studies** to assess the long-term effects of occupational exposures (e.g., shift length, standing duration) on venous health among nursing students and early-career healthcare workers.
- **Evaluate the effectiveness of targeted preventive interventions**, such as compression therapy and ergonomic adjustments, through randomized or quasi-experimental studies to establish evidence-based protocols.
- **Advocate for national guidelines** on occupational health in nursing education, focusing on the prevention of chronic venous disorders.

These recommendations are intended to guide nursing educators, institutional leaders, and healthcare policymakers in fostering safer, more health-conscious training environments for nursing students and future healthcare providers.

Conclusion

This study highlights a notable prevalence (38%) of varicose veins among final-year nursing students, with a higher burden observed among female participants. Prolonged standing during clinical training was identified as the most significant occupational risk factor, reinforcing global evidence that healthcare workers and trainees are particularly susceptible to venous disorders due to the physical demands of their roles.

These findings underscore the need for early preventive strategies in nursing education. Integrating ergonomics, vascular health awareness, and structured physical activity into the nursing curriculum may help reduce long-term vascular risks among students. Institutional measures—such as encouraging the use of compression stockings and promoting active rest breaks—should also be considered.

To ensure lasting impact, nursing programs must adopt a proactive approach by embedding occupational health training into foundational education and advocating for regular health assessments. Preparing students to recognize and manage work-related health risks not only enhances their well-being but also supports the development of a more resilient healthcare workforce..

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Original Article

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Factors Related to Non-Nursing Tasks Among Staff Nurses in Provincial Hospitals in Aceh

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Abstract

Background: Non-nursing tasks, frequently performed by nurses despite not requiring professional training, are common in healthcare facilities worldwide. These additional responsibilities increase workload, negatively affecting care quality, healthcare worker well-being, patient safety, satisfaction, and overall efficiency.

Objective: This study aimed to examine factors related to non-nursing tasks among staff nurses.

Material and Method: A cross-sectional study was conducted in three hospitals in Aceh Province from December 2024 to February 2025. A total of 244 nurses were selected using proportional sampling to ensure accurate representation of the nursing population in each hospital. The sample selection used accidental sampling, choosing odd-numbered nurses from the shift schedule, provided they met the inclusion criteria.

Results: The study found that 73% of nurses had performed non-nursing tasks, with the highest prevalence occurring during the night shift. The most frequently performed task was administrative duties (67.6%). Factors associated with non-nursing tasks included compensating the lack of resources, being pressed by the organizational culture, dealing unexpected clinical events, and protecting patients ($p = 0.001$), with compensating the lack of resources being the most dominant factor (OR = 4.2, 95% CI: 1.99–8.85, $p = 0.001$).

Conclusion: Compensating the lack of resources is the primary factor driving nurses to perform non-nursing tasks as an adaptation to workforce limitations, organizational culture, and unexpected clinical situations, ultimately impacting patient care quality and nurse well-being.

Keywords: Non-nursing tasks, nursing duties, nursing resources, staff nurses.

Introduction

Non-nursing tasks refer to activities that do not require professional nursing training but are frequently performed by nurses worldwide. Examples include answering phone calls unrelated to patient care, handling administrative documents,

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and assisting other staff with duties outside nursing responsibilities.[1,2,3] This phenomenon has been widely observed and affects both nursing care quality and patient outcomes. For example, a study conducted in Egypt reported an average score of 2.26 out of 5 regarding nursing tasks left incomplete due to non-nursing duties.[3] Additionally, research in Jordan found that 48% of nursing students witnessed nurses performing non-nursing tasks during clinical training, leading to disappointment and frustration toward the nursing profession.[2]

The negative impact of non-nursing tasks is evident for nurses, patients, and healthcare facilities. For nurses, these tasks increase workload, reduce patient interaction time, and contribute to stress and burnout.[2,4] Meanwhile, patients may experience reduced quality of care, increased risk of medical errors, and dissatisfaction with healthcare services.[3,5] Healthcare facilities may also face higher operational costs, reputational damage, and challenges in maintaining quality indicators and accreditation standards.[2,4]

Although previous studies have examined the prevalence and adverse impacts of non-nursing tasks in healthcare settings research specifically investigating the determinants of these tasks among nurses in Indonesia particularly within hospital settings in Aceh Province remains limited. Nurses often perform non-nursing tasks due to various factors, including staffing shortages in clinical units, institutional cultural pressures requiring nurses to be flexible in taking on responsibilities beyond their primary roles, increased workload due to unexpected clinical situations, and nurses' willingness to meet patient needs.[6]

This study aims to confirm the factors associated with non-nursing tasks performed by nurses at Hospital in Aceh Province. Identifying the factors contributing to non-nursing tasks is crucial for healthcare policy and hospital management, as it facilitates the development of strategies to optimize nursing workflows and improve the quality of patient care.

Materials and Methods

Research design and setting:

The research design was a cross-sectional study conducted at three hospitals in Aceh Province from December 2024 to February 2025. These hospitals consist of general hospitals providing comprehensive medical services and regional referral hospitals receiving patient referrals. Accreditation ensures that each hospital meets quality standards in healthcare services, which may influence nurses' work patterns in this study.

Population and sample:

The sample size was determined using Isaac & Michael's table[7], considering a total population of 639 nurses, a confidence level of 95%, and a 5% margin of error ($\alpha = 0.05$). Based on these parameters, the required sample size was 227 respondents. To anticipate possible refusals or absences during data collection, an additional 10% of 227 respondents was added, resulting in a final sample size of 250 nurses. The sample distribution for each hospital was determined using a proportional sampling method to ensure accurate representation of nurses across the three selected hospitals. Proportional sampling ensures an accurate representation of nurses across hospitals, while accidental sampling facilitates sample selection based on shift schedules without disrupting hospital operations, with the selection of odd-numbered shifts applied to minimize bias and ensure a more equitable distribution of participants. The inclusion criteria for this study consisted of team leaders and staff nurses, as well as nurses who had been employed for at least one year at one of the selected hospitals. Meanwhile, the exclusion criteria encompassed nurses working in administrative departments, those holding positions as ward head or deputy head of wards, and nurses who were absent or on leave during the data collection period.

Procedure of study:

The data collection process began with obtaining ethical approval from the Ethics Committee of the Faculty of Nursing, Syiah Kuala University, Banda Aceh. Subsequently, the researcher submitted a research permit request to the directors of three hospitals in Aceh Province. After receiving approval from the hospital directors, the researcher sought permission from ward supervisors to conduct the study and distribute the questionnaires.

Nurses were selected as respondents based on their work schedule lists, with those assigned odd-numbered shifts being chosen if they met the inclusion criteria. Respondents were provided with an informed consent form, which was included in the questionnaire along with an explanation of the study's objectives. Upon granting their consent, respondents proceeded to complete the questionnaire and submitted it to the ward supervisor upon completion. The researcher expressed gratitude to all ward supervisors and nurses for their participation.

Once the data collection phase was completed, the researcher conducted a thorough review of all completed questionnaires to ensure accuracy and completeness. This process included verifying the informed consent forms and confirming that all questionnaire items had been fully answered. If the data met the research guidelines, the next step was data processing and statistical analysis.

Results

The characteristics of the study respondents indicate that the majority were female (68%), with an average age of 34.14 ± 7.34 years. Most had a Nursing (Ners) degree (57%) and worked in Type B hospitals (85.7%), primarily in inpatient wards (50.8%). The most dominant job position was inpatient care team member (68%), with the most common work schedule involving morning, afternoon, and night shifts (60.2%). Regarding work experience, the average length of employment was 10.02 ± 8.52 years, with overtime hours in the past three months averaging 6.46 ± 11.89 hours. Nursing resource availability was rated at 75% available (48.8%), while only 24.2% of respondents reported full availability at all times.

In addition to their primary nursing duties, most respondents reported frequently performing non-nursing tasks, particularly during night shifts (41.8%). The most common types of non-nursing tasks involved administrative activities (67.6%) and medical support duties (67.2%). (Table 1)

Table 1: Frequency Distribution of Respondent Characteristics (n=244)

Respondents Characteristics	f	%	± SD
Age (Years)	-	-	34.14 ± 7.34
Gender			
Male	78	32	-
Female	166	68	-
Education			
Diploma in Nursing	97	39.8	-
Registered Nurse	139	57	-
Masters in Nursing	8	3.3	-
Hospital Type			
Type B	209	85.7	-
Type C	35	14.3	-
Workspace			
Inpatient	124	50.8	-
Outpatient	45	18.4	-
Intensive Care	54	22.1	-
Emergency Room	21	8.6	-
Position			
Inpatient Team Leader	26	10.7	-
Inpatient Team Member	166	68	-
Emergency Room/Outpatient Nurse	52	21.3	-

Last 1 Month Work Schedule			
Rotating Shift (morning, afternoon, evening)	147	60.2	-
Shift work (morning and night)	45	18.4	-
Work only morning or evening	7	2.9	-
Work from morning till evening	45	18.4	-
Availability of Nursing Resources			
100% available (always sufficient)	59	24.2	-
75% available (often adequate)	119	48.8	-
50% available (sometimes adequate)	41	16.8	-
25% available (rarely adequate)	25	10.2	-
Shift that most often Non-Nursing Tasks Occur			
In the Morning	62	25.4	-
In the Afternoon	14	5.7	-
At Night	102	41.8	-
Never	66	27,1	-
Types of Non-Nursing Tasks*			
Auxiliary Tasks	122	50	-
Administrative Tasks	165	67.6	-
Allied Care Professionals Tasks	120	49.2	-
Medical Tasks	164	67.2	-
Length of Service (Years)	-	-	10.02 ± 8.52
Overtime in the last 3 months (Hours)	-	-	6.46 ± 11.89

*Each respondent could select more than one type of non-nursing task

The findings indicate that all factors contributing to the execution of non-nursing tasks by nurses at the Regional General Hospital of Aceh Province include compensating for resource shortages, organizational culture, unexpected clinical situations, and meeting patient needs (p-value = 0.001). (Table 2)

Table 2: Non-Nursing Task Factors (n=244)

Non-Nursing Task Factors	**Non-Nursing Task**				**f**	**%**	**p-value**
	Ever		**Never**				
	f	**%**	**f**	**%**			
Compensating the lack of resources							
Compensating the lack of resources	136	87.2	20	12.8	156	100	0.001
Not compensating the lack of resources	42	47.7	46	52.3	88	100	
Being pressed by the organizational culture							
Being pressed by the organizational culture	153	88.4	20	11.6	173	100	0.001
Not being pressed by the organizational culture	25	35.2	46	64.8	71	100	
Dealing unexpected clinical events							
Dealing unexpected clinical events	149	88.2	20	11.8	169	100	0.001
Dealing unexpected clinical events	29	38.7	46	61.3	75	100	
Protecting patients							
Protecting patients	144	84.2	27	15.8	171	100	0.001
Not protecting patients	34	46.6	39	53.4	73	100	

Compensating for the lack of resources is the most influential factor associated with non-nursing tasks, with a p-value of 0.001 and an odds ratio (OR) of 4.20 (95% CI: 1.99–8.85).These results indicate that compensating the lack of resource increase the likelihood of nurses performing non-nursing tasks by 4.20 times in government hospitals in Aceh. (Table 3)

Table 3: Multivariate Analysis

Variables	p-value	OR/Exp (B)	95% CI
Compensating the lack of resources	0.001	4.20	1.99 – 8.85
Being pressed by the organizational culture	0.030	2.93	1.11 – 7.76
Dealing unexpected clinical events	0.004	4.07	1.56 – 10.61
Protecting patients	0.007	2.84	1.32 – 6.11

Discussion

The prevalence of non-nursing tasks among nurses reached 73% in the past three months, which is lower than the 94.5% reported in other studies.[6] This difference may be attributed to a more balanced task redistribution due to an increase in support staff or a reduced frequency of nurses performing non-nursing tasks. These tasks were most frequently performed during night shifts (41.8%), differing from other studies that reported a higher prevalence during morning shifts (54.5%).[6]The limited availability of support and administrative staff during night shifts at provincial hospitals in Aceh requires nurses to take on additional tasks, including logistics, documentation, medication retrieval, and communication with patients' families, particularly in critical situations requiring intensive monitoring.

Administrative tasks were the most common non-nursing responsibilities, consistent with findings showing a 72.4% prevalence.[6] However, retrieving supplies and equipment is also a frequently performed task due to inadequate hospital support services.[8]Additionally, demographic factors influenced engagement in non-nursing tasks. Female nurses (74.1%) were more likely to perform non-nursing duties than male nurses (70.5%), possibly due to multitasking abilities.[9] Nurses with a Diploma in Nursing had the highest engagement rate (80.4%) compared to those with a Ners degree (68.3%) and Master's in Nursing (62.5%), suggesting that higher education enhances awareness of professional role boundaries.[10] Furthermore, nurses in Type C hospitals reported a higher prevalence of non-nursing tasks (80%) compared to those in Type B hospitals (71.8%), possibly due to resource limitations, which require nurses to take on additional responsibilities.[11,12]

Staffing shortages force nurses to handle administrative tasks and extra responsibilities, negatively impacting healthcare service quality and job satisfaction, as described by the Job Characteristics Model.[1,13,14] Additionally, increased workload and stress resulting from non-nursing responsibilities influence nursing students' perceptions of the profession, potentially affecting future nurse recruitment.[2,15] Frequent involvement in non-nursing tasks also diminishes nurses' understanding of their core responsibilities, reducing motivation.[16,17] Ineffective workforce allocation, particularly during night shifts, exacerbates this issue.[18]

Being pressed by the organizational culture plays a crucial role in the prevalence of non-nursing tasks, as observed at the Regional General Hospital of Aceh Province (p-value = 0.001), where overlapping responsibilities between nurses and other healthcare staff contribute to deviations from primary nursing duties. In some cases, nurses are expected to take on additional tasks to meet managerial expectations. However, other studies did not find a notable correlation between organizational culture and non-nursing tasks (p-value = 0.500), indicating variability across institutions.[6] The imbalance in workforce allocation, especially with administrative staff primarily active only during night shifts, forces nurses to perform non-nursing tasks to maintain

hospital operations, increasing workload and stress, consistent with the Job Characteristics Model. This situation reflects how institutions compensate for resource shortages through inefficient workload distribution, which affects nurses' job satisfaction and effectiveness.[21]

Dealing with unexpected clinical events plays a crucial role in nurses performing non-nursing tasks at the Regional General Hospital of Aceh Province (p-value = 0.001).Nurses frequently take on these tasks in response to emergencies, urgent patient needs, and operational demands.[6,21] Data indicate that 73% of nurses have been involved in non-nursing tasks, primarily administrative tasks (67.6%) and medical tasks (67.2%), with the highest frequency occurring during night shifts (41.8%), likely due to high patient influx and limited staff in emergency units.

Protecting patients is another key factor influencing non-nursing task engagement (p-value = 0.001), as nurses often assume additional responsibilities to ensure a safe environment and assist with administrative processes. There is a strong correlation between non-nursing tasks and patient safety, with nurses frequently managing logistics and isolation unit arrangements to protect patient well-being.[15,22] A total of 73% of nurses reported performing non-nursing tasks, primarily administrative duties (67.6%) and medical-related activities (67.2%), which often become necessary during urgent clinical situations.[6] Additionally, nurses take on logistics and administrative roles to support patient safety, demonstrating the need for flexibility in nursing workflows.[15] In unpredictable conditions, nurses must quickly adapt and take on additional roles beyond their primary duties to maintain service quality.[22]

Among all influencing factors, compensating the lack of resources are the most dominant determinant of non-nursing task execution at the Regional General Hospital of Aceh Province (OR = 4.20, 95% CI = 1.99–8.85, p-value = 0.001). Limited resources compel nurses to take on extra responsibilities, increasing workload and affecting patient care quality and hospital efficiency.[24,25] The phenomenon of "rationing of nursing care" occurs when resource constraints prevent nurses from prioritizing core nursing duties, forcing them to perform non-nursing tasks to sustain continuity of care.[24,26] Many nurses rely on personal resources, such as time and energy, to compensate for system inefficiencies, emphasizing the need for strategic human resource management to reduce workload and enhance nurse well-being.[25,27] Effective workforce allocation, appropriate staffing, and managerial support can improve operational efficiency and integration in the workplace, ensuring optimal healthcare service delivery.

