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Personal, Social, and Institutional Factors Influencing Nursing Career Decisions: Evidence from a Post-Conflict Philippine Setting

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Abstract

Nursing remains a socially relevant and globally in-demand profession, yet students often struggle to make informed career decisions and maintain sustained motivation. This study explored the factors shaping nursing students' career choices and the challenges they face at Mindanao State University – College of Health Sciences (MSU-CHS), Marawi City. Using a cross-sectional descriptive design, data were collected from 231 students through a structured questionnaire assessing personal, interpersonal, and social influences, as well as access to career, counseling. Descriptive statistics highlighted that personal motivations, particularly caring for ill family members and a strong commitment to service, were the most significant drivers of career choice. Interpersonal encouragement from family and mentors, and admiration for nurses, also shaped decisions, while social factors such as financial security and opportunities for overseas employment were influential. Students reported major challenges, including academic pressure, financial limitations, and external expectations. Most respondents indicated limited access to effective career counseling. Findings emphasize the need to strengthen institutional support by improving counseling, mental health services, and financial assistance, and by engaging parents, faculty, and community partners more effectively to prepare resilient, committed future nurses.

Keywords: Career choice, nursing career decisions, nursing students, academic and social challenges

Introduction

Nursing is widely regarded as a socially meaningful and globally in-demand profession; however, career decision-making among nursing students remains complex and shaped by multiple factors. Existing studies demonstrate that intrinsic motivations, such as the desire to help the sick, provide compassionate care, and serve others, are primary drivers of choosing nursing as a career [34,14]. Familial influences, including parental encouragement, admiration for nurses, and exposure to role models, further reinforce career decisions, although excessive pressure may lead to dissatisfaction or reluctance among students[20,26].

Social and economic considerations also shape nursing career preferences. Financial stability, employment security, and opportunities for international work are strong motivators, while

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societal respect for the profession contributes to sustained commitment[1]. However, negative stereotypes, gender biases, and the perception of nursing as a female-dominated and less prestigious profession may discourage potential students, particularly males[11].

To navigate these influences, guidance and counseling services play a critical role in helping students make informed and autonomous career decisions. Evidence suggests that access to structured counseling enhances clarity, confidence, and career satisfaction[14,27]. The Philippines, Republic Act No. 9258, and CHED Memorandum Order No. 9, Series of 2013 mandate the provision of guidance and counseling in higher education institutions[6]. Yet, in socio-economically disadvantaged and post-conflict areas such as Marawi City, access to such services remains limited.

Despite a wide literature on nursing career choice, little is known about how it unfolds within the unique socio-cultural and post-conflict context of MSU-CHS in Marawi City. This study addresses this gap by examining the personal, familial, social, and economic factors influencing students' decisions and the challenges they face. These insights are essential for developing context-sensitive guidance and support programs that promote informed and resilient career pathways in nursing.

Research Method

This study employed a cross-sectional descriptive design to examine the factors and challenges influencing nursing students' career choices. Conducted at MSU–College of Health Sciences, Marawi City, during the first semester of AY 2024–2025, the study used a quantitative approach to measure students' characteristics, motivations, and perceptions systematically.

A total of 231 first- to fourth-year nursing students were selected through purposive sampling. Data were collected using a researcher-developed questionnaire based on Nwodoh and Ugwu's framework, covering socio-demographic data, personal and external influencing factors (rated on a 5-point Likert scale), and career-choice and counseling challenges. All items were closed-ended for consistency[26]. Content validity was established through expert review, and a pilot test yielded a Cronbach's alpha of 0.87, indicating high reliability. Data were analyzed using descriptive statistics: frequencies and percentages for categorical variables, and weighted mean and standard deviation for influence scores.

Ethical approval was obtained from the College Dean, and informed consent, voluntary participation, and confidentiality were ensured. While the findings offer valuable local insights, generalizability is limited due to the unique socio-cultural and post-conflict context; future studies may conduct comparative research across institutions or regions.

Results and Discussions

Demographic Profile of the Respondents

This section presents the respondents' demographic characteristics, age, gender, year level, civil status, religion, mode of entry, and monthly family income, to contextualize their backgrounds and potential influences on career choice. Frequencies and percentages were used to identify demographic patterns relevant to interpreting students' motivations, challenges, and counseling needs. Age is particularly important, as it reflects developmental stage and life experience, both of which shape career aspirations and readiness for the nursing profession.

Table 1. Frequency and Percentage Distribution of the Respondents' Profile in Terms of Age

AGE	Frequency (n)	Percentage (%)
18-19 years old	44	19.05%
20-21 years old	89	38.53%
22-23 years	80	34.63%
24 and above	18	7.79%
Total	231	100.00%

Figure 1 shows that most respondents are 20–21 years old, indicating that the study largely captures the perspectives of students in their early twenties, a stage characterized by active academic involvement, career exploration, and personal development. The smaller proportion of younger (18–19) and older (24+) participants suggests that the sample is concentrated among those in transitional academic or early professional phases. This age

distribution should be taken into account when interpreting age-related findings, as it may influence the generalizability of the results.

These observations align with the findings of Pham, Bao, and Bui, who have reported that students aged 20 to 23 are more actively engaged in exploring career options and developing confidence in their decisions[31]. This correspondence reinforces the notion that early adulthood represents a critical period for career decision-making, suggesting that the majority of respondents in this study are at an optimal stage for receiving meaningful career guidance and planning support.

Gender is also an important factor in understanding students' perspectives within the nursing profession, particularly in a field historically dominated by women. Examining the gender distribution offers insight into the dynamics of gender at the MSU College of Health Sciences. It highlights the level of male participation in a traditionally female-oriented discipline. Understanding this distribution is vital for discussions on diversity and inclusivity in nursing education and practice. Table 2 presents the frequency and percentage of respondents by gender, providing a clear profile of the study's demographic composition.

Table 2. Frequency and Percentage Distribution of the Respondents' Profile in Terms of Gender

Gender	Frequency (n)	Percentage (%)
Male	35	15.15%
Female	196	84.85%
TOTAL	231	100.00%

The gender distribution of respondents shows a clear predominance of female students, indicating that the findings may largely reflect female perspectives. This should be considered when interpreting results, especially when gender differences may influence motivation, career choices, or experiences in the program. The underrepresentation of male students may also affect the generalizability of the findings and highlights the need to situate the results within the broader gender dynamics of the nursing profession.

This imbalance reflects global and regional trends in nursing education, where women continue to dominate the field. Mbavai et al. note that caregiving is widely perceived as a traditionally female role, which often discourages men from pursuing nursing[20]. Similarly, Kandil, El Seesy, and Banakhar believed that male nursing students frequently encounter cultural and societal barriers, contributing to their underrepresentation[15]. These findings suggest that the low proportion of male respondents reflects broader societal patterns rather than sampling bias, underscoring the need to promote gender-inclusive strategies in nursing education and career guidance programs.

Academic year level also provides important insight into students' training and professional development stages. Examining the distribution across year levels helps contextualize differences in perspectives, motivations, and challenges. It allows for a more nuanced understanding of how career choices and counseling needs shift as academic progression and clinical exposure progress. Figure 1 presents the frequency and percentage distribution of respondents by academic year. The results show that 2nd-year students comprise the largest group, followed by 4th-year, 1st-year, and 3rd-year students. Although 2nd-year students are most represented, the distribution remains relatively balanced, indicating that perspectives from all stages of the nursing program are captured. These patterns may reflect enrollment trends, retention rates, or program structure and should be considered when interpreting findings related to academic experiences and student progression.