The findings of this study highlight the need for structured healthcare policies, hospital management, and workforce optimization to reduce the burden of non-nursing tasks on nurses, enhance healthcare service efficiency, and ensure that nurses remain focused on patient care to improve safety and service quality.

Conclusion

Non-nursing tasks are influenced by several factors, including compensating the lack of resources, being pressed by the organizational culture, dealing unexpected clinical events, and meeting protecting patients. The generalizability of the findings may be affected by variations in hospital types; however, a comprehensive overview of nurses' experiences across different healthcare systems has been provided through the employment of proportional sampling to ensure balanced representation and trends that accurately reflect real-world conditions. Staff shortages have been identified as the primary issue, increasing the likelihood of responsibilities beyond nursing roles being assumed by nurses by 4.20 times. To mitigate this challenge, enhanced support in the provision of facilities and resources must be ensured by hospital management, along with clear task distribution among healthcare personnel. Workforce allocation strategies should be structured to optimize nursing efficiency and minimize role overlap, enabling nurses to focus on their core duties without unnecessary burden.

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Original Article

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Factors Influencing the Body Mass Index (BMI) of Elementary School Children in Yangon, Myanmar: A Cross-Sectional Study

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Abstract

Background: Obesity is one of the leading causes of death worldwide. It often begins in childhood although most health effects emerge in adulthood. Child underweight is also a significant issue, especially in low-income and lower-middle-income countries. This study evaluated the factors that are influencing the Body Mass Index (BMI) in children.

Methods: The study was a cross-sectional design including 110 mothers of Grade 1 and 2 elementary school students. Simple randomized sampling method was used to select the participants.

Results: The average age of mothers in this study was 35.4(±5.3) years old and the average age of the children was 5.5(±0.5) years old. Only 8.2% of mothers who had family meals every day and it was also same result with lunch box preparation. A total of 29 mothers (26.4%) demonstrated a high level of knowledge, while 30 mothers (27.3%) exhibited a high level of attitude.26.4% of children did not consume fruits while there were 12.7% who did not eat vegetable. 6.5% of children were always having sugared drinks. For water intake, 80% of them were drinking 1 litre of water daily. BMI-for-age (5-19 years old) by WHO was used to assess the average BMI of children which was 16.4±1.73. In ordinal logistic regression analysis, lunch box preparation, knowledge of mothers and vegetable consumption of children were in association with BMI of children.

Conclusion: The study highlighted the influence of maternal characteristics and also child factors which can influence the BMI of children. Knowledge, lunch box preparation characteristics of mother and vegetable consumption of child were associated with BMI.

Keywords: obesity, underweight, mother, children, BMI

Introduction

Obesity and overweight are currently the sixth most risk factors for death globally(1). The underlying causes of the problem typically start in childhood even though the majority of obesity's health effect appear during adulthood(2). Apart from the swift rise in prevalence, obesity and overweight have

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extremely detrimental health even in childhood. In fact, it is linked to type 2 diabetes mellitus, fatty liver, asthma and orthopaedics issues in children[3]. Obesity is on the rise among children and adolescents in developing nations that are rapidly changing their diets and lifestyles according to recent data. Because of the significant socioeconomic gaps, undernutrition frequently coexists with obesity[4].Underweight in children is also a serious problem, particularly in low and lower middle-income nations[5].

Consumption of high amounts of water is commonly linked to weight loss according to previous science evidence[7]. Additionally, the use of sugar-sweetened beverages has grown in tandem with the prevalence of obesity and overweight[8]. Sugared drinks are the main source of added sugar in children's diets, accounting for 10% to 15% of their total caloric intake[9].

42 million children under the age of five were obese in 2010, with over 80% of them coming from developing countries[10]. As each nation's socioeconomic status rises, so does the proportion of overweight children. There was a previous study that focused on overweight middle school children in Yangon, Myanmar and the study included middle school students (10-14 years old). 20.1% of children were overweight or obese, with 30.8% of boys and 9.2% of girls having this condition[3].

There was limited information about the magnitude of BMI among elementary school children in Yangon, Myanmar. The study was aimed to assess the factors that are affecting the Body Mass Index (BMI) of elementary school children. The study also observed not only the prevalence of overweight children but also the underweight.

Methods

Study area and population

The study was a cross-sectional design that assessed the factors influencing the Body Mass Index (BMI) of elementary school children. The prevalence of overweight and underweight of the children were also measured. The study was conducted in a private school of Yangon, Myanmar. The research team contacted the authorities of the school and requested to conduct a study. The research team explained to the authorities about the objective, results and benefits of the study.

All of the assessments were conducted to mothers. Inclusion criteria were (1) mothers of students who are studying in Grade 1 and 2, (2) mothers who are responsible for arranging and cooking meals, and (3) mothers who are willing to participate. Exclusion criteria were (1) mothers who do not live with their children and (2) mothers who are working at the weekends. Simple random sampling method was used to select the participants.

Sample size

A total of 110 participants were selected in this study, which examined the association between multiple predictors and body mass index (BMI) using ordinary logistic regression. A post hoc power analysis was conducted using G*Power (version 3.1), assuming 16 predictors, an outcome prevalence of 30%, a significance level of 0.05, and a moderate effect size (odds ratio = 2.0). The estimated statistical power was approximately 35–45%, indicating limited power to detect small or moderate effects but sufficient power for detecting large associations (odds ratios ≥2.5).The study selected 55 participants from Grade 1 and another 55 from Grade 2 classes.

Measurement tools

Maternal factors include socio-demographic characteristics (Age, education level, ethnic group, income), Environmental factors (family meal, lunch box preparation), knowledge and attitude of mother. Mothers were asked 20 questions about knowledge questions for nutrition in children. Knowledge score was graded low (<12), middle (12-15) and high (16-20). Attitude were assessed with 20 questions in this study. The score was classified into low (20-50), middle (50-80), high (above 80).

Children's Physical Activity Questionnaire (C-PAQ)[13] was used to assess the physical activity of students. C-PAQ questionnaire asked mothers to report on their children's status of physical activity during leisure time and school time over the last 7 days.

For Fruit and vegetable (FV) consumption of children, mothers were asked "how many servings of fruit and vegetable their children eat in a day". For

water intake, mothers were asked with a question "How many litres of water does your child drink in a day?". The question "How often does your child consume sugary drinks?" was designed to assess the intake of sugary beverages among children. Mothers can respond with options: Never, Rarely, Sometimes, Frequently, or Always for this question. BMI-for-age (5-19 years old) by WHO[14]was used to assess BMI in children in this study. There were different standard z-scores for boys and girls.

Data Collection

The research period was from 1st June 2024 to 30th June 2024. The goal and process of the research were explained to the participants before the study. Face-to-face interviews were conducted, and each interview took around 30 minutes. The research team included ten nutritionists who are experts in BMI and nutrition.

Validity and Reliability

Three experts assessed each questionnaire, and the Index of Item-Objective Congruence (IOC)[15] was calculated. To determine the study's reliability, pretest-retest reliability method[16] was used.

Statistical analysis

The study used Statistical Package for the Social Sciences (SPSS) Version 24 to analyze the data. Ordinal logistic regression was used for investigating the association between (1) characteristics of mothers and BMI of children, and (2) characteristics of children and BMI of children.

Ethical Considerations

The Research Ethics Review Committee for Research Involving Human Subjects at Chulalongkorn University granted ethical approval for the study (COA No. 119/67).Written consents were obtained from all participants.

Results

Socio-demographic characteristics of Mothers

The mean age of mothers was 35 years, with most (60.9%) aged 30–39. Over half (52.7%) held a bachelor's degree or higher, and the majority (57.3%) reported a middle income. Burmese ethnicity was most common (45.5%), followed by other groups (Table 1).

Environmental factors, Knowledge and Attitude of Mothers

Table 2 showed that only 8.2% of mothers had daily family meals, while 21.8% never did. Similarly, 30.9% never prepared lunch boxes for their children. The average knowledge score was 13.73, with over 70% showing moderate to high knowledge. The average attitude score was 70.42, with over 90% scoring moderate to high.

Table 1. Socio-demographic characteristics of Mothers

Characteristic (N=110)	Number (n)	Percentage (%)
Age		
Under 30	13	11.8
30-39	67	60.9
40 and above	30	27.3
Mean (±SD) =35.40 (±5.30) Min = 25 Max = 50		
Education		
Middle school and lower	13	11.8
High school	39	35.5
Bachelor's degree and higher	58	52.7
Income		
Low	20	18.2
Middle	63	57.3
High	27	24.5
Ethnic		
Burmese	50	45.5
Kayin	17	15.5
Others	43	39.1

Table 2. Environmental factors, Knowledge and Attitude of Mothers

Characteristic (N=110)	Number (n)	Percentage (%)
Family meal(per week)		
Never	24	21.8
1-2 days	32	29.1
3-4 days	29	26.4
5-6 days	16	14.5

Continue....

Always	9	8.2
Lunch box preparation		
Never	34	30.9
1 day	24	21.8
2 days	29	26.4
3-4 days	14	12.7
5 days and more	9	8.2
Knowledge		
Low	29	26.4
Middle	52	47.3
High	29	26.4
Attitude		
Low	10	9.1
Middle	70	63.6
High	30	27.3

Socio-demographic characteristics of Children

The study included 110 children, evenly distributed by age, with 50.0% aged 5 years and 50.0% aged 6 years as shown in Table 3. Similarly, an equal proportion of children were enrolled in Grade 1 and Grade 2. In terms of sex, 59.1% of the children were male and 40.9% were female.

Table 3. Socio-demographic characteristics of Children

Characteristic (N=110)	Number (n)	Percentage (%)
Age		
5 years old	55	50.0
6 years old	55	50.0
Mean (±SD) =5.50 (±0.502) Min = 5 Max = 6		
Sex		
Male	65	59.1
Female	45	40.9
Class		
Grade 1	55	50.0
Grade 2	55	50.0

Lifestyle factors and BMI of Children

Over half (52.7%) of children had insufficient physical activity, and only 20.0% met the fruit intake recommendation. Vegetable intake was low, with just 9.1% consuming three servings daily. Most (80.0%) drank one litre of water per day. Frequent sugared drink consumption was reported by 20%. The mean BMI was 16.43, with 48.2% overweight/obese and 11.8% underweight (Table 4).

Table 4. Lifestyle factors and BMI of Children

Characteristic (N=110)	Number (n)	Percentage (%)
Physical activity		
Less than 60 mins	58	52.7
60 mins	34	30.9
More than 60 mins	18	16.4
Fruit consumption		
0 serving	29	26.4
1 serving	59	53.6
2 servings	22	20.0
Vegetable consumption		
0 serving	14	12.7
1 serving	54	49.1
2 servings	32	29.1
3 servings	10	9.1
Water intake		
0.5 litre	13	11.8
1 litre	88	80.0
2 litres	9	8.2
Sugar drinks consumption		
Never	16	14.5
Rarely	38	34.5
Sometimes	34	30.9
Frequently	15	13.6
Always	7	6.5
BMI		
Thinness	13	11.8
Normal	44	40.0
Overweight	39	35.5
Obesity	14	12.7
Mean (±SD) =16.43 (±1.72) Min = 13.1 Max = 19.5		

Ordinal Logistic Regression analysis between Characteristics of mothers and BMI of children

Ordinal logistic regression showed that irregular lunch box preparation ($p = 0.013$) and infrequent family meals ($p = 0.041$) were significantly associated with higher child BMI. Lower maternal knowledge was also linked to elevated BMI ($p < 0.05$).

Table 5. Ordinal Logistic Regression analysis between Characteristics of mothers and BMI of children

Variable	Coefficient	SE	OR	p-value	95% Confidence Interval	
					Lower	Upper
Age						
Under 30	-0.286	0.695	0.751	0.681	-1.647	1.076
30-39	-0.640	0.459	0.527	1.945	-1.540	0.259
40 and above	0[a]		1			
Education						
Middle school and lower	0.114	0.681	0.864	0.867	-1.221	1.450
High school	-0.101	0.498	0.837	0.840	-1.076	0.875
Bachelor's degree and higher	0[a]		1			
Income						
Low	0.329	0.626	0.616	0.599	-0.897	1.555
Middle	0.444	0.504	0.388	0.776	-0.543	1.431
High	0[a]					
Ethnic						
Burmese	0.057	0.435	0.897	0.896	-0.796	0.910
Kayin	0.710	0.504	0.217	0.221	-0.421	1.822
Others	0[a]		1			
Family meal						
Never	0.968	0.804	0.225	0.228	-0.607	2.543
1-2 days	1.620	0.791	0.040	0.041*	0.069	3.170
3-4 days	0.442	0.792	0.575	0.577	-1.110	1.994
5-6 days	0.502	0.870	0.567	0.564	-1.203	2.206
Always	0[a]		1			
Lunch box preparation						
Never	2.019	0.813	0.018	0.013*	0.425	3.612
1 day	2.170	0.833	0.010	0.009*	0.538	3.803
2 days	2.037	0.838	0.016	0.015*	0.395	3.679
3-4 days	1.949	0.928	0.035	0.036*	0.129	3.769
5 days and more	0[a]		1			
Knowledge						
Low	-0.549	0.626	0.368	0.031*	-1.776	0.679
Middle	-0.597	0.494	0.223	0.027*	-1.564	0.371
High	0[a]		1			
Attitude						
Low	1.321	0.814	0.102	0.381	-0.274	2.916
Middle	0.757	0.462	0.106	0.101	-0.148	1.661
High	0[a]		1			

*p-value < 0.05

Ordinal Logistic Regression analysis between Characteristics and BMI of children

Table 6 showed that low vegetable intake was a significant predictor of higher BMI (OR = 7.107, p = 0.018). Fruit intake (p = 0.065) and low water intake (p = 0.060) showed marginal associations with higher BMI. Physical activity and sugared drink intake were not significant.

Table 6. Ordinal Logistic Regression analysis between Characteristics and BMI of children

Variable	Coefficient	SE	OR	p-value	95% Confidence Interval	
					Lower	Upper
Age						
5 years old	-0.286	0.695	0.953	0.906	-1.647	1.076
6 years old	0[a]		1			
Sex						
Male	-0.173	0.435	0.841	0.691	-1.026	0.680
Female	0[a]		1			
Physical activity						
Less than 60 min	-0.348	0.524	0.706	0.507	-1.374	0.679
60 mins	0.679	0.583	1.971	0.244	-0.464	1.821
More than 60	0[a]		1			
Fruit consumption						
0 serving	1.112	0.603	3.039	0.065	-0.069	2.293
1 serving	0.842	0.502	2.320	0.094	-0.143	1.826
2 servings	0[a]		1			
Vegetable consumption						
0 serving	1.961	0.827	7.107	0.018*	0.341	3.581
1 serving	0.399	0.703	1.491	0.051*	-0.979	1.778
2 servings	-0.072	0.729	0.930	0.021*	-1.500	1.356
3 servings	0[a]		1			
Water intake						
0.5 litre	1.903	0.972	6.708	0.060	-0.002	3.808
1 litre	1.338	0.787	3.810	0.089	-0.206	2.881
2 litre	0[a]		1			
Sugared drinks intake						
Never	-1.134	0.934	0.322	0.224	-2.965	0.696
Rarely	-0.439	0.844	0.645	0.603	-2.904	1.216
Sometimes	-0.763	0.850	0.466	0.369	-2.428	0.903
Frequently	-0.922	0.957	0.328	0.335	-2.797	0.953
Always	0[a]		1			

*p-value < 0.05

Discussion

The characteristics of the mothers in this study revealed a relatively homogenous yet moderately diverse information in terms of age, education, income, and ethnicity. The majority of mothers were in their thirties (60.9%), with an average age of 35years old. It was lower than the study in Taiwan in which the average age of mothers was 37 years old[17]. It was also lower than the study from Turkey which stated that the average age of mothers in the study was 37.8 years old[18].

Over half of the mothers had at least a bachelor's degree (52.7%), indicating a relatively well-educated group. This result was higher than the study that was conducted in China[20]. It was also higher than a study which focused on relationship between children BMI, parents' BMI and education level[21]. In terms of economic status, most participants reported middle income (57.3%), with fewer identifying as either high (24.5%) or low income (18.2%). It was similar to a study on six countries in which there were 62.0% of mothers with middle income level[22].

Ethnically, the study was moderately diverse, with 45.5% identifying as Burmese, 15.5% as Kayin, and 39.1% as other ethnicities. While Burmese race groups predominated, the inclusion of multiple ethnic groups supports a broader cultural applicability of the findings.