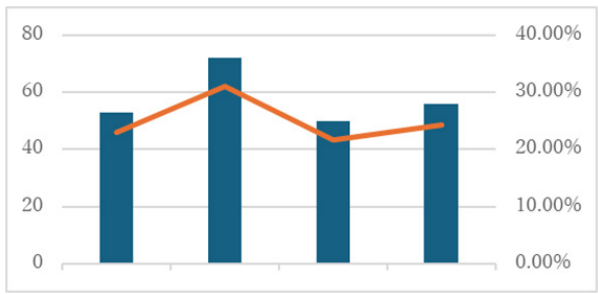

Figure 1. Frequency and Percentage Distribution of the Respondents' Profiles in Terms of Academic Year Level

These results align with previous research suggesting that nursing students' motivations and challenges evolve according to their year level. Lim and Muhtar observed that first-year students

are often influenced by external guidance, whereas senior students focus more on clinical experiences and future career planning[11]. Similarly, Pham, Bao, and Bui found that as students advance academically, they engage more actively in career exploration and develop greater confidence in their career decisions[31]. Including students from all year levels therefore provides a more comprehensive understanding of the different stages of career development and offers valuable insights into their corresponding guidance and counseling needs.

Monthly family income also provides important context for respondents' socio-economic backgrounds, which can shape access to educational opportunities, career decision-making, and perceptions of financial stability associated with the nursing profession. Examining income distribution helps clarify how economic factors may motivate students to view nursing as a practical or sustainable career path. The table below presents the frequency and percentage distributions of respondents by monthly family income.

The income distribution shows that most respondents come from households earning ₱31,000 and above, indicating a predominantly middle- to upper-income group. Students from families earning ₱21,000–₱30,000 account for 19.05% of the sample, while those from households earning ₱11,000–₱20,000 account for 17.75%. Only a few respondents belong to families earning below ₱10,000. This suggests that many students have relatively stable financial support, which may influence their educational experiences and career choices. This trend is consistent with Reyes and Manansala's findings that students from higher-income families are more likely to pursue nursing due to stronger educational support and family encouragement[35]. Their study reported that over 60% of respondents came from households earning more than ₱30,000 per month, which closely mirrors the 54.55% observed in the present study. This similarity reinforces the idea that financial stability plays an important role in shaping students' academic experiences and influencing their decision to pursue nursing.

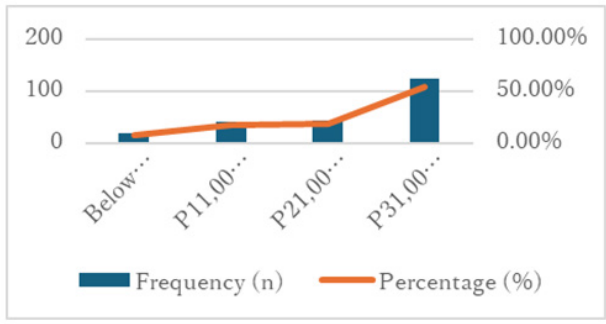

Figure 2. Monthly Family Income of the Respondents

Factors Influencing Nursing Career Choice among MSU College of Health Sciences Students

Personal Factors

Personal factors refer to the internal motivations and values that influence students' decisions to pursue nursing. These include a genuine interest in the profession, a strong desire to care for others, and the motivation to support ill family members. Understanding these intrinsic drivers helps clarify how deeply personal convictions inform career choices. The table below presents the weighted mean and standard deviation of respondents' agreement with various personal factors.

Table 3. Weighted Mean and Standard Deviation of Personal Factors Influencing Nursing Career Choice among MSU College of Health Sciences Students

Statement	Mean (M)	Standard Deviation (SD)
I have a strong interest in the nursing profession.	**4.35**	**0.83**
I have a passion for saving and caring for the sick.	**4.52**	**0.74**
I have a strong desire to help others.	**4.52**	**0.74**
I am motivated to pursue nursing to boost my self-esteem.	**4.32**	**0.87**
I desire to earn respect from significant others by becoming a nurse.	**4.07**	**1.1**
I admire the smart appearance of nurses.	**4.42**	**0.86**
I want to acquire knowledge on how to care for my immediate family	**4.85**	**0.44**

Analysis of personal factors shows that the highest mean score was recorded for the statement, *"I want to acquire knowledge on how to care for my immediate sick family members"* (M = 4.85, SD = 0.44), indicating strong agreement among respondents. This underscores that the desire to support ill family members is a major motivation for pursuing nursing. In contrast, the statement *"I desire to earn respect from significant others by becoming a nurse"* had the lowest mean (M = 4.07, SD = 1.10), reflecting comparatively lower—though still positive—agreement.

The standard deviation values further illuminate response patterns. The highest variability was observed in the item on earning respect (SD = 1.10), suggesting diverse views among students. In contrast, the lowest variability was observed in the item on caring for sick family members (SD = 0.44), indicating strong consensus. Overall, the consistently high mean scores across items highlight the significant influence of personal motivations on students' decisions to pursue nursing.

These findings align with existing studies, which identified personal motivations, particularly the desire to help others and care for sick family members, as central factors influencing nursing career choice[18,19,13,12]. The strong alignment with the highest-rated item in this study underscores that altruistic and family-oriented motivations remain pivotal in shaping students' commitment to the nursing profession.

Second-Party Factors

Second-party factors refer to the influence of individuals close to the students—such as parents, siblings, mentors, teachers, and friends—on their decision to pursue nursing. These significant others can shape career choices through encouragement, expectations, or role modeling. Examining these external influences provides insight into how social relationships contribute to students' motivations. The table below presents the weighted mean and standard deviation of respondents' agreement with various second-party factors.

Table 4. Weighted Mean and Standard Deviation of Second-Party Factors Influencing Nursing Career Choice among MSU College of Health Sciences Students

Statement	Mean	Standard Deviation
Influenced by parent(s)/ guardian(s)	3.82	1.29
Influenced by a mentor	2.65	1.16
Influenced by primary/ secondary school teachers	2.44	1.15
Influenced by siblings	2.96	1.36
Influenced by friends	3.22	1.33
Admire the diligence of nurses	4.44	0.86
Desire to help neighbors with nursing care	4.14	0.89
Influenced by a role model who is a nurse	3.62	1.32

Analysis of second-party factors shows that the highest mean score (M = 4.44) was recorded for the statement, *"I admire the diligence of nurses in carrying out their duties in the care of others,"* indicating strong agreement among respondents. This suggests that admiration for nurses' dedication is a major external influence on students' decision to pursue nursing. In contrast, the lowest mean (M = 2.44) was observed for the item stating that primary or secondary school teachers influenced their career choice, indicating minimal teacher influence in this area.

The standard deviation values also reflect the variability of responses. The greatest variation (SD = 1.36) was observed for the item on influence from siblings, suggesting that students had differing experiences. Meanwhile, admiration for nurses' diligence had the lowest variability (SD = 0.86), indicating strong consensus. Overall, the findings highlight that role modeling from healthcare professionals, particularly admiration for nurses' commitment to care, is the most significant second-party influence. At the same time, teachers and mentors exert the least effect on career choice.

These results align with Dacanay and Ocampo, who found that students are strongly influenced by admiration for nurses' dedication and compassion,

whereas school teachers and mentors play a minimal role[7,10,9,8,4]. The study also noted that family members and community values contribute variably, depending on personal experiences, which explains the diverse responses reflected in the standard deviations observed.

Social Factors

Social factors refer to the broader societal and economic conditions that influence students' decisions to pursue nursing. These include perceptions of job security, financial stability, opportunities for overseas employment, and the social prestige associated with the profession. Examining these influences helps clarify how societal expectations and external conditions shape students' career preferences. The table below presents the weighted mean and standard deviation of respondents' agreement with various social factors.

Table 5. Weighted Mean and Standard Deviation of Social Factors Influencing Nursing Career Choice among MSU College of Health Sciences Students

Statement	Mean	Standard Deviation
Easy access to travel abroad as a nurse	4.06	0.96
The ease of employment for nurses	3.65	1.14
To attract good suitors	2.04	1.21
To be known as a nurse	3.72	1.16
The belief that nurses earn high incomes	3.25	1.2
To gain financial security	3.9	1.05
To be able to provide financial help to relatives and significant others	4.16	1

The Analysis of social factors shows that the strongest motivator for respondents is the desire to provide financial assistance to relatives and significant others, reflected in the highest mean score (M = 4.16). In contrast, the aspiration to "attract good suitors" had the lowest mean (M = 2.04), indicating minimal influence on students' career choices.