The study highlighted suboptimal maternal practices related to family meals and lunch box preparation. Only 8.2% of mothers reported having family meals every day, while 21.8% never had them at all, suggesting there were limited opportunities for organized and communal eating routines with their children. Similarly, lunch box preparation was infrequent, with 30.9% of mothers never preparing lunch for their children and only 8.2% doing so regularly (five or more days per week).

Maternal knowledge and attitudes toward child nutrition were generally moderate. The mean knowledge score was 13.73, with 26.4% of mothers classified as having low knowledge (<12), while 47.3% demonstrated moderate levels. Attitude scores averaged 70.42 with the majority (63.6%) falling in the moderate range and 9.1% scoring low. Although overall attitudes were positive, the presence of a sizable group with limited knowledge underscores the need for health education interventions.

There were110 children, evenly split by age, with 50.0% aged 5 years and 50.0% aged 6 years. Grade distribution was also balanced, with equal representation in Grade 1 and Grade 2. In terms of sex, 59.1% were male and 40.9% were female, indicating a slight predominance of boys in the study.

More than half (52.7%) of the children did not engage in the 60 minutes of physical activity each day[23], while only 16.4% exceeded this level. Fruit and vegetable consumption was also below dietary guidelines[24], with 26.4% reporting no fruit intake and 12.7% reporting no vegetable intake; only 20.0% and 9.1%, respectively, met the recommended servings. Most children (80.0%) consumed one litre of water daily. Sugared drink intake was notable, with 20.1% consuming them frequently or always. Nearly half (48.2%) of the children were overweight or obese, while 11.8% were classified as thin, indicating a dual burden of malnutrition. The results of overweight and obese in this study were higher than the studies in China[11] and Thailand[12]. It was also higher than the previous study from Myanmar which had overweight prevalence 20.1%[3].

In ordinal logistic regression analysis, lunch box preparation, knowledge of mother and vegetable consumption of children had significant association with BMI of children. This result was similar to a study from Germany which stated that there was significant relationship between parent's knowledge and child wellbeing[25]. It was also consistent with results of study from Netherlands which concluded that there was association between vegetable intake and BMI[26]. However, it was different from the study in North Dakota in which there was no relationship between vegetable consumption and BMI of children[27].

Conclusion

In conclusion, this study found that maternal practices, particularly lunch box preparation and nutrition knowledge, were significantly associated with children's BMI. Nearly half of the children were overweight or obese, with inadequate fruit and vegetable intake being key contributing factors. These findings highlighted the need for targeted public health interventions focusing on maternal education, healthy meal preparation, and regular family meals. Although limited by self-reported data and sample size, the study contributes valuable insights into maternal influence on child nutrition and supports early intervention strategies to address childhood obesity.

Ethical Clearances: The study received ethical approval from Chulalongkorn University's Research Ethics

Review Committee for Research Involving Human Subjects (COA No. 119/67).

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Original Article

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Determinants of the Utilization of Non-Communicable Disease Health Services

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Abstract

Objective: This study aims to identify the determinants of health services utilization for non-communicable diseases (NCDs). Identifying key factors that influence the level of NCD health service utilization is essential to support the effective implementation of programs, to improve the performance of primary health care services, and to enhance the quality of life through early detection and control of NCD risk factors.

Material and Methods: The study employed a quantitative approach with a cross-sectional design. A total of 180 respondents were selected using a simple random sampling method. The inclusion criteria were individuals aged over 18 years who had accessed non-communicable disease (NCD) health services at primary health centers, were in a compos mentis state, and were willing to participate. Data were collected using a structured questionnaire comprising demographic variables, knowledge, and illness perception, measured using the Brief Illness Perception Questionnaire (B-IPQ).

Results: The Utilization of non-communicable disease (NCD) health services was significantly associated with sex(p=0.001), travel distance(p=0.002), knowledge (p=0.002), and illness perception (p=0.027) but not significantly associated with age (p=0.223). The most dominant factor was sex, with an odds ratio of 4.727 (95% CI: 2.033–10.992), indicating that female respondents were approximately 4.7 times more likely to utilize non-communicable disease (NCD) health services compared to males.

Conclusion: The findings of this study indicate that sex, travel distance, knowledge, and illness perception were associated with the utilization of non-communicable disease (NCD) health services. Sex was the most dominant factor for non-communicable disease (NCD) health services utilization.

Keywords: Non-Communicable Diseases, health services, health behavior, determinants

Introduction

Global attention to non-communicable diseases (NCDs) has increased in line with the rising frequency of their occurrence. Globally, NCDs account for approximately 70% of all deaths worldwide(1). Nationally, about 66% of all deaths

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in Indonesia are caused by NCDs[2]. The 2023 Indonesian Health Survey (SKI) suggested the prevalence of hypertension among individuals aged 18 years and above, as determined by blood pressure measurements, was 30.8%. The prevalence of diabetes mellitus (DM) among individuals aged 15 years and above, based on blood glucose level assessments, was recorded at 11.7%[3].

The burden of NCDs can be reduced through effective control and prevention efforts. The Regulation of the Minister of Health of the Republic of Indonesia No. 71 of 2015 concerning the Control of Non-Communicable Diseases, Article 20 states that "the community, both individually and in groups, plays an active role in controlling NCDs through community-based health efforts (UKBM) by establishing and developing NCD health services"[4].

NCD health services are an integral part of public health efforts that emphasize active community participation throughout all stages, including planning, implementation, monitoring, and evaluation. In this context, the community plays multiple roles—not only as beneficiaries, but also as targets of change, agents of change, and key resources. NCD health services are classified as Community-Based Health Efforts (UKBM), which are organized by and for the community in accordance with their local potential, capacity, and needs[5]. The utilization of health services reflects individual health behavior aimed at the prevention and management of diseases or health disorders that may pose potential risks. A person's decision to access healthcare facilities is influenced by three main components: predisposing factors, enabling factors, and need factors[6].

One of the most widely used the oretical approaches to understanding health behavior is the Andersen Model. This model emphasizes that an individual's health service-seeking behavior is influenced by three main categories: predisposing factors, enabling factors, and need factors. These factors encompass various aspects such as knowledge, attitudes, beliefs, values, as well as demographic characteristics like age, education level, occupation, and socioeconomic status. In addition, the availability of health services and the perceived health needs of individuals or families also play a significant role in determining the utilization of health services, including in the context of NCD control[7]. Further research is needed to identify the most dominant factors influencing the utilization of NCD health services.

Material and Methods

Research design and setting

This quantitative study employed a cross-sectional design and was conducted at one of the Primary Health Centers (Puskesmas) in Aceh Besar. The rationale for selecting the research location includes the continuously rising prevalence of non-communicable diseases (NCDs), the persistently low level of community participation in health programs, and the area's diverse demographic profile. The data collection period spanned from November 5, 2024, to January 18, 2025.

Population and sample:

The study population consisted of all individuals who accessed health services in the selected Primary Health Center during 2023. A total of 180 respondents were included in this study. The Krejcie and Morgan formula with a 95% confidence level was used in the sample size determination. The inclusion criteria were individuals aged over 18 years who accessed health services at Puskesmas Aceh Besar, were fully conscious (compos mentis), had no hearing or visual impairments, and were willing to participate. Patients with impaired consciousness were excluded from the study.

Procedure of study:

Data were collected using a questionnaire consisting of variables on demographics, knowledge, and illness perception (Brief Illness Perception Questionnaire – B-IPQ). The knowledge questionnaire comprised 8 multiple-choice, with each correct answer was scored as 1, while incorrect answers were scored as 0. The total score was then accumulated, converted into a percentage, and categorized as either "good" or "poor." The Brief Illness Perception Questionnaire (B-IPQ), uses a Likert scale ranging from 1 to 10, where 1 indicates the lowest score and 10 the highest. The categorization was based on the mean score, with higher scores indicating a more negative perception of illness.

Data collection was completed with the help of two graduates with a bachelor's degree in nursing who had a good understanding of non-communicable diseases. A comprehensive preparation was provided for the enumerators through training sessions and explanations regarding the study objectives and procedure, to ensure the enumerators could apply the procedures accurately and consistently.

The data collection process began with meetings with respondents to introduce the enumerators and explain the purpose, objectives, and procedures of the study. Respondents were then provided information about the study and an informed consent form to review and sign. For individuals who agreed to participate, the researchers/enumerators arranged a mutually agreed time for data collection and provided the questionnaire, which had been previously explained in terms of its purpose and completion procedure. Completing the questionnaire took approximately 20 minutes. Respondents were given the opportunity to ask questions regarding the questionnaire. Upon completion, the researcher formally concluded the session. Data were analyzed using SPSS version 25.

Results

Demographic characteristics of the respondents are shown in Table 1 as follows:

Table 1. Demographic Characteristics

No.	Demographic Data	f	%
1.	Age		
	a. Adults (18–45 years)	27	15.0
	b. Pre-elderly (>45–59 years)	105	58.3
	c. Elderly (≥60 years)	48	26.7
2.	Sex		
	a. Male	37	20.6
	b. Female	143	79.4
3.	Travel Distance		
	a. ≤ 3 km	137	76.1
	b. > 3 km	43	23.9

Based on Table 1, the majority of respondents were in the pre-elderly age group(58.3%) and identified as female(79.4%). The highest level of education attained by the respondents was senior high school, reported by 68 individuals (37.8%). In terms of proximity to non-communicable disease (NCD) healthcare services, the majority of respondents—137 individuals (76.1%)—resided within a 3 km radius.

Respondents' illness perception, knowledge, and utilization of non-communicable disease health services are shown in Table 2 as follows:

Table 2. Illness Perception, knowledge, and utilization of non-communicable disease health services

No.	Variables	f	%
1	**Illness Perception**		
	Positive	158	87.8
	Negative	22	12.2
2	**Knowledge**		
	Good	116	64.4
	Poor	64	35.6
3	**Utilization of Non-Communicable Disease Healthcare Services**		
	Not utilizing	39	21.7
	Utilizing	141	78.3

Based on Table 2, a total of 158 respondents (87.8%) had a positive illness perception; 116 respondents (64.4%) had good knowledge; and 141 respondents (78.3%) utilized non-communicable disease healthcare services.

The Relationship between respondents' age, sex, travel distance, knowledge, and illness perception with the utilization of non-communicable disease healthcare services can be seen in Table 3 below.

Table 3. Independent Variables and Utilization of Non-Communicable Disease Healthcare Services

No	Independent Variables	Utilization of Non-Communicable Disease Healthcare Services				Total		p-value
		Not Utilizing		Utilizing				
		f	%	f	%	f	%	
1.	**Age**							
	Adults (<45 years)	9	5	18	10	27	15	0,223
	Pre-elderly (45–59 years)	19	10,6	86	47,8	105	58,3	
	Elderly (≥60 years)	11	6,1	37	20,6	48	26,7	
2.	**Sex**							
	Female	22	12,2	121	67,2	143	79,4	0,001
	Male	17	9,4	20	11,1	37	20,6	
3.	**Travel Distance**							
	≤ 3 km	22	12,2	115	63,9	137	76,1	0,002
	3 km	17	9,4	26	14,4	43	23,9	
4.	**Knowledge**							
	Good	22	12,2	115	63,9	137	76,1	0,002
	Poor	17	9,4	26	14,4	43	23,9	
5.	**Illness Perception**							
	Negative	9	5	13	7,2	22	12,2	0,027
	Positive	30	16,7	128	71,1	158	87,8	
	Total	37	46,8	42	53,2	79	100	

Based on Table 3, it can be concluded that gender (p=0.001), travel distance (p=0.002), knowledge (p=0.002), and illness perception (p=0.027) are significantly associated with the utilization of non-communicable disease healthcare services. However, age (p=0.223) is not significantly associated with the utilization of these services.

Further analysis findings using Bivariate logistic regression can be seen in Tables 4 and 5 as follows:

Table 4. Bivariate Logistic Regression Selection

No	Independent Variables	P-Value
1.	Age	0,245
2.	Gender	0,000
3.	Travel Distance	0,002
4.	Knowledge	0,001
5.	Illness Perception	0,028

Based on Table 4, the results of the bivariate selection using simple logistic regression indicate that the variables that proceeded to multivariate logistic regression modeling are gender (p=0.000), travel distance (p=0.002), and knowledge (p=0.001).

Table 5. Multiple Logistic Regression Modeling

No.	Variables	B	p	OR	95% CI
1.	Gender	1.553	0.000	4.727	2.033-10.992
2.	Travel Distance	1.245	0.003	3.474	1.519-7.949
3.	Knowledge	-1.002	0.013	0.367	0.167-0.806

Based on Table 5, it can be concluded that the determinants of gender, travel distance, and knowledge are significantly associated with the utilization of non-communicable disease healthcare services ($p < 0.05$). The most dominant determinant related to the utilization of these services is gender,

with an odds ratio (OR) of 4.727 (95% CI: 2.033-10.992). This means that female respondents are 4.7 times more likely to utilize healthcare services compared to male respondents.

Discussion

The Relationship Between Age and Utilization of Non-Communicable Disease Healthcare Services

The research findings indicate that there was no significant relationship between age and the utilization of non-communicable disease healthcare services. This result is consistent with a previous study, which showed that there was no relationship between age and the utilization of non-communicable disease healthcare services in the implementation of the non-communicable disease program[8]. Age did not show a significant effect in this study because the age groups examined, namely adults and the elderly, had a balanced proportion of respondents who were both active and inactive in utilizing the services. This suggests that both adult and elderly age groups exhibit similar variations in respondent activity levels [8].

Age is one of the main factors influencing the utilization of Posbindu PTM (Integrated Non-Communicable Disease Early Detection Post). Younger individuals tend to feel healthier and often overlook early signs of non-communicable diseases (NCDs), thus they are less likely to access Posbindu PTM services. In contrast, older individuals, particularly the elderly, are more aware of the health risks they face and are therefore more motivated to undergo regular check-ups at Posbindu NCDs to prevent or detect diseases at an early stage[9].

These results indicate that older age groups tend to utilize non-communicable disease healthcare services more than younger age groups. This difference can be attributed to the increased health awareness that comes with aging, where older individuals are more concerned about their health condition. Younger individuals, on the other hand, tend to feel healthier and often overlook early signs of non-communicable diseases, thus they are less likely to access non-communicable disease healthcare services.

The Relationship Between Gender and Utilization of Non-Communicable Disease Healthcare Services

The results of this study indicate a significant relationship between gender and the utilization of non-communicable disease (NCD) healthcare services. Several previous studies have shown that gender is a contributing factor in healthcare service utilization. It has been reported that healthcare utilization is higher among women due to greater health needs compared to men [10].

It has been reported that women possess higher health awareness than men. They are more likely to seek healthcare services when experiencing unusual symptoms. Furthermore, women's roles within the family also influence healthcare utilization patterns[11]. In many cultures, women are responsible for family health, which leads them to access health information more frequently and utilize community-based services such as NCD healthcare services [12] Hormonal and reproductive factors also play a role, as women have specific health needs that make them more accustomed to preventive health screenings[13].

Conversely, men tend to underutilize Posbindu PTM for several reasons. Masculinity-related stigma may be one of the causes. Many men perceive seeking healthcare as a sign of weakness, leading them to postpone check-ups until symptoms become more severe[14]. In addition, lower health awareness and a tendency to prioritize work over health also contribute to the lower utilization of Posbindu PTM services by men[11].

The Relationship Between Distance and Utilization of Non-Communicable Disease Healthcare Services

The hypothesis test results indicate that there is a relationship between the distance to non-communicable disease (NCD) healthcare services and the utilization of those services in the working area of Puskesmas in Aceh Besar. Physical accessibility is one of the main challenges in utilizing NCD healthcare services, especially for communities living in rural areas or regions with limited transportation infrastructure. Long travel distances and difficult geographical conditions—such as damaged roads or rough terrain—serve as significant barriers to accessing NCD healthcare services. Limited physical access can reduce individuals' motivation to undergo

routine check-ups, particularly if they lack adequate means of transportation[15].

In addition, greater distance is also associated with increased transportation costs incurred by the community. Although Non-Communicable Disease (NCD) healthcare services are essentially free, travel expenses can become an additional burden for individuals with low socioeconomic status[16]). Oldenburg et al demonstrated that the level of healthcare service utilization tends to decrease as the distance between a person's residence and the health facility increases[17].