In terms of variability, the statement *"To attract good suitors"* had the highest standard deviation (SD = 1.21), suggesting that respondents held widely differing views. Meanwhile, *"Easy access to travel abroad as a nurse"* recorded the lowest variability (SD = 0.96), indicating relatively consistent agreement. Overall, the findings suggest that financial stability and international employment opportunities are key social motivators for pursuing nursing, whereas considerations related to personal attractiveness play little to no role.

These results are supported by Santos and Rivera, who found that providing financial support to family and opportunities for overseas employment are major motivators for choosing nursing[9,27,24]. Similarly, attracting suitors had a negligible influence, aligning with the low mean observed in this study (M = 2.04).

Challenges and Implications for Guidance and Counseling

This section examines the challenges nursing students face in choosing nursing as a career and their implications for improving guidance and counseling services. Key difficulties include academic stress, financial constraints, family and peer pressure, limited information, and negative societal perceptions. Understanding these concerns highlights the support students need and identifies areas where career guidance needs strengthening. The table below presents the frequency and percentage of these challenges to guide targeted interventions.

Table 6. Frequency and Percentage Distribution of the Challenges in Choosing Nursing as a Career

Challenges	Frequency	Percentage (%)
Academic stress	158	68.40%
Financial constraints	146	63.20%
Family and peer pressure	125	54.10%
Lack of adequate information about nursing	80	34.60%
Negative societal perceptions	51	22.10%
Others (Health-related concerns)	1	0.40%

These findings align with previous studies showing that nursing career decisions are influenced not only by personal motivations but also by external pressures and expectations within the profession. McKenna et al. and Kinanee and Millner reported that many nursing students decide to enter the profession due to a combination of altruistic values and perceived job stability; however, they also revealed that students often struggle with emotional stress and uncertainty during training[21,16,23]. Moreover, Tiliander et al. found that financial concerns and limited resources affect students' decisions to pursue further specialization in nursing, reinforcing this study's observation that financial constraints are a major challenge for 63.2% of respondents[36]. These studies support the idea that academic stress, economic limitations, and external expectations are pervasive challenges in nursing education, underscoring the need for structured guidance, psychosocial support, and accessible financial aid systems within nursing institutions.

Effectiveness of Career Counseling

This section assesses students' perceptions of the effectiveness of career counseling services provided before or during their decision to pursue nursing. These insights help determine whether existing guidance adequately supports informed career choices and identifies areas for improvement. The findings also align with studies showing that academic stress and financial difficulties are the most common challenges faced by nursing students in the Philippines[22,16,17].

Their research showed that heavy academic workloads, clinical demands, and limited financial support are major contributors to student stress. This aligns with the present study, which found that 68.4% of respondents reported academic stress and 63.2% cited financial constraints. In addition, 54.1% identified family and peer influence, reflecting the external pressures noted by Mendoza and Cruz. These findings underscore the need for stronger career counseling programs that address both personal and socio-environmental factors shaping students' career choices.

Table 7. Frequency and Percentage Distribution of the Effectiveness of Career Counseling

	Frequency	Percentage (%)
Very effective	7	12.50%
Somewhat effective	16	28.60%
Neutral	16	28.60%
Not very effective	6	10.70%
Not effective at all	11	19.60%

The data show that 75.8% of students did not receive career counseling before enrolling in nursing, revealing a major gap in guidance services. Only 12.5% of those who received counseling found it highly effective, indicating limited impact. These results echo studies noting that many Filipino students enter higher education without sufficient career guidance, often leading to uninformed or uncertain career choices[28,4,8,9]. Similarly, their findings found that only a small proportion of students rated career counseling as "very effective," mirroring the present study's findings. Collectively, this evidence underscores the urgent need to strengthen and expand career counseling programs to ensure that students receive meaningful support in making informed, confident decisions about their professional paths.

Types of Career Guidance Needed by the Students

This section identifies the types of career guidance nursing students consider essential for their academic development and career planning. These needs include access to information sessions, psychological support, individualized counseling, financial aid guidance, and parental involvement. Understanding these priorities helps institutions design more relevant and student-centered support programs. The table below shows the frequency and percentage distribution of these needed guidance services.

Table 8. Frequency and Percentage Distribution of Career Guidance Types Needed by Nursing Students

Type of Career Guidance Needed	Frequency	Percentage (%)
Information sessions on nursing careers	149	64.50%
Psychological support for academic stress	136	58.90%

Continue.....

Individualized career counseling	135	58.40%
Scholarship and financial aid information	131	56.70%
Parental engagement in career decisions	86	37.20%

The results show that 64.5% of students requested additional information sessions on nursing careers, indicating a need for clearer guidance on professional pathways. Psychological support was also identified by 58.9% of respondents, reinforcing earlier findings on the stress associated with nursing education. Additionally, 56.7% highlighted the need for financial aid information, underscoring persistent economic concerns. These findings align with studies showing that health-related students generally require comprehensive career information, mental health support, and financial guidance to navigate academic and professional challenges[2,3.4].

Overall, the study shows that academic stress, financial difficulties, and external influences strongly shape students' decisions to pursue nursing, while existing career counseling services are often viewed as insufficient. Strengthening institutional guidance through personalized counseling, clear career information, financial aid support, and psychological services can better equip students to make informed choices. Involving parents and mentors further enhances students' motivation and confidence, supporting more deliberate and sustainable career decisions.

Conclusion

This study concludes that nursing students at MSU-CHS choose nursing due to a mix of personal, second-party, and social factors. Personal motivations, especially the desire to care for sick family members, were the strongest influences, followed by encouragement from family and peers and admiration for nurses. Social factors such as financial stability and overseas job opportunities also shaped decisions, while less relevant considerations, like attracting suitors, had minimal impact.

Students also face significant challenges, including academic stress, financial constraints, external pressure, and major gaps in career counseling services. Most respondents received no guidance before enrolling, and only a few found counseling effective. These findings highlight the need for comprehensive, student-centered career guidance that provides clear career information, financial aid support, and psychological services, with active involvement of parents, mentors, and faculty.

To address these concerns, the school should strengthen its guidance programs through regular career orientations, trained counselors, and collaboration with scholarship and mental health providers. Counselors should offer early and continuous support, faculty should integrate mentorship into academic advisement, and parents should be engaged in the career decision-making process. Students are encouraged to make use of available counseling services and reflect on their motivations and goals. Local governments and civil society organizations can further support by offering scholarships, wellness programs, and community-based career initiatives. Future research should explore other institutions, use qualitative approaches, and assess the effectiveness of current guidance interventions on student outcomes.

Ethical Approval This study received ethical clearance before its conduct. • Date of Ethical Approval: May 10, 2025 • Reference Number: 0-1411

All research procedures were carried out in accordance with the ethical standards of the approving body, which is the Muslim Mindanao Integrated College Academy, and with due respect for participants' rights, confidentiality, and informed consent.

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Conflict of Interest Statement The author declares no conflict of interest, financial or otherwise, in relation to the conduct of this study and the preparation of the manuscript.

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Original Article

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Lived Experiences of Postgraduate Diploma Community Nursing Students with Flipped Learning at the Higher Institute of Health Specialties

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Abstract

Background: Flipped learning is an innovative teaching and learning strategy that enhances student-centred learning. This study aimed to explore postgraduate diploma nursing students' lived experiences with flipped learning in the Community Health Nursing Practice Program at the Higher Institute of Health Specialties in Oman.

Method: A hermeneutic phenomenological qualitative approach was used in the study, and six Omani students were interviewed.

Findings: Thematic analysis revealed four themes: procedural experience of flipped learning, perceived benefits and challenges, instructor-student roles, and comparison with lecture-based learning.

Conclusion: The study findings revealed that flipped learning enhanced engagement, critical thinking, and independent learning, but posed challenges like increased workload. The study offers insights for curriculum reform and highlights the importance of contextualizing flipped learning within Arab nursing education to meet evolving educational and professional demands.

Keywords: Flipped Learning, Nursing Education, Postgraduate Students, Phenomenological Study

Introduction

Traditional lecture methods dominate nursing education, limiting opportunities for active student engagement and the development of practical skills. In recent years, Flipped Learning (FL) has emerged as an innovative, student-centred instructional strategy that addresses these challenges by reversing the conventional classroom model (1). Instead of passively receiving information during lectures,

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students in FL environments engage with learning materials before class and apply knowledge through active, collaborative activities during scheduled sessions [1].

Evidence suggests that FL enhances academic performance, critical thinking, teamwork, and practical readiness [2, 3]. Moreover, it equips learners with the 21st-century skills necessary to meet current healthcare market demands [4]. Despite these benefits, FL remains underexplored in many nursing education settings, particularly in Arab regions.

This study aims to explore the lived experiences of postgraduate diploma nursing students using FL in the Community Health Nursing Practice(CHNP) program at the Higher Institute of Health Specialties (HIHS).The study seeks to answer the following research questions:

1. What does it mean to be a postgraduate diploma nursing student using FL in the CHNP program at HIHS?
2. What are the benefits of FL as perceived by postgraduate diploma nursing students in the CHNP program at HIHS?
3. What are the challenges of FL as perceived by postgraduate diploma nursing students in the CHNP program at HIHS?

Frame of Reference

In 1980, Malcolm Knowles introduced the Adult Learning Theory, known as andragogy, which focuses on teaching adults [5].Unlike pedagogy, which centers on teaching children, andragogy emphasizes that adults are self-directed learners who prefer learning by doing, value relevance, draw on prior experiences, engage their senses, and thrive with goal setting. They tend to learn differently from children and take ownership of their learning process.

This theory underpins the current study's aim and research questions. FL, as a teaching approach, aligns with the core principles of Adult Learning Theory. FL encourages autonomy, promotes active knowledge-seeking, and involves minimal instructor supervision. It also fosters collaboration, as students organize, present findings, and share experiences with peers, enhancing engagement and critical thinking.

Literature Review

Compared to the conventional lecture approach, FL provides a more dynamic and student-centred learning experience[6]. It has been shown to reduce lecture time, offer hands-on learning, and enhance students' preparedness and motivation [7]. Additionally, FL can improve academic performance, engagement with course materials, comprehension, self-confidence, and critical thinking skills[8].

Furthermore, FL in higher education has been shown to offer a cost-effective, student-centred approach to accommodate growing enrolments and can mitigate funding and structural issues that prioritize faculty research over student learning [9]. Meanwhile, it equips students with the 21st-century skills needed to address global challenges and the knowledge required to meet current market demands[4]. Students with strong academic backgrounds as well as a set of practical knowledge, skills, and abilities are always preferred by employers. Employers prefer hiring employees with the skills and dispositions to bring ideas to life[10]. Due to the outdated teacher-centred teaching methodology, the traditional education system has failed to develop essential employability skills, behaviours, traits, and competencies, as argued by [3]. In the traditional teacher-centred teaching approach, the development of necessary abilities and inspiring students by personalizing learning around their interests are disregarded. Students are unable to integrate their theories into practice in a real-world working environment.

In Arab countries, nursing education is moving towards adult learning strategies, and flipped learning has been implemented in teaching nursing students. However, most of the existing studies on FL have been conducted in Western contexts. highlighting a gap that this study aims to address.

Methodology

Study design

A qualitative research design guided by a hermeneutic (interpretative) phenomenological methodology was used to address the study's aim and research questions. This study is underpinned by the philosophical traditions of Heideggerian

hermeneutics[11] and Gadamerian hermeneutics[12]. Hermeneutics is the classical discipline focused on the theory and practice of interpretation, particularly understanding the meaning behind texts and human experiences. It involves uncovering hidden meanings within context[12]. Hermeneutic phenomenology aims to gain a deeper insight into the lived experiences of individuals by exploring their interactions within historical and cultural contexts [13].

Recruitment of participants

Six postgraduate diploma nursing students from the CHNP Program were recruited from the HIHS in Oman from December 2024 to February 2025.HIHS was established as the Oman Specialized Nursing Institute in 2001. It has since expanded to offer nine different specialized health programs at the postgraduate diploma level. The institute was the first of its kind in the Gulf Cooperation Council (GCC) region to offer specialized programs.

Participants were selected using a convenience sampling method. While purposive sampling is commonly used in qualitative research, convenience sampling was utilized in this study due to easier access to participants and availability during the data collection process. Of the seven eligible students, six agreed to participate in the study.One participant declined to participate**.** The main reasons for non-participation were lack of time due to academic and clinical commitments. The mean age of participants was 37.5 years. Most of them (83%) had clinical experience in Community Health Nursing, while a few (16%) did not. Table 1 presents the inclusion and exclusion criteria, and Table 2 outlines the participants' demographic data.

Data collection

Eligible participants were invited to participate at their convenience in a 45–60-minute semi-structured online interview, scheduled around their academic and examination commitments. All interviews were conducted via Zoom, and verbal consent was obtained. Participants' anonymity was maintained by replacing their names with reference numbers (P1-P6). Care was taken to ensure that the participants' quotes did not contain information that would enable others to identify them. Participants' confidentiality was maintained by assuring them that their personal information would be saved in a password-protected computer, and no one could access it except the research team.

Interviews were recorded, encrypted, and stored securely at the HIHS. Participants were informed of their right to withdraw at any time without consequences. Sharing the same native language helped enhance understanding of cultural meanings. Interview questions were prepared in English and translated into Arabic by the first author, a fluent Arabic speaker. To ensure accuracy, one interview transcript was professionally translated and back-translated; no discrepancies were found. Reference [14]emphasized that having the same researcher conduct and translate interviews enhances both the authenticity of the data and the researcher's familiarity with participants' cultural context. The process of data collection stopped upon reaching data saturation, as no new data emerged and similar information was reiterated.

Data analysis

All interviews were transcribed verbatim from audio recordings and subsequently translated from Arabic to English. Data transcription and translation were completed immediately following each interview. Although software such as NVivo is often effectively used in qualitative research, manual analysis was selected for this study as it aligned better with the researcher's preferred working style. Manual analysis, despite the recognized advantages of tools like NVivo, involves analysing and examining data without relying on electronic or automated methods. This process includes reviewing the data, organizing it with codes or categories, and interpreting the underlying meanings to ensure deep engagement with the material.

To maintain consistency with the study's philosophical foundations, the data analysis approach was grounded in hermeneutic phenomenology. The analytical framework adopted, which incorporated both qualitative methodology and philosophical hermeneutics, was based on the principles outlined by Ajjawi and Higgs[15]. The process followed six systematic steps. Four major themes emerged: procedural experience of flipped learning, perceived

benefits and challenges, instructor-student roles, and comparison with lecture-based learning. Discussions between two researchers were conducted to refine and finalize the themes generated in this study. Table 3 provides an integrative thematic analysis grounded in hermeneutic philosophical principles.

Findings

Procedural experience of FL

The participants cited the procedural experience of FL, through group gathering, the process starts with searching for information, writing, and presenting.

> Group gathering helps us to learn more by sharing ideas and learning from each one. (P2)
>
> The process of FL starts with searching for information, which helps students better understand the session's content. (P1)
>
> In FL, we write information that helps in remembering it for a longer time. (P4)
>
> My active role as a learner, searching for information, and presenting it, helped me in the process of retrieving data. (P4)
>
> It is a good strategy because, as a group, we search for information, discuss with our colleagues, and present the information. (P2)

Data analysis suggests the importance of following the procedural steps in FL sessions for the students to get the maximum benefits in terms of understanding and retrieving the information.