Therefore, more effective strategies are needed to overcome distance-related barriers in the utilization of NCD healthcare services, particularly Posbindu (Integrated Health Post for NCDs). One potential approach is to increase the number of NCD service points in areas with limited access and to provide mobile Posbindu services that can reach communities in remote areas. Additionally, offering transportation subsidies or incentives for individuals who regularly attend NCD healthcare services could serve as a viable solution to enhance community participation.

The Relationship Between Knowledge and Utilization of Non-Communicable Disease Healthcare Services

The results of this study also indicate a significant relationship between knowledge and the utilization of Non-Communicable Disease (NCD) healthcare services. This finding is consistent with the study by Agung, Berawi, and Warsono, which reported a significant association between knowledge and the use of NCD healthcare services. The study showed an odds ratio (OR) of 9.141, indicating that individuals with poor knowledge are 9.141 times more likely not to utilize NCD healthcare services compared to those with good knowledge[18].

Knowledge about healthcare services is one of the key factors influencing an individual's decision to seek care. When people lack sufficient knowledge about the availability and benefits of NCD healthcare services, they are less likely to participate in related programs[19].

Low levels of knowledge may be influenced by educational attainment and type of occupation. Individuals with higher education levels tend to have a greater understanding of the importance of health, and thus are more likely to engage in health-promoting behaviors, including participation in Posbindu NCD activities. Conversely, individuals with limited knowledge often prioritize work or rest at home over attending Posbindu sessions, due to a lack of understanding about their benefits. However, when people possess adequate knowledge and recognize the importance of participating in Posbindu, they are more willing to allocate time to utilize these healthcare services[20].

The Relationship Between Illness Perception and the Utilization of Non-Communicable Disease (NCD) Health Services

The statistical test results indicated that there was no significant relationship between illness perception and the utilization of NCD health services. This suggests that while illness perception influences an individual's awareness and concern regarding their health condition, it does not necessarily have a direct impact on their decision to utilize preventive health services such as NCD health services.

This finding is consistent with the study by Marthasari et al., which found that the relationship between health-illness perception and the utilization of NCD health services was not statistically significant ($p = 0.421$). This implies that individuals' perception of their health status does not directly affect their decision to engage with NCD services[21].

However, research by Febriani et al., demonstrated that individuals with negative illness perceptions—those who feel threatened by disease—are more likely to utilize preventive health services such as Posbindu PTM. Negative perceptions of illness may increase an individual's vigilance regarding health risks and encourage more proactive preventive behaviors[22]. This supports the Illness Perception Theory by Howard Leventhal, which posits that individuals with more negative perceptions of illness are more likely to engage in health management behaviors and seek medical care[23].

Prusaczyk et al.,revealed that although individuals with negative perceptions of their health tend to be more proactive in seeking medical treatment, other factors such as accessibility of

healthcare facilities, cost, and family support also play a significant role in influencing their decision to utilize healthcare services [9].

The Most Dominant Determinant Associated with the Utilization of Non-Communicable Disease Health Services

Based on the results of the multivariate logistic regression model, the most dominant determinant associated with the utilization of Non-Communicable Disease (NCD) health services was gender. The Odds Ratio (OR) value of 4.727 (95% Confidence Interval: 2.033–10.992) indicates that female respondents were 4.7 times more likely to utilize NCD health services compared to male respondents. When compared to the variable of travel distance (>3 km), females were 6.82 times more likely to access such services.

Gender, as a predisposing factor in Andersen's Behavioral Model of Health Service Utilization, suggests that fundamental individual characteristics such as sex can influence health-seeking behavior. Women are generally more proactive in utilizing health services than men. This tendency can be attributed to several factors, including their social role in managing family health, a higher level of health awareness, and greater receptiveness to community-based health initiatives. Conversely, men are often less inclined to seek health services, perceiving health check-ups as a lower priority. In many cases, they may feel reluctant or embarrassed to participate in health programs, especially when such services are predominantly attended by women. Furthermore, masculine norms and stigma—which view seeking medical help as a sign of weakness—also act as barriers that discourage men from optimally utilizing health services[24].

Conclusion

Based on the research findings, it can be concluded that gender, knowledge, travel distance, and illness perception are significantly associated with the utilization of non-communicable disease (NCD) health services. In contrast, age was not found to be associated with the utilization of these services. Among the identified factors, gender emerged as the most dominant determinant influencing the utilization of NCD health services

Limitations of The Study: Not all respondents were available to complete the questionnaire during the implementation of the health services, requiring the researchers to conduct home visits to administer the questionnaire. Also, this study was conducted in only one sub-district; therefore, the findings may not be generalizable to other areas with different social, cultural, economic, and healthcare infrastructure characteristics.

Future Research Recommendations: Future researchers are encouraged to expand the scope of the study by including a broader geographic area and additional variables, such as socio-economic factors, support from healthcare personnel, and health behaviors. Furthermore, researchers may explore more specific community-based interventions to enhance public participation in these health programs.

Ethical Consideration: This study received ethical approval from the Research Ethics Committee of the Faculty of Nursing, Syiah Kuala University, under approval number 112016310724.All respondents provided written informed consent to participate in this study.

Conflict of Interest: All the authors declared that they have no conflicts of interest in this study.

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Original Article

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Effectiveness of Using Eye Masks and Earplugs on Sleep Quality of Patients in Intensive Care Unit

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Abstract

Background: Sleep quality is a vital component of recovery in intensive care unit patients. However, environmental factors such as continuous noise from medical equipment and excessive lighting often disrupt sleep, potentially delaying healing. Non-pharmacological interventions, including the use of eye masks and earplugs, offer a simple approach to improve sleep without medication.

Objective: This study aimed to assess the effectiveness of eye masks and earplugs in improving sleep quality among intensive care patients.

Material and Method: A quasi-experimental study with a non-equivalent control group design was conducted in the Surgical High Care Unit (HCU). A total of 68 patients were divided into intervention and control groups based on different data collection periods. The intervention group used eye masks and earplugs for two consecutive nights from 10:00 PM to 6:00 AM. Sleep quality was measured using the Richards-Campbell Sleep Questionnaire (RCSQ) before and after the intervention.

Results: The intervention group showed a significant increase in sleep quality scores (from 59.4 to 72.6), while the control group showed no meaningful change (from 61.27 to 61.04), with a p-value of 0.000.

Conclusion: The use of eye masks and earplugs effectively improves sleep quality in ICU patients. This low-cost, non-invasive intervention is recommended as part of standard ICU care to support patient recovery.

Keywords: Eye mask and earplugs, Sleep Quality, Intensive Care Unit

Introduction

Sleep plays a crucial role in the recovery process of ICU patients from their critical illnesses. Sleep quality plays an important role in the clinical field as more and more people complain about decreased sleep quality and its impact on daily activities. In addition, poor sleep quality can be a major symptom

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of various sleep disorders and other health problems[1]. The intensive care unit is a room that functions as a place to treat patients with unstable conditions with sophisticated equipment in it. Medical technology such as heart monitors, mechanical ventilators, and infusion pumps in the Intensive Care Unit (ICU) often produce varying noise[2]. The sounds produced by these machines are generally high frequency and can disturb the patient's sleep. In addition, the intensive care unit has high exposure to night light and uncertain health staff activities until late at night[3].

ICU patients are known to suffer from fragmented sleep as well as reduced slow-wave and rapid eye movement sleep. More than 60% of ICU survivors report poor or insufficient sleep. Because poor sleep and delirium often co-occur in critically ill patients, it has been suggested that there is a relationship between the two disorders, and growing evidence suggests that sleep disturbances are associated with delirium[4]. Sleep deprivation can lead to various cardio-metabolic risks, such as weight gain, glucose intolerance, and high blood pressure. Blood pressure is physiologically regulated by cardiac contractility, cardiac output, and peripheral vascular resistance. It is controlled by the autonomic nervous system and is connected to blood pressure through baroreceptor feedback mechanisms. The results of the study showed a significant increase in systolic, diastolic and Mean Arterial Pressure (MAP) in individuals with limited sleep time, when compared to individuals with normal sleep[3,5].

From the initial observation results, in the intensive care unit, the sound of monitor alarms and various other devices can be heard, as well as diagnostic and administrative activities that contribute to noise in the intensive care unit. Initial interviews conducted with patients in the intensive care unit found that most patients said they had difficulty sleeping and starting to sleep due to noise from medical personnel and from the equipment in the intensive care unit. In addition, bright lighting also affects the quality of patient sleep. Likewise, the results of the researcher's observations showed that patients who had sleep problems tended to have disturbed hemodynamics[6].

Sleep-promoting interventions include pharmacological and non-pharmacological treatments. Sleep-inducing medications provide sedation and analgesia and are often used in intensive care units. However, the use of these medications can have negative effects[5]. Drug-induced sleep is also not recommended for some patients, such as non-ventilated patients with pulmonary hypercapnia. Therefore, there is now a greater emphasis and recommendation on non-pharmacological interventions. Some non-pharmacological interventions include the use of physical devices such as eye masks and/or earplugs, relaxation techniques such as massage and foot baths, music therapy, quiet time, acupuncture, and aromatherapy which are used to improve sleep quality in the intensive care unit[7,8].

Providing earplugs and eye masks is a relevant action in closing the patient's sense of hearing and vision in the ICU to prevent sleep disturbances due to external stimuli[9]. This action is part of the nursing intervention that aims to maintain a normal circadian rhythm, so that it can reduce sleep disturbances in patients in the room[10]mental well-being, and recovery. Nonpharmacologic interventions are recommended as first-choice treatment. However, studies evaluating the interventions are often of poor quality and show equivocal results. Objective: To assess whether the implementation of nonpharmacologic interventions is associated with improved inpatient night sleep. Design, Setting, and Participants: In a nonrandomized controlled trial, patients were recruited on the acute medical unit and medical and surgical wards of a Dutch academic hospital. All adults who spent exactly 1 full night in the hospital were recruited between September 1, 2019, and May 31, 2020 (control group[11].The use of eye masks and earplugs improves sleep quality in ICU patients. In line with research showing that the use of eye masks and earplugs effectively improves sleep quality in ICU patients who receive frequent examinations. These findings also provide additional support for the use of additional non-pharmacological interventions that can improve sleep quality in the ICU environment[3,12]. Despite its promising benefits, the routine use of eyemasks and earplugs in nursing practice or patient care is still not standard practice in many healthcare settings. It is therefore important to explore the effectiveness of eyemasks and earplugs in improving patient sleep quality and to provide scientific evidence to support its implementation as part of the standard of clinical care.

Materials and Methods

Research design and setting:

The research design selected for the study was quasi-experimental, pre-test and post-test with non-equivalent control-group design, at the General Hospital of Aceh. This study was conducted after completing the ethical review process, which was approved by the Health Research Ethics Committee at dr. Zainoel Abidin General Hospital, Banda Aceh, under approval number 246/ETIK-RSUDZA/2024. All respondents provided written informed consent to participate in this study.

Population and sample:

The sample size in this study was determined using Cohen's table[13] with a confidence level of 95% and a significance level (α) of 0.05. Based on an estimated population of approximately 80 patients, the minimum required sample size was 68 respondents, divided equally into 34 participants in the intervention group and 34 in the control group. In this study, the intervention group and the control group consisted of patients in the Surgical High Care Unit (HCU) during different time periods. The control group consisted of patients who received standard care, while the intervention group was patients who, in addition to receiving standard care, were also given treatment in the form of using eye masks and earplugs for two consecutive nights. The intervention group and the control group were compared although their selection was not random. The sample in this study was selected based on certain inclusion and exclusion criteria to ensure data homogeneity and validity. Inclusion criteria included patients who had not received intravenous sedation or anesthesia in the last 12 hours, such as Fentanyl, Morphine, or Midazolam; not in an intubated condition; did not experience communication or hearing disorders; were adults (≥ 21 years or married); and had a Glasgow Coma Scale (GCS) score of 15. Exclusion criteria included patients with hearing or vision impairment; undergoing treatment for severe sleep disorders, such as sleep-related breathing disorders, severe insomnia, or sleep movement disorders; undergoing treatment for a diagnosis of depression or anxiety disorders; and those with other mental disorders. Although the sampling was not randomized, group allocation was based on different time periods but within a similar patient population, thereby minimizing potential baseline differences.

Procedure of study:

Before implementing the intervention, all enumerators received comprehensive training on the implementation procedures, including the steps for completing the questionnaire and the ethical principles that must be upheld during interactions with respondents. Three professional nurses, graduates of the Ners program, were hired as enumerators, Prior to the intervention, the researcher conducted an initial assessment of patients' sleep quality using the Insomnia Severity Index (ISI) [14]. The screening results indicated that all respondents had ISI scores ranging from 14 to 20, which reflects a moderate level of sleep disturbance. The researcher and enumerators visited each potential respondent to provide a direct explanation of the study's purpose, the procedures to be followed, and their rights and responsibilities throughout the process. After the explanation was given, respondents were asked to sign an informed consent form as written confirmation of their voluntary participation in the study.

Both groups were given a pre-test before the intervention and a post-test after the intervention concluded. The pretest was conducted by assessing the respondents' sleep quality by filling out the Richards-Campbell Sleep Questionnaire (RCSQ). On the third day, all respondents' sleep quality was reassessed using the RCSQ questionnaire as a posttest value. In the control group, patients received standard care on the first and second nights, whereas in the intervention group, patients were provided with eye masks and earplugs on both nights started at 10:00 PM and ended at 6:00 AM, with a total usage time of approximately 8 hours. This intervention was carried out for two consecutive nights. Prior to use, the sleep aids were explained to the patients, including how to use them properly.

Results

The study was conducted from December 3, 2024 to January 23, 2025. The purpose of this study was to determine the effectiveness of the use of eye masks

and earplugs on the quality of sleep of patients in the intensive care unit of the Dr. Zainoel Abidin Aceh Regional General Hospital.

The results of the study are presented in the following tables and graphs. Based on table 1, it is found that the average age of respondents in the intervention group was 50.41 years. While in the control group the average age of respondents was 44.26 years. It was found that female gender was the most respondents, namely in the intervention group totaling 19 people (55.9%) and in the control group totaling 18 people (52.9%). The most common marital status was married status, namely 30 people (88.2%) in the intervention group and 19 people (55.2%) in the control group. The most common level of education was secondary education, namely 18 people (52.9%) in the intervention group and 16 people (47.1%) in the control group. Furthermore, the most common occupation was housewives with 15 people (44.1%) in the intervention group and 15 people (44.1%) in the control group.

For the most treatment days, namely 1-2 days of treatment, as many as 20 people (58.9%) in the intervention group and 26 people (76.5%) in the control group. The most common medical diagnosis is Post Laparotomy, as many as 11 people (32.4%) in the intervention group and 10 people (29.4%) in the control group. For the history of comorbidity in the intervention group, there were 17 people (50%) and in the control group there were more respondents who did not have a history of comorbidity, as many as 22 people (64.7%).

Table 1: Frequency Distribution of Respondent Characteristics (n=68)

Respondent Characteristics	**Intervention**		**Control**	
	(n = 34)		**(n = 34)**	
	f	%	**f**	%
Age				
Mean	50.41		44.26	
Min-Max	20-76		20-75	
Gender				
Man	15	44.1	16	47.1
Woman	19	55.9	18	52.9
Married Status				
Not married yet	2	5.9	10	29.4
Married	30	88.2	19	55.9
Widower/Widow	2	5.9	5	14.7
Level of education				
Basic education	13	38.3	15	44.1
Secondary Education	18	52.9	16	47.1
Higher education	3	8.8	3	8.8
Work				
Doesn't work	3	8.8	4	11.8
Housewife	15	44.1	15	44.1
Civil Servants/TNI/POLRI	2	5.9	4	11.8
Farmers/Fishermen/Laborers	8	23.5	2	5.9
Self-employed	6	17.6	8	23.5
Retired	-	-	1	2.9
Treatment Day				
1-2 days	20	58.9	26	76.5
3-4 days	6	17.6	8	23.5
>4 days	8	23.5	-	-

Continue.....