Perceived benefits and challenges of FL

Perceived benefits of FL

The Participants reported several benefits of FL, including being active learners, a participative and energetic strategy, understanding the information, and a better retrieval process. Also, FL helps the students to become lifelong learners.

Students are active learners

Some participants expressed the role of FL in supporting the students to become active learners in the class.

> Utilizing FL as a learning strategy helps the students become active learners, wherein they are responsible for achieving the session learning objectives. (P6)
>
> Students are active learners and are responsible for their learning. They are engaged in the learning process. (P5)

The findings of the data indicate that utilizing FL in class helps students become active learners and take responsibility for their learning.

A participative and energetic strategy

Some participants noted the role of FL in keeping the students participating in the classroom and sharing their experiences and ideas with their colleagues.

> FL helps the students to participate in group activities because it mandates that every member in the group participate and share their experiences. (P3)
>
> To reflect on my limited experience in Community Nursing, I learnt a lot from my colleagues during the group discussions in classes with FL. (P5)
>
> FL is an interactive and enjoyable learning strategy. I enjoyed the class because of the discussion and interactions with the group and the teacher. (P4)
>
> It is a helpful strategy, which helps the students to engage in the class and with the group members. (P2)

One participant highlighted the paramount role of FL in helping students become more energetic.

> FL is a learning strategy that provides energy in the class. I feel very energetic because of the movement. I didn't remember that I fell asleep at those sessions with FL. Moving, thinking, and searching for the information helps the students to be more energetic. (P1)

The findings of the data suggest that FL helps the students to be more energetic, which might be due to the involvement of both the mind and body in the process. This is evidence of the utilization of critical thinking and the movement of the body during the class.

Understanding and retrieval of the information

Some participants indicated that FL supports students in better understanding the information, helping them achieve their learning goals and retain the knowledge for a longer period.

> FL enhances the students' understanding of the session contents. (P5)
>
> FL is a more useful strategy for retrieving the information. (P1)
>
> The information is stuck more in our minds because we search and share ideas as a group. (P2)
>
> The information stays for a long time, and we can utilize it for other courses. (P6)
>
> FL is a learning strategy that helps adult learners to achieve their learning objectives. In a group task, group members share information and discuss it; this process helps the students understand and achieve their learning objectives. (P5)

The data analysis reveals that the effectiveness of FL lies in its emphasis on active student engagement, suggesting that learning through doing rather than passive listening enhances both comprehension and long-term retention of information.

Enhancing lifelong skills

Some participants reported the role of FL in enhancing lifelong skills, including critical thinking, and becoming more resilient and confident.

> FL enables students to be more self-resilient and confident in achieving their learning objectives and understanding the information. (P4)
>
> In FL, we as students have power in the class; we can ask our colleagues questions. I believe asking questions enhances the critical thinking process. (P6)
>
> I had utilized the information that I learned in FL sessions in other sessions and my oral presentations, which further helps me to understand the content more critically. (P4)

Perceived challenges of FL

The participants reported some challenges of FL, including time, preparation of the information at home, the personality of the learners, and a lack of resources.

Time

One participant expressed that the session time is limited compared to the objectives of the session.

> FL requires more time to accomplish the task, and we have a huge number of learning objectives. From my perspective, it is not advisable to utilize FL for a long time or many learning objectives. (P1)

Another participant reported the importance of having the session of FL at the beginning of the day.

> I prefer that the class with FL should be done in the first or second hour in the timetable, not at the end of the day. One time, the faculty applied at the beginning of the day, it was more useful than the second time when she applied at the end of the day. I felt tired and could not enjoy the task. (P2)

The other participant suggests that FL should not be applied to many objectives and for a long time.

> Flipped learning should not be applied to many learning objectives or for the whole day. It is a time-consuming process and needs a lot of energy. (P3)

The findings suggest the importance of considering time in terms of the quantity and quality of the utilization of FL. This might reflect the students' peak consideration time, which increases in the morning and decreases at the end of the day.

Preparation of information at home

One participant expressed that preparing the information at home is a challenging process.

> As a postgraduate student, unlike an undergraduate student, I encounter challenges in terms of being a mother and having children. This increases the challenges in preparing for the FL sessions at home. (P1)

The data analysis reveals that FL utilization might be affected as adult learners have commitments and responsibilities toward their families.

Personality of the learner

One participant reported that the learner's personality could be a challenge in the utilization of FL.

> The personality of the learner affects the learning process, as those learners who have shy behavior will have their learning process affected. They have challenges in participating in classroom discussions and presenting information to the entire group. (P2)

The data finding shows that the learner's characteristics might be a barrier to the implementation of the FL process.

Lack of resources

All participants agreed that the lack of resources, such as updated books, online journals, and the availability of the internet, could be major challenges in the full utilization of FL.

> In our library, despite having good books, these books are not up-to-date. Therefore, I believe it is important to have access to online updated books and scholarly articles. Sometimes we have stress because of limited resources.(P1-P6)

> In our institute, we as students do not have access to the internet, the utilization of FL requires having good internet, and we are used to using our data. As you know, the process of uploading online books and articles consumes a lot of internet. This causes anxiety.(P1-P6)

The data analysis suggests that having limited resources could hinder the process of utilizing FL and have psychological impacts on the students.

Instructor-student roles

Participants reported the roles of instructor and student in the FL process.

Role of the instructor

Some participants perceived the facilitation role of the instructor as paramount in the teaching and learning process.

> The instructor has a facilitating role; therefore, it is imperative to have experience for a successful process of learning and achieving the session objectives. (P1)

> The teacher has an important role in making the class more interactive and enjoyable. (P5)

> It depends on the instructor's style of conveying the message. (P4)

The findings imply that the effectiveness of FL largely depends on the instructor's expertise, as their ability to facilitate interactive and engaging sessions is crucial for fostering meaningful learning experiences.

Role of the student

All the participants agreed that students have a major role in FL sessions.

> In FL, the students are dependent on themselves and not on the instructor for achieving their learning objectives. The students have a major role in terms of collecting data and presenting it. The information is not delivered by the instructor; it is not a spoon-feeding strategy. (P1-P6)

Comparison with lecture-based learning

Participants compared the FL strategy with lecture-based learning in terms of acquiring lifelong skills.

> FL is an innovative teaching and learning strategy that helps students acquire critical thinking and problem-solving skills. This occurs as a result of students are responsible for their learning and not get the ready information. Whilst in lecture-based sessions, just to be more specific, those sessions utilized the PowerPoint presentation as a teaching and learning strategy, the instructor took the lead of the class by reading the information on the slides. We, as students, are passive learners and listeners only. (P2)

> FL is a learning activity based on discussion and problem-solving, which helps the students to think critically, unlike a PowerPoint presentation, which is based on the teacher presenting the information. (P1)

All participants perceived the PowerPoint sessions as boring

> Most instructors utilize PowerPoint presentations as the main teaching strategy, which we describe as very boring and time-wasting. When we had to utilize FL in our sessions, we enjoyed ourselves

and did not feel bored at all. Therefore, we would recommend utilizing such innovative strategies for our future sessions in all courses (P1-P6)

One participant reported the importance of utilizing mixed teaching and learning strategies.

Combining FL with PowerPoint and using the board is more effective for students, as it keeps them engaged and encourages class participation. (P1)

The data analysis reveals that FL has distinct characteristics in terms of developing the students' lifelong learning process compared with lecture-based strategies.