Medical Diagnosis				
Post Laparotomy	11	32.4	10	29.4
Post Posterior Stabilization/ Laminectomy	4	11.8	6	17.6
Post Craniotomy	1	2.9	1	2.9
Sepsis	2	5.9	3	8.8
Post ORIF	5	14.7	6	17.6
Others (rectal prolapse, liver abscess, post nephrectomy, etc.)	11	32.4	8	23.5
Comorbid				
No	17	50	22	64.7
Yes	17	50	12	35.3
Diabetes mellitus	8	23.5	5	14.7
Hypertension	8	23.5	6	17.6
Impaired kidney function	1	3	1	3
Insurance				
BPJS	34	100	34	100

Table 2: Frequency of Sleep Quality Value (n=68) Intervention Group and Control Group

	Intervention Group (n=34)		**Control Group (n=34)**	
Variables	**Mean ± SD**	**Min - max**	**Mean ± SD**	**Min - Max**
Pre-test	59.4 ± 8.6	43.8-78	61.27 ± 7.85	48.5-80.3
Post test	72.6 ± 8.3	53.7-85.3	61.04 ± 7.93	47.3-80.3
p-value	0,000		0.240	

Table 2 shows the analysis of the average difference of two different independent groups. In the sleep quality test in the intervention group, the average value was 72.6 in the control group, the average value was 61.04. The difference in sleep quality in the intervention group obtained a p value <0.05, which is 0.000, which means that statistically there is a significant difference in sleep quality between before and after the intervention of using eye masks and earplugs. Furthermore, to determine the different values in the group, the analysis used is the Independent t-test which is a parametric test that tests the differences between two different groups if the data distribution is normal.

In the test of the average difference in sleep quality between the two groups, the p value was obtained = 0.000 or <0.05, so it can be concluded that Ho is rejected. This means that statistically there is a difference in sleep quality in the intervention group after using eyemasks and earplugs with the control group with standard hospital intervention.

This study demonstrated that the use of eye masks and earplugs significantly improved sleep quality among ICU patients, as evidenced by a notable increase in Richard-Campbell Sleep Questionnaire (RCSQ) scores following the intervention. These findings affirm the effectiveness of a simple and low-cost intervention within the critical care context. An unexpected finding was the absence of any complaints or reported side effects

Discussion

The results of this study indicate that the use of eye masks and ear plugs has an effect on the quality of patient sleep, where the results of the average difference test of sleep quality between the two groups using the Independent T-test with p = 0.000 or <0.05 indicate that there is a significant difference in sleep quality between the two groups that underwent intervention and with standard hospital intervention.

This is in line with research results which state that the use of eye masks and earplugs serves to reduce disturbances from the surrounding environment, such as noise and light, which are often the cause of poor sleep quality in the intensive care unit (ICU)[15]. Eye masks help block light that can disrupt circadian rhythms and melatonin production, which are essential for restful sleep. Meanwhile, earplugs reduce ambient noise levels, which are often high (>80 dB) in the ICU, allowing patients to sleep better and deeper[16,17].

In addition, there are quite a few patients who experience sleep disorders not because of their medical condition, but because of environmental discomfort[18]. By providing simple interventions such as eye masks and earplugs, patients can obtain better sleep quality without having to rely on pharmacological therapy that carries the risk of side effects, especially in patients with certain comorbidities[19]. These results are also consistent with previous studies that have shown that eye masks and earplugs can prolong sleep duration, increase sleep efficiency, and improve sleep phases[20].

The use of eye masks and earplugs among ICU patients generally offers several benefits, including improved sleep quality, reduced stress levels, and enhanced comfort due to a darker and quieter environment. These factors contribute to better rest quality, which ultimately supports the overall recovery process [7,21]. Nevertheless, despite their significant benefits, several potential risks should be considered. Some patients may experience discomfort. In certain individuals, earplugs may cause skin or ear canal irritation, especially if the devices are unclean or used for prolonged periods without replacement. There is also a risk of infection if earplugs are not regularly cleaned or replaced. Similarly, eye masks may cause discomfort if too tight or not well-fitted to the patient's facial contour. Therefore, although eye masks and earplugs are generally regarded as safe and effective, healthcare providers must ensure proper, hygienic use tailored to each patient's condition to prevent unwanted side effects[3]. Notably, in this study, no adverse effects were reported by patients during the intervention period.

The use of eye masks and earplugs in intensive care units has been shown to be very beneficial in improving the quality of sleep for patients[318]. By blocking out distracting light with an eye mask, patients can more easily achieve restful sleep, while earplugs help to block out the noise of medical equipment and conversations that can break their concentration while trying to sleep. Many patients report feeling more refreshed and alert after using these devices, as the quieter, darker environment makes them feel more comfortable. Additionally, by reducing distractions from light and sound, these devices not only improve the quality of sleep, but can also help to reduce the levels of stress and anxiety that are often experienced in intense intensive care settings[722]. In line with research results showing that the use of eye masks and earplugs together can overcome disturbances from light and sound, which are common problems in hospital environments[23]. This is in line with research findings that revealed that the use of eye masks and earplugs significantly improved the quality of sleep for patients in the ICU. This intervention has been shown to be effective in reducing sleep disturbances that are common in intensive care settings[118].

Conclusion

The use of eye masks and earplugs has been shown to be effective in improving the quality of sleep for patients in the intensive care unit (ICU). Where there was a significant difference in sleep quality between the intervention group and the control group after the intervention with a p value = 0.000. This simple intervention helps reduce light and noise disturbances, allowing patients to sleep better without the need for pharmacological intervention. These findings support the results of previous studies and show significant benefits in nursing practice.

Limitation: This study has several limitations. The first is sleep quality was assessed subjectively using the RCSQ without the support of objective tools such as polysomnography or actigraphy. Additionally, the intervention was conducted for only two consecutive nights, so its long-term effects remain unknown.

Future Research Recommendations: For future research, we recommend the use of a randomized

controlled trial (RCT) design with a larger sample size, objective sleep monitoring, a longer intervention duration, and the inclusion of additional clinical outcomes such as the incidence of delirium and length of ICU stay.

Ethical Clearance: The research approval was given by the Health Research Ethics Committee at dr. Zainoel Abidin General Hospital, Banda Aceh, under approval number 246/ETIK-RSUDZA/2024.

Conflict of Interest: None

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Original Article

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Demystifying Misconceptions and Myths Surrounding Menstruation among Secondary School Girls in Kano State, Nigeria

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Abstract

Background: Understanding menstrual health and hygiene is essential for the well-being of adolescent girls, yet misconceptions persist among secondary school students.

Methods: A cross-sectional survey was conducted with 408 participants from four schools in Kano State, using random sampling to assess menstrual misconceptions. Data were analysed using descriptive and inferential statistics, including ANOVA.

Results: The overall mean score of 2.35 indicates a high prevalence of myths and misconceptions about menstruation among participants. However, differences in misconceptions across schools were not significant (F = 2.460706, F critical = 2.866266, p = 0.078353).

Conclusion: Educating students through awareness campaigns is crucial to dispel these myths, reduce stigma, and foster a better understanding of menstruation. Implementing comprehensive educational programs can empower young girls to manage their menstrual health confidently.

Key Words: Menstruation, Myths, Schoolgirls, Nigeria

Introduction

Menstruation is essential for the reproductive health of young girls, yet it remains a taboo subject in many cultures[1]. Over 26% of the world's population are menstruating females, with cycles lasting from two to seven days[2]. In Africa, the significance of menstruation varies among communities, shaped by diverse cultural traditions and taboos[3]

In Nigeria, 46 million women of reproductive age menstruate[4], with 21.4 million being female adolescents[5]. Discussions about menstruation are often avoided due to cultural taboos and misconceptions. This creates challenges for menstrual hygiene, which is crucial for gender equality, human rights, and development. Myths and societal beliefs surrounding Menstrual Hygiene Management (MHM) negatively affect hygiene practices during menstruation[6].

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In parts of Africa, particularly Ethiopia and Nigeria, menstruation is surrounded by myths. Some communities view menstrual blood as impure, leading to practices such as isolating women. In rural Nigeria, burning menstrual cloths is avoided due to beliefs that it can cause skin issues, infertility, and even cancer[7]. Additionally, women are advised against handling charms during menstruation, as it is thought to render them ineffective[8].

Nigerian traditional society, particularly in north-western regions like Kano, holds deep-rooted myths and superstitions about health and menstruation. Harmful practices such as child marriage and female genital mutilation continue despite Nigeria's international commitments[9]. Beliefs that menstruating women should stay away from farms to prevent crop damage and that menstruating girls are ready for marriage contribute to a poor understanding of menstrual health and hygiene among women and girls[6].

In Kano state, the prevalence of child marriage reaches up to 76%, allowing girls to be married off as early as age 9[10]. This practice severely inhibits the human rights of women and girls and perpetuates gender inequality. Myths surrounding child marriage include the belief that marrying a girl before puberty brings blessings or protects her from sexual violence and unwanted pregnancy[11]. Additionally, some interpretations of Islam suggest that once a girl begins menstruating, she is eligible for marriage, regardless of age.

Understanding menstruation myths and beliefs among secondary school girls in Nigeria is crucial for clarity on the subject. This study is influenced by local culture, Islamic traditions, and societal views that affect behavior and lifestyle. Many individuals lack knowledge about menstruation[12], contributing to challenges in menstrual hygiene due to myths and taboos[13]. The objective of this study is to evaluate these beliefs among secondary school girls in Kano state, Nigeria

Methods

Research Design

This paper presents a study of girls from four secondary schools in Kano state, Nigeria, exploring socio-cultural misconceptions that influence their behavior, beliefs, and development. It examines their educational performance, social interactions, and personal growth, aiming to highlight diverse perspectives. The first author conducted the fieldwork in Nigeria, while the second author contributed from Thailand, with both collaborating virtually to analyze and refine the data

Research Population

This study focuses on girls aged 12-19 from public senior secondary schools in Kano State, Nigeria, as they are significantly affected by menstruation myths and misconceptions. This age group often experiences menstruation for the first time, which can negatively impact their sexual health and social life. The populations of the selected schools are detailed in Table 1.

Table 1: Population of selected schools

S/No	Name of School	Population
1	GGSS RANGAZA	1300
2	GGSS ZANGON GABAS	1505
3	GGSS ZAURA DANBABA	1220
4	GGSS SABUWAR RANGAZA	1250
	Total	5275

C. Sample Size Calculation

To determine the sample size of the respondents, [14] formula was adopted:

$$n = \frac{N}{1 + N\,(e)^2}$$

Where,

n = sample size
N = population size
= level of significance
Applying the formula
N = 5175
e = 0.05

$$n = \frac{5275}{1+5275(0.05)^2}$$

n =399 Approximately 400

This sample is distributed among the selected secondary schools using [15] formula as follows:

$$nh = \frac{nNh}{N}$$

Where,

nh = sample of respondents in each school

n = the total sample size

Nh = total number students in each school

N = the population size

Applying the formula, we have

For GGSS Rangaza, $nh = \frac{400\,x\,1300}{5275} = 99$

For GGSS Zangon Gabas, $nh = \frac{400\,x\,1505}{5275} = 114$

For GGSS ZauraDanbaba $\frac{400\,x\,1220}{5275} = 93$

For GGSS SabuwaRangaza,

$$nh = \frac{400\,x\,1250}{5275} = 94$$

The sample size for the study was 408 participants, including a buffer of 8 for potential missing questionnaires. This consisted of 101 students from GGSS Rangaza, 116 from GGSS Zangon Gabas, 95 from GGSS Zaura Danbaba, and 96 from GGSS Sabuwa Rangaza, selected using a random sampling procedure from the four schools in Kano state.

Sampling Techniques

A simple random sampling technique was used to select respondents for the study, ensuring each person in the target population had an equal chance of being chosen. This method minimized selection bias and enhanced sample representativeness, leading to more reliable and generalizable results. Participants were selected randomly by assigning them numbers and choosing individuals purely by chance.

Instruments

The data was collected using a modified self-report questionnaire based on two previous studies on menstrual hygiene management (MHM)[6, 13]. The first study[6] provided a framework for assessing menstrual hygiene practices among adolescent girls, considering social and cultural contexts. The second study focused on the relationship between knowledge, attitude, and practices regarding menstrual health[13]. By combining elements from these studies, the questionnaire was tailored to research objectives, covering hygiene practices, access to sanitary materials, socio-cultural beliefs, and awareness of menstruation. This adaptation ensured the tool's reliability and validity for assessing MHM practices in selected schools. The data collection instrument consisted of two parts, each utilizing a 4-point Likert scale

i. Strongly Agree = 1
ii. Agree = 2
iii. Disagree = 3
iv. Strongly Disagree = 4

The corresponding measurement scale for interpreting the responses is as follows:

i. 0.1 - 1.5 = Strongly Agree
ii. 1.6 - 2.5 = Agree
iii. 2.6 - 3.5 = Disagree
iv. 3.6 - 4.0 = Strongly Disagree

Validity of the Tools

The questionnaire was validated for content by three experts at the development stage. They reviewed each question and assigned an Index of Item-Objective Congruence (IOC) score based nthe degree to which each item aligned with the intended objectives of the questionnaire[16]. The IOC scores range from -1 to +1: Incongruent = -1, Questionable = 0, and Congruent = +1. Items with an IOC value of ≥0.5 were considered satisfactory

Reliability of the Tools

Pilot study was conducted in order to test the internal consistency of each tool using Cronbach's Alpha coefficient, with a threshold of 0.7 and above indicating good consistency. SPSS version 22 was used in testing reliability for internal consistency.

Data Collection Procedure

Data was randomly collected by a trained research assistants (RAs) in each school. Each group of students was supervised by 2 Ras, completed a questionnaire in 30 – 50 minutes, while ensuring no interactions occurred among them.

Method of Data Analysis

The data collected from participants was analysed using SPSS version 20, employing both descriptive and inferential statistics. The study utilized Analysis of Variance (ANOVA) as adopted in [17] to compare socio-cultural factors influencing MHM practices among the students. ANOVA helped identify significant differences in MHM-related behaviors based on socio-cultural variables like tradition, taboos, education, and parental influence.

Results

Socio-demographic characteristics

The socio-demographic characteristics of secondary school girls in the area were presented considering the following specific variables such as age, marital status, class, ethnic group, religion and the person who provides sanitary pads during menstruation.

Table 2: Socio-demographic characteristics of respondents

Items	Variable	Frequency n = 400	Percentage (%)
Age			
	13	22	5.5
	14	55	13.8
	15	86	21.5
	16	85	21.3
	17	98	24.5
	18	44	11.0
	19	8	2.0
	20	2	.5
Marital Status			
	Married	15	3.8
	Single	385	96.3
Class			
	SS3	18	4.5
	SS2	195	48.8
	SS1	82	20.5
	JS3	101	25.3
	JS2	4	1.0
Ethnic Group			
	Tiv	2	.5
	Igbo	43	10.8
	Hausa/Fulani	347	86.8
	Yoruba	2	.5
	Others	6	1.5
Religion			
	Christian	39	9.8
	Moslem	345	86.3
	Traditionalist	14	3.5
	Others	2	.5

Living with			
	Parents	278	69.5
	Mother only	93	23.3
	Father only	20	5.0
	Husband	9	2.3
The person who provides sanitary pads during menses			
	Father	51	12.8
	Mother	327	81.8
	Yourself	22	5.5

The socio-demographic characteristics of the 400 respondents, shown in Table 2, reveal significant variability in age, education, and other factors. Most respondents (24.5%) are 17 years old, with 21.5% aged 15 and 21.3% aged 16, indicating a focus on adolescents in secondary school. A small percentage are younger (5.5% aged 13) or older (0.5% aged 20). Marital status shows that 96.3% are single, aligning with their age group. In terms of class, 48.8% are in SS2, 25.3% in JS3, and 20.5% in SS1. Ethnically, 86.8% are Hausa/Fulani, while 10.8% are Igbo, and others like Tiv and Yoruba make up 0.5%. Religiously, 86.3% identify as Muslim, and 9.8% as Christians. Most (69.5%) live with both parents; 23.3% with their mother, and 5.0% with their father. Support for menstrual hygiene is primarily from mothers (81.8%), followed by fathers (12.8%) and 5.5% who rely on themselves.

Myths and Misconceptions about Menstruation

Table 3 presents myths, beliefs, and misconceptions about menstruation, showing means scores and standard deviations that reflect participants' agreement levels. The overall mean score of 2.35 indicates that most cultural views are accepted by the population, highlighting prevalent misconceptions about menstruation in the area.

Table 3: Mean and Standard Deviation of Myths, Beliefs and Misconceptions/Fallacies about menstruation

Items	Mean (n=400)	Std. Deviation	Decision
girls are restricted from eating certain foods during menses	1.99	.886	Agreed
girls are restricted from interacting with men during menses	2.07	1.038	Agreed
Menses signifies a girl is ready for marriage	2.33	1.029	Agreed
girls should have sex to avoid stomach pain and possible death	2.61	1.020	Disagreed
Dysmenorrhea occurs in menstruating girls who are virgin	2.52	.981	Disagreed
Girls who discuss menses freely are viewed as wayward	2.18	1.085	Agreed
Drinking hot water, alcohol or spicy drinks during menses makes menstrual flow to end fasters and stops abdominal pain	2.48	.873	Agreed
Menstrual cloths or sanitary towels should not be seen in the open to avoid bad luck	2.39	.892	Agreed
Scanty flow shows the girl is not normal (Abnormal)	2.52	.928	Disagreed
Girls should not go to farm during menses to avoid withering of crops	2.41	.967	Agreed
Grand mean	2.35		Agreed

Table 3 indicates that beliefs restricting girls' behaviors during menstruation are common, with high mean values for items such as restricting certain foods (mean = 1.99, SD = .886) and interactions

with men (mean = 2.07, SD = 1.038). These practices suggest a cultural belief in social restrictions tied to menstruation, likely rooted in notions of impurity. Such restrictions can lead to isolation, affecting girls' mental and emotional well-being. Another concern is the belief that menstruation signifies marriage readiness (mean = 2.33, SD = 1.029), which may contribute to harmful practices like early marriage, adversely impacting educational and health outcomes for young girls. While many respondents agreed with certain myths, some beliefs were rejected. Notably, the idea that girls should engage in sex to ease menstrual pain (mean = 2.61, SD = 1.020) and that virgins are more prone to dysmenorrhea (mean = 2.52, SD = .981) faced disagreement. Cultural practices such as hiding menstrual cloths to prevent bad luck (mean = 2.39, SD = .892) and avoiding farming during menstruation to prevent crop damage (mean = 2.41, SD = .967) blend superstition with stigma, as supported by research on menstrual shame and privacy.

Menstruation Fallacies Among Secondary School Girls

The hypothesis that there is no significant difference in menstruation fallacies and beliefs scores of menstruation fallacies among secondary school girls in Kano state, Nigeria was tested using Analysis of variance (ANOVA) and the result is presented in Table 4.

Table 4: ANOVA: Menstruation Fallacies Among Secondary School Girls

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	1.02926	3	0.343087	2.460706	0.078353	2.86626
Within Groups	5.01934	36	0.139426			
Total	6.0486	39				

The results in Table 4 indicate that the within-group variance of 5.01934 is greater than the between-group variance of 1.02926, suggesting no significant differences in menstruation fallacies among secondary school girls across the selected schools. The analysis shows (F = 2.460706, F critical = 2.866266, p = 0.078353), with the P-value exceeding the significance level of 0.05 and the F calculated being less than the F critical. Thus, the null hypothesis is accepted, indicating no differences in menstruation fallacies scores among secondary school girls in Kano state, Nigeria.

Discussion

Menstrual practices reflect the belief that menstruation requires specific social and cultural restrictions, possibly rooted in notions of impurity or taboos associated with menses in various cultures. Such restrictions may reinforce isolation and exclusion, potentially impacting girls' mental and emotional well-being. The findings align with existing research that highlights the widespread prevalence of restrictive beliefs about menstruation across different cultures. For instance, the restriction on girls from consuming certain foods during menstruation (mean = 1.99) corroborates the study by[18], which identifies dietary restrictions as a common manifestation of menstrual stigma. Such restrictions can negatively affect girls' nutritional intake and overall health, further perpetuating the stigma surrounding menstruation. Similarly, the prohibition against interacting with men during menstruation supports the findings of [19], who document how menstrual taboos often result in isolation and reinforce gender-based segregation.

The deep-rooted misconception/fallacy that associates menstruation with a girl's physical and social transition into adulthood, often placing undue pressure on her autonomy and rights, corroborates the findings of other scholars. This observation aligns with the work of [20], which discusses how menarche, in many traditional societies, is viewed as a marker of fertility and is often tied to early marriage practices. Such beliefs contribute to the marginalization of girls and limit their opportunities for personal and educational development. Interestingly, disagreement with some of these restrictive beliefs suggests that harmful practices may be gradually losing their influence, possibly due to increased awareness and education about menstruation. However, while these beliefs may not be universally accepted, their persistence indicates

that misconceptions surrounding menstruation still exist and continue to impact individual behaviours and health-related decisions.

The study also highlights how menstruation is often perceived through a mystical or superstitious lens, which aligns with the research by[21]. This perception perpetuates restrictive behaviours that lack scientific validity but hold strong cultural significance. Addressing these misconceptions through targeted education and awareness campaigns is crucial for shifting societal perspectives, reducing stigma, and fostering a more informed understanding of menstruation. By challenging these fallacies, efforts can be made to improve menstrual health management, reduce discrimination, and create a more inclusive and supportive environment for menstruating individuals.

Conclusion

In conclusion, addressing menstruation fallacies and beliefs among secondary school girls in Kano State is crucial for improving their overall well-being and educational outcomes. This could be achieved through implementing comprehensive educational programmes, providing accurate information, and dispelling myths surrounding menstruation, which can empower young girls to manage their menstrual hygiene effectively and confidently. This approach not only enhances their personal hygiene practices but also contributes to breaking the stigma associated with menstruation in the community.

LIMITATIONS OF THE STUDY

The findings are context-specific and not generalizable. Self-reported data can introduce bias due to ethical sensitivities. Variations in participants' ages and understanding of scientific terms affect response accuracy. Consent requirements limited sample size, and time constraints hindered long-term observation.

FUTURE RESEARCH RECOMMENDATIONS

Despite the valuable insights gained through this study, further research is essential to dismantle myths about menstruation among secondary school girls. Future studies should aim to drive meaningful change in education, policy, and practice.

- Assess menstrual misconceptions among secondary students from various cultural, geographical, and socioeconomic backgrounds.
- Examine longitudinal studies on the long-term effects of menstrual health education for girls and women in rural areas. –
- Investigate how stakeholders and media influence menstrual myths and misconceptions.

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Ethical Approvals: Ethical approval (reference number SHREC/2023/4346) was granted on 08/011/2023 by the Kano State Ministry of Health Research Ethics Committee, along with a letter from the Senior School Management Board. School head teachers were informed about the study's objectives, and consent was obtained. The study's purpose was explained to students, and written informed consent was secured from all participants. The questionnaire excluded any personal identifiers

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Original Article

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Impact of Internet-Based Cognitive Behavioral Therapy on University Students' Mental Health and Loneliness During COVID-19 Self-Isolation

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Abstract

Background: This study examined the effectiveness of an internet-based cognitive behavior therapy (iCBT) in alleviating loneliness and mental health issues in university students during the COVID-19 pandemic.

Methods: An iCBT program was developed and implemented with 186 students from August 2020 to February 2021. It included a 30-minute psychoeducation video created on YouTube and the column method to assess cognitive restructuring. The participants completed five columns over seven days using the university's academic information system. The evaluation tools included PHQ-9, GAD-7, and UCLA Loneliness Scale for depression, anxiety, and loneliness, respectively, and IES-R scales measuring decreases in academic and class motivation. The participants were randomly assigned to the intervention group and the control groups.

Results: The intervention group showed significantly lower scores than the control group in "Intrusion symptoms," "Avoidance symptoms," "Hyper-arousal," "PTSD," "depression," "anxiety," and "loneliness." Additionally, significant improvements were observed in the intervention group's "depression," "loneliness," and "decreased learning motivation," including "decline in class motivation" and "total decline in learning motivation" after the intervention.

Conclusion: These results demonstrated that the iCBT intervention effectively reduced loneliness, PTSD symptoms, depression, and anxiety, and also enhanced learning motivation. Thus, iCBT may effectively alleviate loneliness and mental health issues associated with self-isolation during pandemics.

Keywords: COVID-19, student mental health, loneliness, internet cognitive behavioral therapy (iCBT)

Introduction

In December 2019, cases of pneumonia caused by a novel coronavirus were first reported in Wuhan, China. Subsequently, the World Health Organization (WHO) declared it a "Public Health Emergency of International Concern" on January 30, 2020, and a pandemic on March 11, 2020[1]. Consequently, universities were forced to adopt self-isolation measures and conduct online classes. Various issues unique to the remote format were highlighted, such

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as the need for proper communication infrastructure, confusion with the first-time online learning experience, and the burden of numerous assignments and information processing. Additionally, restrictions on-campus access reduced opportunities for social interactions with friends. Self-isolation and online classes during the COVID-19 exacerbated loneliness among university students. Moreover, students have been identified as a high-risk group for mental health issues globally.

The COVID-19 pandemic significantly impacted the mental health of university students worldwide. Research has shown that various stressors, including fear of infection, academic anxiety, and social constraints, contributed to psychological distress among students. For instance, Cao et al.[2] found that Chinese university students experienced heightened anxiety due to concerns about infection and academic pressure. Similarly, Wang et al. 3 highlighted that uncertainty and stress during the early stages of the pandemic had a direct impact on students' mental health. In the United States, Son et al.[4] identified economic concerns and the transition to online learning as key factors affecting students' psychological well-being. Meanwhile, Elmer et al. [5]examined changes in university students' social networks and suggested that increased social constraints negatively influenced mental health.

Similar trends were observed in Japan, where Takahashi et al. [6]reported findings consistent with those in other countries. Furthermore, Oe [7] identified a link between loneliness and decreased motivation for learning. Among nursing students, Masuda et al. [8] found that stress was closely related to psychological health during the COVID-19 response period. These findings align with Ochiai's [9] assertion that university students, being in a critical stage of adolescence, are particularly vulnerable to loneliness—an emotion that plays a fundamental role in their psychological development. Given this, addressing loneliness appears to be crucial for improving students' mental well-being during the pandemic.

Additionally, from a psychiatric nursing perspective, the prolonged social isolation and increased screen time due to online classes may have heightened risks of de-pressive symptoms, emotional exhaustion, and sleep disturbances among students. The lack of face-to-face interactions with peers and faculty could have also exacerbated feelings of alienation, reducing opportunities for emotional support. Psychiatric nursing emphasizes the importance of early identification of mental health issues, timely interventions, and fostering resilience through structured support systems, which are crucial in mitigating the long-term psychological effects of the pandemic on students.

To mitigate loneliness, various interventions have been explored. A meta-analysis by Masi et al. [10] evaluated multiple approaches, including social skills training, social support enhancement, increased interpersonal contact, and cognitive behavioral therapy (CBT). Among these, CBT demonstrated the most significant effect size in randomized controlled trials. However, due to the risks associated with face-to-face inter-actions during the pandemic, internet-based CBT (iCBT) emerged as a viable alternative. Seewer et al. [11] reported the effectiveness of iCBT in addressing loneliness, suggesting that it could help alleviate feelings of isolation among university students who were forced to stay home due to state-of-emergency measures during the COVID-19 pan-demic. Zhou et al. [12] defined iCBT as a digital intervention grounded in CBT principles, delivered through online platforms. In Japan, Kobayashi et al. [13] highlighted the accessibility of iCBT, noting that it overcomes geographic and economic barriers. This characteristic made iCBT particularly valuable during the pandemic, as it enabled re-mote mental health interventions while maintaining infection control measures.

Despite the growing use of iCBT, no studies have specifically examined its effectiveness in addressing the mental health challenges faced by university students in Japan during the COVID-19 pandemic. To bridge this gap, the present study aims to investigate the impact of iCBT on alleviating loneliness and psychological distress associated with self-isolation among university students.

Methods

1. Design

This study was designed as a non-randomized controlled trial (NRCT)

Trial registration: This non-randomized controlled trial was prospectively registered in the UMIN Clinical Trials Registry (UMIN000058274).

2. Research Question

How effective is iCBT in alleviating loneliness and reducing mental health issues associated with self-isolation during the COVID-19 pandemic?

3. Participants(Fig. 1)

A total of 1880 university students in Japan were invited to participate, and 186 consented. Students staying home due to the COVID-19 pandemic were included, while those with mental disorders were excluded. Forty-three students who completed both pre- and post-intervention questionnaires and participated in the cognitive restructuring method were assigned to the intervention group; another 43 formed the control group. The final sample size was 86. Questionnaire collection was difficult due to the pandemic.

The sample size was 86, with tolerance (5%), response rate (30%), and confidence (95%). Notably, it was challenging to collect questionnaire responses owing to the impact of the pandemic.

1. Inclusion and Exclusion Criteria

Inclusion Criteria

1. Enrollment Status: Currently enrolled as undergraduate or graduate students at a university.
2. Age: Aged 18 years or older.
3. Language Proficiency: Able to read and understand the language in which the intervention materials and assessments were provided.
4. Access to Technology: Had regular access to the internet and a compatible device (computer, tablet, or smartphone) for participating in the online iCBT program.
5. COVID-19 Self-Isolation: Currently experiencing or had experienced a period of self-isolation due to COVID-19 restrictions within the past 6 months.
6. Consent: Provided informed consent to participate in the study.

Exclusion Criteria

1. Severe Psychiatric Conditions: Current diagnosis of a severe mental disorder (e.g., schizophrenia, bipolar disorder) or active suicidal ideation requiring immediate clinical intervention.
2. Concurrent Psychological Treatment: Currently receiving psychotherapy or counseling for mental health issues.
3. Substance Abuse: Evidence of moderate to severe substance use disorder.
4. Inability to Commit: Unwilling or unable to complete the study assessments or the full duration of the iCBT program.

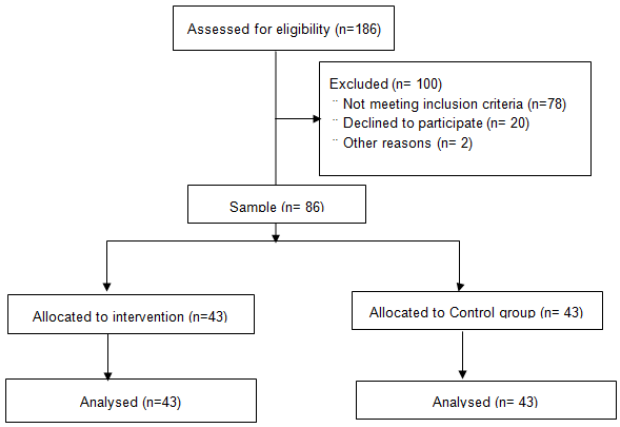

Fig 1: Participant

5. Instruments

i) The iCBT Program

The program was conducted from August 2020 to February 2021 and advertised on the university website. As one of the intervention methods for addressing loneliness, Burns 14 highlights cognitive therapy; thus, cognitive restructuring using the column method was employed. Face-to-face CBT posed the risk of infection; hence, inter-net-based cognitive behavioral therapy (iCBT) was utilized. The program development was based on a model proposed by Noguchi et al. [15]. Initially, a 30-min psychoeducation video was created on YouTube. This video explained the mental health risks to college students due to COVID-19, emphasized the need for mental health support, and introduced the concept of cognitive restructuring. Cognitive restructuring was conducted using the column method. Using the university's educational information system, five columns (thought record sheets) were created. Participants were instructed to record the following:

"Event causing mood decline," "Emotions felt at that time (intensity 0-100)," "Thoughts at that time," "More adaptive thoughts," and "Change in emotions (intensity 0-100)." The records for these five columns were created for seven days. The participants completed the five columns using their smartphones or computers at home.

ii) The Survey

Participants' demographic information was collected regarding their age, gender, department, and academic year. The Patient Health Questionnaire-9 (PHQ-9), consisting of nine items rated on a four-point scale (0–3), based on the frequency of symptoms over the past two weeks, was used to diagnose and assess the severity of depression. The Generalized Anxiety Disorder-7 (GAD-7), consisting of seven items rated on a four-point scale (0–3), based on the frequency of symptoms over the past two weeks, was used to evaluate symptoms of generalized anxiety disorder[16]. The Impact of Event Scale-Revised (IES-R), consisting of 22 items rated on a five-point scale, assessing the intensity of symptoms over the past week, was used to measure post-traumatic stress disorder (PTSD) symptoms. The UCLA Loneliness Scale developed by Russell et al. [17], consisting of 20 items rated on a four-point scale, was used to assess loneliness. Subscales from the Motivation Decrease Scale, developed by Shimoyama [18], were used to measure decreases in academic and class motivation. Each subscale consisted of five items rated on a five-point scale.