Table 1: Participants' inclusion and exclusion criteria

Inclusion criteria	a) Postgraduate diploma nursing students b) Enrolled in the Community Health Nursing Practice program at the Higher Institute of Health Specialties c) Willing to provide informed consent d) Willing to be audio-recorded e) Willing to describe their lived experiences
Exclusion criteria	a. Postgraduate diploma nursing students enrolled in programs other than the Community Health Nursing Practice at the Higher Institute of Health Specialties b. Decline or are unable to provide informed consent to participate in the study c. Refusing to be audio-recorded

Table 2: Participants' demographic data

Participant code	Age	Years of clinical experience
P1	38	18 years
P2	35	14 years
P3	33	12 years
P4	35	15 years
P5	43	18 years
P6	41	20 years

Table 3: Integrative of thematic and philosophical principles

Ajjawi & Higgs'(2007) interpretive analysis steps	Braun & Clarke' (2006) thematic analysis steps	Philosophical hermeneutic principles
Stage 1: Immersion	Familiarisation with the data	Preunderstanding Use of reflective diary Fusions of horizons Preliminary interpretation of the text to facilitate coding

Continue.....

Stage 2: Understanding	Code generation	Use of the hermeneutic circle Codes represented participants' horizons
Stage 3: Abstraction	Categories generation Subcategories generation Manually grouping categories and subcategories into subthemes	Subthemes represented my horizons
Stage 4: Synthesis and theme development	Grouping of subthemes into themes Development of themes	Use of hermeneutic circle
Stage 5: Illumination and illustration of phenomena	Naming and defining themes Linking the literature to the themes identified above	Reconstructing interpretations into stories Completion of the hermeneutic circle
Stage 6: Integration and critique	Producing the report	

Discussion

Four themes were generated from the data: procedural experience of flipped learning, perceived benefits and challenges, instructor-student roles, and comparison with lecture-based learning. This study confirmed that FL has a significant impact on the postgraduate diploma nursing students' learning process in the CHNP program at HIHS. Some participants describe the procedural steps of FL. Although they highlighted searching, writing, and presenting the information as the most important steps, they did not state watching online, digital videos, and doing exercises as part of homework to prepare for lessons. A systematic literature review concluded the importance of utilizing online materials and video in classes of FL classes [16]. These instruments revolutionized education, communication, and ideas in the digital age [16]. However, the reason for the participants not using the online materials might be due to the generation gap. These participants graduated from the Nursing Institute since long time ago, and this could create a generation gap as the participants are postgraduate students who have experience of being nurses for more than ten years.

Some participants expressed that being active learners is one of the important benefits of utilizing FL. Active learning is also known as student-centred learning, which is generally defined as any instructional method that engages students in the learning process. In short, active learning requires students to do meaningful learning activities and think about what they are doing[17]. This definition is in line with the current study findings, in which the students were involved and engaged to prepare the session information and present it to their entire group. The concept of active learning is underpinned by a constructivist philosophy, one of the more influential paradigms in contemporary educational theory, which holds that knowledge cannot be 'transmitted' but requires the active construction of meaning by the learner[18]. One of the challenges expressed by participants is that shy participants have difficulty in group discussions and presenting information. This finding was not discussed in previous research. A current scoping review reported that one of the challenges is resistance toward FL, as students were not happy to switch from lecture-based to FL [19]. These findings were in contrast with the current study, where participants expressed that PowerPoint presentation is a boring strategy and they recommend being replaced with FL.

Strengths and limitations

To the best of our knowledge, the current study is the first to explore the lived experiences of postgraduate Omani diploma nursing students enrolled in the CHNP program with the utilization of FL. These findings provide a basis for future qualitative

studies on the utilization of FL in higher education in this population. Furthermore, the adoption of an interpretative phenomenological approach generated in-depth data on the impact of the utilization of FL on the lived experiences of postgraduate Omani diploma nursing students studying in the CHNP program. The strength of this study lies in the in-depth nature of the interviews and openness of the participants' responses, which are integral to an interpretive phenomenological approach. A limitation of this study is that fewer participants were recruited than planned to owe to the limited postgraduate diploma nursing students enrolled in the CHNP program. Furthermore, the audio-only interviews limited the observation of facial expressions, which may have provided valuable nonverbal clues. In a qualitative study, researchers' assumptions and prior knowledge inevitably influence the interpretation and generation of data. Therefore, in this study, such influence was considered by the researchers through maintaining a reflexive note to minimise potential bias while presenting the data as narrated by the participants. Yet the possibility of influences affecting the process of data collection and analysis cannot be entirely ruled out.

Conclusion

This study contributes to understanding the experiences of postgraduate Omani diploma nursing students enrolled in the CHNP program with the utilization of FL. Despite of commonality of the current study's findings and previous studies, one of the distinct findings was that the personality of the learner could be a challenge in the utilization of FL. The participants expressed FL as a positive learning strategy compared with PowerPoint as a boring and passive strategy. It is essential to recommend the implementation of innovative teaching and learning strategies in the higher education system of Oman.

Further research and practice

Future research should explore the long-term impact of flipped learning on academic performance and student engagement across higher education colleges in Oman. It would also be beneficial to investigate how individual learner characteristics, such as personality types or learning styles, influence the effectiveness of FL. Additionally, studies could examine the perspectives of educators to identify the benefits and barriers to implementing FL and to develop tailored professional development programs. From a practical standpoint, institutions should consider piloting FL approaches in different nursing and health programs, assessing their scalability, and integrating technology and pedagogical training to ensure sustainable implementation.

Declarations

Ethical considerations

Ethical approval was obtained from the Higher Institute Research and Newsletter Committee on12th December 2024(Ref: MOH/HIHS/2024), and all procedures followed were in accordance with the ethical standards.

Consent to participate

All participants provided verbal consent to participate in the study.

Consent for publication

The consent form was read to all participants, and they agreed to the statement, 'I agree that any data collected may be published in anonymous form in academic books, reports, or journals'.

Declaration of conflicting interest

The authors declared no potential conflicts of interest concerning the research, authorship, and/or publication of this article.

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Data availability

The authors confirm that the data supporting the findings of this study are available within the article (and/or) its Supporting Information Materials.

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Original Article

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Older Not Over: Recovery Experiences of Abandoned Elderly in Residential Care Facility

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Abstract

The research examines the challenges, perception, and ability to cope of abandoned elderly in the process of recovery in Residential Care Facility. This study sought to understand the new beginning and experience of abandoned elderly to achieve recovery. The researchers employed a phenomenological approach and utilize a purposive sampling method. Following this, data is collected from 16 abandoned older adults participants using semi-structured interviews. Data saturation was achieved after interviewing the 13th informant, with additional insights gained from the first two, although redundancy occurred with the third informant. The raw data were audio recorded, transcribed, and analyzed using Colaizzi's method. To ensure the credibility of the research, the researchers implemented member checking, comprehensive documentation of the research processes, bracketing, and an audit trails. The significant experiences of recovery have converged into a central theme, OLDER Not Over which encompasses five emerging themes (i.e., "OLDER"). (1) *Obstacles Faced in Institutional Life* illustrates the difficulties they faced during the recovery process. (2) *Learning Diverse Coping Strategies to Manage Emotional Distress* outlined the key methods and interventions they used to alleviate feelings of loneliness and helplessness. (3) *Discovering Pathways of Emotional Resilience emphasized their capacity to explore new methods for maintaining emotional stability*. (4) *Exhibiting Anchors of Inner Strength* focuses on their sources of hope and resilience while confronting internal challenges. (5) *Rediscovering Meaning and Well-being in Recovery* underscores their recognition of personal growth and improvement as they navigate their recovery. The findings from this study highlighted the role of Residential Care Facilities and their staff, such as nurses, social workers, and house parents, in addressing the fundamental needs of abandoned elderly individuals. In conclusion, the challenges in emotional and psychological state of abandoned elderly from past and present experiences had a significant impact in the speed of their recovery. This stressors and environmental factors altered their ability to cope that influence their mental health and the process of healing.

Keywords: Abandoned Elderly, Recovery Process, Recovery Experiences, Residential Care Facility

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Introduction or back ground

Many elderly individuals residing in care facilities have histories of mistreatment, including emotional abuse, neglect, and psychological trauma, which negatively impact their health and quality of life [1]. Loss of autonomy often exacerbates feelings of helplessness and depression, further worsening mental health outcomes [2]. Supportive care is therefore essential in fostering recovery and enhancing overall well-being.