The PHQ-9 and GAD-7 were used with permission, whereas the IES-R could be used without permission for research purposes [19].

6. Data Collection

The video on CBT was uploaded to the university's online platform. Additionally, each assessment scale used as an evaluation metric was made available online through Google Forms to allow participants to respond online. Furthermore, a five-column method was implemented using Google Forms to request participants to record their thoughts.

7. Ethical Considerations

This research was conducted in accordance with the Ethical principles of the re-vised Helsinki Declaration. This study was approved by the University of Hyogo University Ethics Review Committee (No. 20003).

Results

Demographic factors (Table 1):

Demographic data was obtained from 86 participants (21 boys and 68 girls). The distribution of students was as follows: 1st year (54 students, 62.8%), 2nd year (13 students, 15.1%), 3rd year (10 students, 11.6%), and 4th year (9 students, 10.5%). The age distribution was as follows: 18 years (26 students, 30.2%), 19 years (25 students, 29.1%), 20 years (18 students, 20.9%), 21 years (11 students, 12.8%), 22 years (5 students, 5.8%), and 23 years (1 student, 1.2%).

Table 1: Demographic Factors

	N	%			N	%
Gender				**Year**		
Male	21	24.4		Freshman	54	62.8
Female	68	79.1		Sophomore	13	15.1
				Junior	10	11.6
Department				Senior	9	10.5
Business Department	14	16.3		**Age**		
Nutrition Management Department	18	20.9		18 years old	26	30.2
Health Systems Department	7	8.1		19 years old	25	29.1
Nursing Department	22	25.6		20 years old	18	20.9
Social Welfare Department	7	8.1		21 years old	11	12.8
Child Welfare Department	6	7.0		22 years old	5	5.8
Early Childhood Education Department	12	14.0		23 years old	1	1.2

Inter-group data comparison before intervention (Table 2):

T-tests were conducted to compare intergroup data at the pre-test stage for each subscale. Consequently, the intervention group showed significantly higher scores in "Intrusion symptoms" of PTSD compared to the control group. Although the intervention group tended to have higher mean values on the other subscales, no significant differences were found at the 5% level of significance. Overall, the homogeneity of each group (intervention and control) at the pre-test stage was confirmed.

Table 2: Inter-group data comparison before intervention

		Intervention group		Control group				
		M	**SD**	**M**	**SD**	**t value**	**p value**	**Cohens'd**
IES-R	Intrusion symptoms	11.36	8.18	8.34	6.73	2.21	0.02	0.26
	Avoidance symptoms	12.52	7.50	9.85	7.42	1.93	0.06	0.24
	Hyper-arousal	8.15	6.24	5.88	5.07	1.95	0.06	0.26
	PTSD total	32.03	20.33	24.07	17.46	2.10	0.06	0.27
PHQ-9	Depression	13.00	3.46	4.96	4.94	1.75	0.09	1.35
GAD-7	Anxiety	6.27	5.41	4.53	4.25	1.70	0.10	0.23
UCLA Loneliness Scale	Loneliness	56.33	4.93	39.20	9.72	1.97	0.06	1.75
Decline in learning motivation	Decreased learning motivation	13.70	2.17	13.78	2.04	0.10	0.92	0.03
	Decline in class motivation	8.55	2.50	8.22	3.08	0.58	0.56	0.08
	Total decline in learning motivation	22.24	3.21	22.01	3.83	0.41	0.68	0.05

Verification of intervention effects (Table 3)

The video was viewed 117 times with an average viewing time of 3:07 min and an average playback rate of 10.4%. Participants were assigned to the intervention group (6 boys and 32 girls) or the control group (12 boys and 36 girls) voluntarily. To verify the intervention effects, ANCOVA was used, with the pre-test scores of each evaluation metric as covariates, groups (intervention group, control group) as independent variables, and the post-test scores of each evaluation metric as dependent variables. A test for the parallelism of regression, a prerequisite for ANCOVA, was conducted. The interactions between groups (intervention and control groups) as independent variables and the post-test scores of each evaluation metric as dependent variables were not significant. First, for PTSD, the intervention group showed significantly lower values than the control group for "Intrusion symptoms" ($F(1, 82) = 5.58$, $p = .02$, $\eta p2 = .03$), "Avoidance symptoms" ($F(1, 82) = 2.96$, $p = .05$, $\eta p2 = .02$), "Hyper-arousal" ($F(1, 82) = 2.53$, $p = .10$, $\eta p2 = .01$), "PTSD total" ($F(1, 82) = 4.55$, $p = .03$, $\eta p2 = .02$), "depression" ($F(1, 182) = 5.81$, $p = .02$, $\eta p2 = .03$), "anxiety" ($F(1, 82) = 6.14$, $p = .01$, $\eta p2 = .03$), and "loneliness" ($F(1, 82) = 5.56$, $p = .02$, $\eta p2 = .03$). Next, multiple comparisons and tests for simple main effects were performed using the Bonferroni correction. Consequently, significant improvements were confirmed in the intervention group for "depression" ($p = .03$), "loneliness" ($p = .02$), "Decreased learning motivation" ($p = .02$), "Decline in class motivation" ($p = .03$), and "Total decline in learning motivation" ($p = .01$).

Table 3: Changes in each scale before and after the intervention

		Intervention group				Control group						
		Before		After		Before		After				
		M	SD	M	SD	M	SD	M	SD	F value	p value	η^2
IES-R	Intrusion symptoms	11.36	8.18	10.33	6.35	8.34	6.73	7.90	6.44	5.58	0.02	0.03
	Avoidance symptoms	12.52	7.50	12.00	7.94	9.85	7.42	8.81	7.31	2.96	0.05	0.02
	Hyper-arousal	8.15	6.24	7.33	2.52	5.88	5.07	5.39	5.05	2.53	0.10	0.01
	PTSD total	32.03	20.33	29.67	16.44	24.07	17.46	22.11	17.46	4.55	0.03	0.02
PHQ-9	Depression	13.00	3.46	6.61	4.69	4.96	4.94	4.98	5.23	5.81	0.02	0.03
GAD-7	Anxiety	6.27	5.41	4.67	2.89	4.53	4.25	4.27	4.34	6.14	0.01	0.03
UCLA Loneliness Scale	Loneliness	56.33	4.93	42.94	9.31	39.20	9.72	39.21	9.60	5.56	0.02	0.03
Decline in learning motivation	Decreased learning motivation	13.70	2.17	11.00	2.00	13.78	2.04	13.68	2.27	0.02	0.89	0.00
	Decline in class motivation	8.55	2.50	6.67	1.53	8.22	3.08	7.36	2.61	0.29	0.59	0.00
	Total decline in learning motivation	22.24	3.21	17.67	3.21	22.01	3.83	21.04	3.27	0.02	0.89	0.00

Discussion

This study examined the effectiveness of iCBT in alleviating loneliness and mental health problems associated with self-isolation during the COVID-19 pandemic. The intervention group showed significantly lower values than the control group for "Intrusion symptoms," "Avoidance symptoms," "Hyper-arousal," "PTSD total," "depression," "anxiety," and "loneliness." Additionally, significant improvements were con-firmed in the intervention group for "depression," "loneliness," "Decreased learning motivation," "Decline in class motivation," and "Total decline in learning motivation." These results suggest that iCBT interventions can reduce "loneliness"; alleviate symptoms of PTSD, depression, and anxiety; and significantly improve learning motivation among university students.

From the perspective of psychiatric nursing, loneliness and mental health distress are deeply intertwined, particularly in times of crisis such as the COVID-19 pandemic. Social isolation can exacerbate feelings of anxiety and depression, leading to increased psychological distress and potentially long-term psychiatric conditions. iCBT offers a structured approach to addressing these issues by providing cognitive restructuring strategies that help individuals reframe negative thoughts and develop healthier cop-ing mechanisms. Given the high rates of mental health disorders among university students during the pandemic, such interventions are essential.

Ohue conducted a mental health survey of university students in July 2020 (second wave) during the COVID-19 pandemic [20]. The results showed that 102 participants (13.8%) reported moderate-to-severe anxiety disorders, 154 (20.9%) reported moderate-to-severe depression, and 318 (43.1%) reported moderate-to-severe PTSD symptoms. This indicates a high risk of mental health problems among university students during the COVID-19 pandemic, suggesting the need for mental health support for university students during the COVID-19 pandemic. The second wave of COVID-19 infections showed significantly lower levels of PTSD, decreased motivation to learn, and decreased motivation to attend classes compared to the third wave. It was found that early feelings of loneliness and a decline in learning motivation led to later mental health issues

[21]. Additionally, Adachi et al. stated that although the need for consultations and support at universities was significantly lower in the 2020 academic year than in the previous year [22], it is necessary to consider interventions for students who have become socially withdrawn, are unable to respond to surveys because of deteriorating health conditions and have dropped out of academic activities due to distance from universities. Therefore, "loneliness" and mental health support were considered necessary during the COVID-19 pandemic.

Insights from past studies suggest that approaches such as online support groups, mindfulness programs, and television counseling are effective in improving the mental health of university students [23]. Furthermore, Valeri et al. demonstrated in a randomized controlled trial (RCT) focusing on loneliness related to COVID-19 that video-based interventions can effectively reduce loneliness and related negative emotions such as fear and social prejudice. Participants who participated in the video interventions reported more significant reductions in loneliness than those who only received information sheets [24]. Similarly, our study confirmed the effectiveness of CBT via an online intervention for mental health support during the COVID-19 pandemic. This program was developed based on the 5-minute cognitive reconstruction method of Noguchi et al. [15] and Burns' 14 CBT for loneliness. Similarly, by implementing cognitive reconstruction methods that can be conducted in about five minutes a day, intervention effects for "depression," "anxiety," and "PTSD" were verified. Additionally, Burns reported factors related to loneliness such as "becoming defensive," "fearing criticism," "having unrealistically high expectations," and "being excessively self-critical" 14. University students may have experienced various problems unique to remote learning during the COVID-19 pandemic, such as securing the communication environment necessary for online classes, confusion about online classes for the first time, and the burden of handling large amounts of assignments and information, that may affect their mental health. Additionally, some universities restricted access during the COVID-19 pandemic, reducing opportunities for socializing with friends and communicating less. University students may have become more defensive due to fear of infection and rumors during the COVID-19 pandemic, exacerbating loneliness. Loneliness is also commonly experienced during adolescence as self-discovery progresses 9; therefore, interventions to address these feelings of loneliness assumed greater importance during the COVID-19 pandemic. Cognitive reconstruction is one of the CBT techniques to alleviate loneliness 14. This method was effective in recognizing these negative thoughts, overcoming painful emotions, and fostering more positive and realistic thinking, in this study.

From a psychiatric nursing perspective, these findings emphasize the importance of emotional support systems in conjunction with iCBT. Nurses and mental health professionals play a crucial role in facilitating these interventions, providing additional counseling, and ensuring that students have access to appropriate psychological re-sources. Further research is needed to explore the long-term impact of iCBT on mental health and to determine the most effective combination of digital and human support.

Future Challenges and Conclusions

In this study, iCBT was implemented during the COVID-19 pandemic. A total of 117 students (6.2% of the university population) watched educational videos, and only 43 (2.0%) engaged with the cognitive reconstruction method. This low participation may indicate that high-risk students did not access the program. The limited reach could be due to the rapid development and deployment necessitated by the pandemic. To prepare for future emergencies, more robust and accessible support systems are needed.

This was a non-randomized trial, and random sampling was difficult under pandemic conditions. Future research should consider randomized controlled trials (RCTs) for more reliable results.

The study also had limitations. The sample was skewed toward female and first-year students, which may affect the generalizability of the findings. Mental health and loneliness can differ by gender and academic year, and our sample may not reflect the broader student population. Although no significant interactions were found in subgroup analyses, the potential influence of sample imbalance cannot be ruled out.

Future studies should aim for more balanced recruitment and apply appropriate statistical adjustments to improve representativeness. Longitudinal designs may also help assess long-term effects.

Despite these limitations, this study suggests that iCBT has potential as an effective mental health support for university students during isolation periods. Further research with improved design and broader participation is needed to confirm its effectiveness and applicability.

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Original Article

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Exploring the Nursing Professional Self-Concept of Nursing Interns in China:Current Status and Influencing Factors

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Abstract

Objective. This study examines the current self-concept of nursing professionals among intern nursing students, and aims to identify the influencing factors and explore strategies for stabilizing and fostering the positive development of nursing teams

Methods 156 intern nursing students from a tertiary hospital in Beijing were selected as the survey subjects by convenient sampling, the questionnaire survey was carried out using the general information questionnaire and the nursing professional self-concept scale.

Results The total score of the professional self-concept scale of intern nursing students was (83.50±13.43), the average score of each item was (2.78±6.71), among the five dimensions, the satisfaction score was the highest (20.89±3.35), indicating that interns generally value their professional identity and derive fulfilment from clinical practice. The professional skills score (18.33±4.49), suggests adequate competence in technical aspects, whereas the lowest score was observed in communication (11.93±1.75), suggesting that insufficient communication skills may hinder effective patient interactions and collaborative teamwork. There were statistically significant differences in nursing professional self-concept scores among intern nursing students based on gender, leadership roles, only-child status, whether nursing was their chosen major, and personality type.

Conclusion Intern nursing students are at a moderate level of self-concept in the nursing profession. Nursing educators should provide a supportive and encouraging learning environment for interns, and improve their professional self-concept by combining theoretical learning and practical experience, so as to continuously stabilize and expand the nursing workforce in China .

Key words: Nursing interns; Nursing; Self-concept; Influencing factors

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Introduction

The nursing professional self-concept refers to nurses' cognitive understanding of the nursing profession and their professional orientation. A positive nursing professional self-concept can enhance nurses' professional identity [1]. Clinical internships are a critical period for nursing students to improve their self-awareness and transition from academic education to clinical practice [2]. However, However, nursing students' lack of work experience and differing psychological characteristics from in - school students and practicing nurses often lead to a significant decrease in their nursing professional self - concept during the internship phase compared to the academic learning stage[3]. As an important reserve force for the future nursing profession, focusing on the nursing professional self-concept of intern nurses is essential for maintaining students' mental health and promoting their professional identity and sense of professional benefit.

In recent years, domestic scholars have increasingly studied nursing students' nursing professional self-concept. Leng Yanan et al. [4] pointed out that during the internship period, a positive nursing professional self-concept can lead interns to adopt effective practical behaviors and strengthen their professional identity. Wu Han et al. [5], in their study on the mediating effect of professional self-concept on intern nurses' learning engagement and humanistic care, found that the higher the level of learning engagement among nursing students during their internship, the greater their satisfaction with nursing and their humanistic care toward patients. Hou Danhua et al. [6] also demonstrated that the higher the score of nursing students' professional self-concept, the more positive their emotional experiences during the learning process, which helps improve their health assessment awareness and nursing abilities, thus fostering a correct professional outlook.

Research on nursing professional self-concept interventions abroad has reached a relatively mature stage. For example, Australian scholar Mohajer Samira [7] proposed that professional portfolio learning, as an innovative and comprehensive blended teaching method, can enhance interns' nursing professional self-concept and strengthen the connection between theoretical knowledge and clinical practice in Geriatric. Research shows[8] that high nursing professional self-concept enables students to take on their clinical roles with ease.

Therefore, this study aims to investigate the current status of nursing professional self-concept among intern nurses and analyze its influencing factors. By identifying targeted measures to improve the nursing professional self-concept of intern nurses, this study aims to provide a reference for the stability and growth of the nursing workforce.

Subjects and Methodology

Research object

A convenience sampling method was employed to select 158 nursing students who were interning at a tertiary general hospital in Beijing from November 15, 2024, to December 15, 2024. The inclusion criteria were participants with at least 3 - month internship duration and voluntary participation. Exclusion criteria included history/current mental illness or consciousness disorders and inability to complete the survey.

The instruments

General information questionnaire

A self-designed general information questionnaire was used to collect general data from intern nurses, including the following seven items: gender, place of household registration, whether they are an only child, whether nursing was their voluntary choice of major, whether there are family members working in the medical field, whether they have served as student leaders, and personality type (self-assessed as introverted or extroverted).