Residential care facilities function as vital sanctuaries for elderly individuals who have experienced abandonment and mistreatment. These institutions provide safety, medical assistance, and psychosocial support, enabling residents to regain self-efficacy and improve their quality of life. By addressing the unique challenges of this vulnerable group, residential care facilities play a crucial role in facilitating recovery journeys [3]. Evidence indicates that well-structured support systems within such facilities significantly improve mental health and overall well-being [4]. However, the quality of care is often compromised by inadequate staffing and limited training, perpetuating cycles of neglect and systemic gaps in care [7].

These realities underscore the critical role of nursing interventions in advocating for improved policies, enhanced social support, family involvement, and holistic care.

In the Philippines, elderly individuals are frequently admitted to residential care facilities due to chronic health conditions, economic difficulties, and shifting family dynamics. For example, illnesses such as dementia necessitate continuous monitoring that families may find challenging to provide at home [8]. Rising cases of abandonment and increasing demand for elder care prompted the Philippine government to establish laws and programs addressing their needs. Since the 1950s, the Department of Social Welfare and Development (DSWD) has provided residential facilities offering shelter, rehabilitation, and holistic activities for the elderly and other vulnerable groups [9].

Despite these efforts, limited research exists on the recovery experiences of abandoned elderly in Philippine residential care facilities. Exploring their lived experiences is essential to understanding how institutional care influences mental health, social relationships, and overall well-being. Moreover, identifying the specific interventions and services that meaningfully contribute to recovery can inform policies and practices that enhance quality of care. By focusing on these recovery pathways, this study highlights the importance of developing context-specific, culturally responsive approaches that address systemic challenges while promoting dignity and resilience among abandoned elderly in residential facilities.

Before data collection, the researchers sought ethical clearance to ensure the study's adherance to established standards involving human as informants. Ethical approval was submitted including the study proposal, research instrument, and informed consent to conduct this study and was approved and obtained from Dr. Yanga's Colleges, Inc. (DYCI) Ethical Committee.Ethical approval from Ethical Review Board (date: 02-25-2025) Hence, this study seeks to answer the following research question: (1) What are the barriers that the abandoned elderly patients encounter during their recovery journey in residential care facilities? (2) How do these individuals manage the identified barriers in their own way? (3) How do the informants describe their understanding of recovery and their sense of well-being?

Material and Methods

Research Design

This study employed phenomenology to elucidate how individuals encountered specific phenomena without imposing their own interpretations or biases. While it originated in philosophy, psychology, and education, its methodological applications have expanded across social and health sciences to explore emotionally complex, deeply personal human experiences, including aging, loss, and abandonment.

Research Informant

The informants were selected through the use of purposive sampling method appropriate for qualitative study. This approach allowed the researchers to select informants intentionally based on the criteria and to ensure rich and meaningful insights will be provided for the study.

The informants were from two reputable residential care facilities. Informants were aged 62 to 76 years old, consist of four women and 12 men with lengths of stay ranging from1 to 10 years. Reasons for abandonment arises from personal, family dynamic hanges, and societal factors such as migration of children abroad, financial constraints due to aging and loss of livelihood, entered the facility voluntarily due to absence of care giver, loss of housing, and those who were rescued from streets.

Inclusion criteria were established such as (1) an elderly must be 60 years old and above, (2) must be a resident in care facility, (3) an elederly who have recovered emotionally, and (4) cognitive ability to communicate. Individuals with (1) cognitive decline (e.g., dementia, Alzheimer's disease), (2) physical limitations (e.g., chronic pain), (3) sensory impairments (e.g., hearing loss), and (4) social isolation were excluded. However, one informant named *Isidro*, was an exception. He had a history of stroke but he mentioned that he recovered and was able to perform daily life activity independently.

Technical Details

The objective of the study is to explore recovery experiences of abandoned elderly and to examine how residential care facility's interventions influence recovery. Semi-structured interviews were implemented that lasts 45 to 60 minutes. Mobile phones as equipment for recording interviews. Primary data included interview transcripts, audio recordings, and field notes which were anonymized and stored in password-protected files. Moreover, ethical clearance obtained from the DYCI Ethics Review Committee and written informed consent secured and explained.

Credibility was maintained through triangulation method[5] wherein the researchers conducted interview and observation at the same time to ensure validity. Another method was member checking to validate the researchers' interpretations [6]. To ensure transferability, researchers employed purposive sampling. Confimability and and dependability followed the concept of bracketing methof to minimize biases.

Data Analysis

Colaizzi'smethodguidedanalysis:familiarization, extraction of significant statements, grouping related codes to form potential themes, process of review and refinement to ensure an accurate reflection of the experiences shared by the elderlies, themes were defined and named, present these themes alongside quotes from the narratives, and validation by member checking. To ensure trustworthiness, the researchers established credibility through member checking, dependability by using an audit trail, confirmability through peer debriefing, and transferability the use of thick description.

Figure 1. OLDER Not Over: Recovery Experiences of Abandoned Elderly in Residential Care Facility

Results and Discussion

Table 1: Demographic Profile Summary of the Informants

Pseudonym	Lengthof Stay	Age	Gender	Reasons of Abandonment
Dante	2 years	72	Male	His children migrated abroad and gradually lost contact with him.
Nestor	1 year	69	Male	Due to old age, he was unable to secure employment.
Berto	3 years	65	Male	Voluntarily left his family and entered the care facility due to his advanced age.
Victor	2 years	70	Male	Having lost contact with his wife and children.
Andres	1 year	65	Male	After the death of his spouse, his children gradually distanced themselves.
Isidro	2 years	62	Male	He previously work as a caregiver but become a client after having stroke.
Lita	2 years	65	Female	After the death of her parents, she live in the streets.
Rosario	3 years	76	Female	Lives alone in her province and a friend recommend coming to GRACES.
Delfin	2 years	62	Male	Living alone in the streets and no contact with his family.
Lorenzo	3 years	75	Male	Lost all members of his immediate family.
Vilma	10 years	73	Female	Made the personal decision to remain single throughout her life.
Roel	5 years	70	Male	Abandoned his family and now, he reports that his children have grown apart.
Aida	1 year	69	Female	Grew apart from her family, now her children became increasingly disengaged.
Arnold	7 years	71	Male	Lives without any remaining close family connections.
Danilo	1 year	73	Male	Chose to remain single and live independently throughout her life.
Erwin	2 years	72	Male	Abandoned his family, now reports that his children have maintained a distant relationship.

Table 2: Theme clusters and formulated meanings under the emergent theme "Obstacles Faced in Institutional Life"

Obstacles Faced in Institutional Life	Emotional Struggles	• Intrusive and unrelenting Memories • Memories of the past intensified at night • Despair and emotional anguish • Grief and loss
	Challenges in Meeting Care Standards	• Shortage of staff • Hot tempered nurse • Obligated to care of their peers
	Loss of Autonomy in a Controlled Environment	• Inability to leave freely • Strict security measures • Lack of financial freedom • Sense of being controlled
	Adjusting to a New Environment	• Difficulty adapting to new surroundings • Passive and observational approach to adaptation • Navigating new experiences • Struggles to connect with opposite gender

This theme reflects the multifaceted nature of institutional living. The emotional and social challenges experienced by elderlies. In the cluster ***"Emotional Struggles"***, one of the informants expressed, *"Honestly, heaviest thing I experienced...was the sudden flashback of memories, the hurtful ones..." - Andres*

Moving forward to the second cluster, "***Challenges in Meeting Care Standards***," faces practical challenges such as limited resources and staffing shortages create barriers to providing quality care . As one elderly shared, *"Our caregivers are lacking, only one left. One nurse." - Isidro*

Additionally, the third cluster, "***Loss of Independence/Autonomy in a Controlled Environment***", captures the challenges as they navigate a setting that restricts their freedom and autonomy. One of them expressed, *"... It feels like you're considered locked up because you can't go out." - Delfin*