Nursing Professional Self-Concept Scale

The Nursing Professional self-concept Scale used in this study was developed by Arthur [8] and localized into Chinese by Yang Guirong et al. [9]. This scale consists of 30 items across five dimensions: flexibility, management ability, professional skills, communication, and satisfaction. Each item is scored using a Likert scale with four levels, and higher scores indicate a higher level of nursing professional self - concept, with a total score of 120 points. A positive

nursing professional self - concept is considered when the average score per item exceeds 2.5 or the total score exceeds 75. The Chinese version of the scale has been proven to have high reliability and validity, with a split-half reliability of 0.86 and an internal consistency reliability of 0.84.

Data collection methods

The questionnaires were distributed online to the participants via Questionnaire Star. Prior to the survey, the participants were informed about the research purpose and precautions to ensure they understood the requirements. Each participant independently completed the questionnaire. After completion, the preliminary data were exported from Questionnaire Star for analysis. The estimated time for completing the questionnaire was 5 to 10 minutes, and each participant was allowed only one submission opportunity to ensure the authenticity and reliability of the data.

Statistical methods

Data analysis was performed using SPSS 27.0. Continuous variables were described using mean and standard deviation, and categorical variables were described using frequency and percentage (%). Univariate analysis was conducted using independent-sample t-tests and analysis of variance (ANOVA), while multivariate analysis was performed using multiple regression analysis to identify the influencing factors of professional self-concept among intern nurses. A P-value < 0.05 was considered statistically significant.

Results

General information on nursing interns

A total of 158 electronic questionnaires were distributed, with 156 valid responses collected, yielding a valid response rate of 98%. Among the 156 surveyed intern nurses, 7.7% were male and 92.3% were female. For household registration, 84.0% were from rural areas and 16.0% from urban areas. 23.7% of participants were only children. For detailed information, see Table 1.

Table 1: General information on nursing interns (n=156, %)

Item	Variable level	Number of people (% of %)
Gender	Male	12 (7.7)
	Female	144 (92.3)
Locationof household	Rural	131 (84.0)
	Urban	25 (16.0)
Only child	Yes	37 (23.7)
	No	119 (76.3)
Whether admission to the nursing program is voluntary	Yes	77 (49.4)
	No	79 (50.6)
Whether someone in the family is engaged in the medical profession	Yes	10 (6.4)
	No	146 (93.6)
Are you a student leader	Yes	51 (32.7)
	No	105 (67.3)
Personality	Introversion	34 (21.8)
	Extraversion	122 (78.2)

Self-concept scores of nursing interns on nursing specialty

In this survey, the total score of nursing professional self-concept among intern nurses was (83.50±13.43), and the average item score was (2.78±6.71). The dimension with the highest score was satisfaction (20.89±3.35), followed by professional skills (18.33±4.49), while the dimension with the lowest score was communication (11.93±1.75). For detailed information, see Table 2.

Table 2 Professional self-concept scale scores of nursing interns (n=178, score,$\bar{x}\pm s$)

Dimension	Dimension Score	Entry Mean Score
Total score	83.50±13.43	2.78±6.71
Satisfaction	20.89±3.35	2.21±0.41
Professional skills	18.33±4.49	3.05±0.74
Flexibility	18.21±4.65	3.03±0.77
Management skills	14.11±2.94	2.35±0.49
Communication	11.93±1.75	2.38±0.35

The item with the highest score on the scale was "Nursing is a satisfying career" (2.70±0.79), while the item with the lowest score was "As a nurse, I feel trapped in difficulties" (1.94±0.92). For detailed information, see Table 3.

Table 3 Entries in the top 5 and bottom 5 nursing specialty self-concept scores of practicing nursing students(n=156, score,$\bar{x}\pm s$)

Entry	Dimension	Score
Entries with top 5 scores		
7. nursing is a career that gives satisfaction	Satisfaction	3.22±0.99
14. the ability to be flexible and adaptable can help solve nursing problems	Flexibility	3.15±1.00
3. I am able to improvise when I encounter special situations at work	Flexibility	3.12±0.91
8. I believe flexibility is one of my characteristics	Flexibility	3.11±0.96
15. most people would say nursing is a valuable profession	Satisfaction	3.06±0.94
Entries with scores in the bottom 5		
28. my creativity helps me solve problems when I face nursing problems	Communication	2.02±0.98
13. I regret choosing nursing as a career	Satisfaction	2.01±0.88
9. I prefer that I have boundaries with my patients	Communication	2.01±0.89
16. I don't believe I can be particularly compassionate	Communication	1.95±0.92
18. as a nurse, I have the feeling of being put into a difficult situation	Satisfaction	1.94±0.92

Comparison of nursing professional self-concept scores among practicing nursing students with different demographic characteristics

The results indicated that there were statistically significant differences in the scores of nursing professional self-concept among intern nurses regarding gender, whether they were only children, whether nursing was their voluntary major choice, whether they served as student leaders, and different personality types (P<0.05, see Table 4).

Table 4 Comparison of nursing professional self-concept scores among practicing nursing students with different demographic characteristics (n=156, score, $\bar{x}\pm s$)

Item	Category	Number of people	Score	t/F	P
Sex	Male	12	57.67±8.01	-8.31*	<0.01
	Female	144	85.65±11.40		
Location of household registration	Rural	131	86.69±10.52	8.08	0.389
	Urban	25	66.76±14.78		
Only child	Yes	37	71.08±15.98	-7.28*	<0.01
	No	119	87.22±10.02		
Whether voluntarily choose nursing profession	Yes	77	88.49±9.54	4.91*	<0.01
	No	79	78.63±14.88		
Whether someone in the family is in the medical profession	Yes	10	92.60±5.71	2.24*	0.26
	No	146	82.88±13.59		
Whether they are student leaders	Yes	51	74.55±15.78	-6.53	<0.01
	No	105	87.85±9.53		
Personal character (self-assessed introversion or extroversion)	Introversion	34	70.74±15.88	-7.22*	<0.01
	Extraversion	122	87.06±10.01		

* denotes the value F, ** denotes the value t

Multiple linear regression analysis of factors influencing nursing professional self-concept of intern nursing students

To further clarify the impact of sociodemographic factors on nursing students' professional self-concept, a multiple linear regression analysis was conducted. The scores of nursing professional self-concept among intern nurses were used as the dependent variable, while gender, place of household registration, whether they were only children, and whether nursing was their voluntary choice (statistically significant items in the general data) were used as independent variables. The results showed that these factors influenced the self-concept scores of intern nurses. The coding method for independent variables is shown in Table 5, and the results are presented in Table 6.

Table 5 Independent Variable Assignment Methods

Item	Mode of assignment
Sex	Male = 1; Female = 2
Place of household registration	Rural=1; Urban=2
Only child or not	Yes=1; No=2
Whether the nursing profession is a voluntary choice	Yes=1; No=2
Anyone in the family working in the medical profession	Yes=1; No=2
Whether serving as a student leader	Yes=1; No=2
Personal Character (Self-rated introvert or extrovert)	Introvert=1; Extrovert=2

Table 6 Multiple linear regression analysis of factors influencing the nursing professional self-concept scores of nursing interns (n=156)

Dependent variable	Independent variable	Unstandardized coefficient		Standardized coefficient	t	P
		B	Standardized Error	B		
Intern nursing students' self-concept of nursing specialty	Constant	62.191	17.626		3.528	<0.001
	Gender	17.487	4.257	0.348	4.108	<0.001
	Location of household	-6.624	4.611	-0.181	-1.436	0.060
	Whether only child	5.500	8.039	0.173	0.684	P<0.01
	Whether nursing profession is voluntary	-1.809	2.393	-0.067	-0.756	0.002
	Whether someone in the family is in the medical profession	-4.719	3.605	-0.086	-1.309	0.129
	Whether he/she is a student leader	3.571	3.481	0.124	1.026	0.042
	Personal character (self-rated introversion or extroversion)	-4.778	8.313	-0.147	-0.575	0.003

R^2=0.405； *Durbin-Watson*=2.022； F=14.322； P<0.01

Discussion

Nurses, the largest occupational group in health care, play a vital role in maintaining doctor - patient relationships and safeguarding patient health.[7]. However, due to the high-risk, high-intensity nature of nursing work, coupled with societal pressures, nurses have a high turnover rate, and the global health care system is increasingly facing a shortage of nursing staff [10-11]. Studies have shown that a positive professional self-concept enables nurses to provide better patient care, enhances job satisfaction and professional identity, and reduces burnout and turnover intentions, which are crucial for both nurses' personal well-being and professional development [12-13]. Therefore, focusing on the cultivation of professional self-concept in nursing students can help alleviate the nursing shortage and improve the quality of nursing services.

Intern nursing students' professional self-concept is generally at an intermediate level

According to the results in Table 2, the total score of professional self-concept among intern nurses was (83.50±13.43), which is above 75, indicating a medium level. This is lower than the findings of Huang Miao et al. [14], possibly because their study only included undergraduate students, who generally have higher professional quality and knowledge reserves.Among the five dimensions, satisfaction had the highest score, with the item "Nursing is a satisfying career" scoring the highest. This may be related to the initial enthusiasm and motivation of intern nurses as they begin their clinical work with professional ideals and beliefs.

The dimensions of flexibility and professional skills were at a medium level. The medium - level scores in flexibility and professional skills dimensions may be due to individual differences in students' abilities, learning paces, and psychological pressures like concerns about employment prospects and self - doubt about skills. To enhance intern nurses' self-concept in professional skills and flexibility, schools and medical institutions can take measures such as strengthening practical teaching, providing simulation training, encouraging clinical internships, and adjusting teaching and evaluation methods. Mental health support to build students' confidence is also essential.

The management ability dimension scored relatively low, possibly due to insufficient experience and confidence among intern nurses. Nursing

education may focus more on professional knowledge and skills while neglecting management and leadership training, leading to lower self-evaluation in this area. Hospital leaders should provide more practice opportunities, management skills training, and guidance based on personal interests to improve intern nurses' self-evaluation in management ability.

The communication dimension had the lowest score, indicating a need for improvement in communication skills among the surveyed intern nurses. This aligns with the findings of Zhang Qunhong [15] et al. and may stem from inadequate emphasis on communication skills training in nursing education and insufficient practical activities in relevant courses. The lack of patient communication opportunities and individual differences in background, personality, and language expression also affect communication skills. To address this, more communication skills training, encouragement to participate in communication activities, and adjustments to teaching and evaluation methods are recommended.

Analysis of the factors influencing the self-concept of the nursing profession of nursing interns

Gender

According to the results of the study in Table 4, there is a statistical difference between the nursing professional self-concept scores of female trainee nurses compared to male trainee nurses (P<0.05). This discrepancy may stem from societal perceptions influenced by historical media portrayals and traditional gender norms, which frame nursing as a predominantly female profession. Such stereotypes contribute to limited public recognition of male nurses, leading them to perceive lower professional value and familial contribution, thereby fostering negative emotions like frustration[16], and also as a result of this, male nurses may need to be paid more attention to and given more support for constructing and maintaining a sense of professional identity. Relevant studies indicate that 60% of male students chose nursing due to family transfer or arrangement rather than passion. This may lead to resistance after enrollment and affect their nursing professional self - concept[17].

To address this situation, nursing educators should tailor their teaching to the needs of their students, strengthen the professional cognitive education of male nursing students in practice, and cultivate their enlightened professional understanding in order to improve their sense of professional identity; encourage male nursing students to participate in continuing education and professional development activities in order to improve their knowledge of professional skills, which will enhance their self-confidence and market competitiveness; and change the gender and nursing profession through training, discussion, and publicity of the traditional perceptions and prejudices can help male trainee nursing students to develop a positive self-image and enhance their self-concept in the nursing profession, thus better integrating them into the profession.

Whether or not they are student leaders

According to the results in Table 4, the difference between the nursing professional self-concept scores of those who had been student leaders compared to those who had not been student leaders was statistically significant (P <0.05). This is similar to the results of the study by Zhang Xiuting [3] et al. This may be due to the fact that intern nursing students who have had the experience of student cadres are often held in higher expectations, such students are expected to have a higher knowledge base, broader vision, and skillful operational skills, which may lead to the collapse of the psychological defenses of such nursing students and create a sense of discrepancy, resulting in a loss of self-confidence and love for the nursing career if the performance of such students is not evaluated in the expected manner.

Therefore, nursing educators should provide special training and education for students who have served as student cadres, provide psychological counseling and support, encourage nursing students to help class cadres deal with stress and anxiety, promote mental health, enhance their self-confidence, and improve job satisfaction; give positive feedback and praise to nursing students, affirm their efforts and achievements, and help them establish a good self-identity.

Whether or not you are an only child

According to the results in Table 4, the scores of nursing professional self-concept among only-child intern nurses were significantly lower than those of non-only-child intern nurses (P<0.05), which is consistent with the findings of Zhang Qunhong[15]. This may be because non-only-child individuals often receive more family support, which helps them gain emotional reliance and practical assistance when facing challenges, thereby enhancing their confidence and self-efficacy. Additionally, non-only-child individuals tend to have more family interactions, which promotes their interpersonal communication skills, an important skill for nursing students that positively impacts their self-concept. Research has shown [18] that some only children grow up in relatively superior environments, which may lead to a self-centered attitude, lack of initiative, and independence, thereby affecting their nursing professional self-concept.

Therefore, hospital leaders and teachers should focus on the mental health of only-child nurses, guide them properly, and help them build confidence. They should encourage only-child nurses to participate in team work to develop their communication skills and team spirit. Moreover, it is essential to cultivate effective interpersonal and patient-care communication skills among nursing students to enhance their confidence and efficiency in nursing work.

Whether the nursing program is voluntary or not

According to the results in Table 4, nursing students who did not choose nursing as their major voluntarily had significantly lower scores in nursing professional self-concept compared to those who did (P<0.05). This contradicts the findings of Zhu Min[19], possibly due to differences in sample size and distribution.

Most nursing students select the major after careful consideration, aligning it with their interests and other factors, leading to a more positive attitude towards nursing. Research indicates that intern nurses with a strong interest in nursing tend to have a higher nursing professional self-concept, which encourages them to commit to the nursing profession [20].

To address this, hospital leaders and school teachers should provide clinical internship opportunities to expose students to the actual work environment early on. This hands-on experience can enhance their understanding and interest in the profession. Additionally, offering career planning services to help students set personal career goals can foster a positive attitude towards nursing and improve their nursing professional self-concept.

Personalities (self-assessed introversion or extroversion)

According to the results of the study in Table 4, extroverted nursing students' nursing professional self-concept is higher than introverted nursing students' nursing professional self-concept scores, and the difference is statistically significant (P<0.05), which is different from the results of the study conducted by Ho [9] and others , and the reason for this may be that Ho studied nursing students' nursing professional self-concept in different stages of internship, and in the primary stage of internship, nursing students have just begun to engage in clinical practice. and need a transformation process. During this period, practicing nursing students with different personalities had a consistent self-concept understanding of the nursing profession. In addition, extroverted personalities are more active in social situations and are good at communicating with people. In the nursing profession, this trait helps to establish good relationships with patients and improve the quality of nursing services, which leads to a sense of accomplishment in nursing and enhances their self-confidence and self-worth.

Therefore, nursing educators can conduct counseling and support groups to help introverted nursing students deal with stress, improve their emotional state, and enhance various kinds of satisfaction; and encourage introverted nursing students to participate in social activities, such as team building activities and professional exchanges, in order to improve their communication skills and teamwork spirit, thus enhancing nursing professional self-concept.

Conclusions

Nursing interns' professional self-concept of nursing is at a medium level, and there is much room

for improvement in the overall situation, which is influenced by gender, whether they serve as student cadres, whether they are only children, whether they voluntarily choose their nursing specialty, and their personalities. Nursing educators should provide a supportive and encouraging learning environment for nursing interns to improve their professional self-concept by combining theoretical learning and practical experience, so as to continuously stabilize and strengthen our nursing team. However, this study has several limitations. First, the sample was from a specific hospital, limiting the generalizability of the findings to other regions or cultures. Second, the cross-sectional design does not allow causal inference, and longitudinal studies are needed to explore the development of professional self-concepts. Third, personality type was self-assessed (introversion vs. extroversion), which may be less valid than standardized psychological assessments. Finally, this study did not examine the relationship between variables like the clinical work environment or institutional support system and professional self-concept.

Representations:

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