Finally, the fourth cluster, "***Adjusting to New Environment***," which indicates adapting to the restrictive environment of the care facility. One of the informants explained, *"Before, you could go out anywhere. You could go to church. Here, we're tightly guarded..." - Isidro*

Table 3. Theme clusters and formulated meanings under the emergent theme "Learning Diverse Coping Strategies to Manage Emotional Distress"

Emergent Theme	Theme Cluster	Formulated Meanings
Learning Diverse Coping Strategies to Manage Emotional Distress	Spirituality as a Means of Emotional Regulation	• Prayer and reading books as coping strategies • Spiritual coping as a form of emotional release • Faith as a source of strength • Spirituality as Coping Anchor
	Affirmative thinking	• Maintaining positive outlook • Emotional boundaries support focus • Positive mindset through active engagement
	Stability Through Routine	• Regaining Control Through Daily Routine • Self-Directed Daily Routine • Radio Listening as Daily Habit • Consistent Routine with Reliable Medical Care in the Facility

Spirituality serves as a cornerstone for many. As stated in the first cluster, "***Spirituality as a Means of Emotional Regulation***", through engaging in these practices, residents were able to regain a sense of hope. One informant shared, *"...Whenever I pray, it feels like the heaviness in my heart lessens, and the burdens I'm thinking about seem to lift a little". - Andres*

Followed by the second cluster, "***Affirmative thinking***" highlights how maintaining positive

thoughts serves as a crucial coping. One informant shared, "*... What I do is I just try to be open-minded... In this world, there's really both good and bad...*" - *Victor*

Building on this, the third cluster, "***Stability Through Routine***", structured daily routines emerge as a critical factor in providing residents with a much-needed sense of control. As one of the elderlies stated, "*To be honest, my simple daily routine already means a lot...it may seem like a small thing, but for me, it really helps me feel like my day is still in order*" - *Andres*

Table 4. Theme clusters and formulated meanings under the emergent theme "Discovering Pathways of Emotional Resilience"

Emergent Theme	Theme Cluster	Formulated Meanings
Discovering Pathways of Emotional Resilience	Preference for Solitude	• Prioritizing Self-Care Practices • Relying on Self-Support • Choosing Personal Coping Over Interpersonal Help
	Acknowledgment of Emotional Guidance	• Support from House Parents • Guidance from Social Workers • Counseling for Emotional Support • Valuing Support Despite Challenges

This shows how informants intentionally turn inward, drawing strength from quiet routines and reflection. In line with this, the cluster one, "***Preference for Solitude***" illustrates that some informants choose solitude to manage emotional distress, as one informant expressed, "*Ah, to be honest, I don't really ask for emotional support that much...*" - *Andres*

Along with preference of managing stress, the second cluster, "***Acknowledgement of Emotional Guidance***" highlights how residents greatly benefit from the emotional support provided by staff members as one of them shared, "*The social worker – if you have a problem, they're okay with it. Yes, they're kind*". - *Rosario*

Table 5. Theme clusters and formulated meanings under the emergent theme "Exhibiting Anchors for Inner Strength"

Emergent Theme	Theme Cluster	Formulated Meanings
Exhibiting Anchors for Inner Strength	Spiritual Practices to Maintain Stability and Courage	• Moving Forward Through Prayer • Staying Hopeful Through Faith • Spirituality as a Central Pillar of Strength
	Meeting Core Human Needs	• Basic Needs Are Met, Peace of Mind Follows • Essential Needs Are Fulfilled • Core Needs Are Provided

Residents rely on spiritual practices as anchors to sustain their inner strength. To begin with, the cluster, "***Spiritual Practices to Maintain Stability and Courage***" emphasizes the ability of elderly individual to find strength upheld by prayer and belief. An individual emphasized," *Me, just prayers only. That's what I hold on to no matter what happens..."- Andres*

Building upon this, the second cluster "***Meeting Core Human Needs***" highlights the support and essentials provided by the institution. Elderlies stated appreciation from the goodness they receive to start a new life by providing their self care and basic needs. An elderly expressed, "*... we don't have job, we don't have money on the streets. Because on the streets…different kind of illnesses you'll get because you're on the streets… here you have bed, someone looks after you…someone feeds you, on the street no one". - Delfin*

Table 6. Theme clusters and formulated meanings under the emergent theme "Rediscovering Meaning and Well-Being in Recovery"

Emergent Theme	Theme Cluster	Formulated Meanings
Rediscovering Meaning and Well-Being in Recovery	Influence of Healing Towards Meaningful Life	• Transformative impact of receiving care • Stability through supportive environment • Perceived improved well-being
	Redirected Purpose	• Finding meaning through a renewed sense of direction • Recovery nurtured by empathy and genuine support • Appreciation of personal worth
	Perceived Changes of Overall Well-Being	• Better life direction • From abandoned to well sheltered • Emotional burden to peace of mind • Acknowledges growth and recovery at the facility

In the first cluster, "***Influence of Healing Towards Meaningful Life***", it fosters peace, appreciation, and a renewed sense of purpose, contributing to their emotional and physical recovery. One informant stated, "*Right now, I can say that I'm doing okay – both physically and emotionally... I really feel that we're well taken care of here..."- Dante*

Extending from the transformative impact of care, the second cluster, "***Redirected Purpose***", captures how informants, begin to reshape and rediscover their sense of purpose while living inside the care facility. An elderly emphasized, "*It's like I became more responsible for my own health because of their support...But here, you can really feel that you're not being neglected..."- Nestor*

Redirected purpose is closely tied to how an elderly "***Perceived Changes in Overall Well-Being".*** This cluster highlights the perspectives of elderly individuals regarding their emotional and spiritual improvements experienced throughout their journey. An informant shared, "*...Before, I always felt like I had weight in my back – full of anger, sadness, and the feeling of having no one on your side. But since I've been here, slowly, my perspective have changed..." - Nestor*

Each component of the acronym **O.L.D.E.R.** captures a distinct phenomenon, collectively illustrating the process of recovery including the challenging progress involving the complex realities in adjustments to new environments and emotionally,

physically and social obstacles. **"O"** represent for **Obstacles faced in Institutional Life,** emphasizing the emotional and social challenges, particularly those related to the loss of loved ones and feelings of isolation. Aligned with this is **"L"** refers to **Learning Diverse Coping Strategies to Manage Emotional Distress,** pointing to management and strategies they exhibit in the peak of emotional and spiritual distress, often to keep the elderly individuals to strive and gather the courage to accept limitations. **"D"** stands for **Discovering Pathways of Emotional Resilience,** underscoring how elderly individual discover meaning and strength independently and through the assistance of Social Workers and House Parents.**"E"** refers to **Exhibiting Anchors of Inner Strength,** highlighting the up bringing of spiritual beliefs and addressing the needs of the elderly to help them establish their strength deeply through faith that is crucial for their recovery and ongoing progress. Lastly, "**R"** represent for **Rediscovering Meaning and Well-Being in Recovery** reflects the perception of older adults towards the support they received which impact their well-being to achieve a sense of recovery, highlighting the improvements and development they encountered with their selves during recovery.

Discussion

The findings reflect the existing literature on the challenges and coping strategies that the abandoned elderly used while living in residential facility, yet it introduces new insights. Similar to the previous study of Sebastian et al. [9], the informants highlighted the effects of structured institutionalized rules, routines, impact of understaffing, and the lack of autonomy. While Sutton et al. [10] discuss implementation strategies and risks, including workflow integration, staff training, and user acceptance—factors that also influence how elderly residents perceive care and recover. This study goes further by showing how the informants' past trauma (e.g., abandonment) unfold during times of solitude which is a link that previously not emphasized. The informants described persistent feelings of isolation due to abandonment and limited family contact. This aligns with research showing that disruptions in social relationships contribute to loneliness in later life. For example, Yang [11] reported heightened loneliness among widowed older adults, particularly women. While the causes differ, both findings emphasize that the absence of meaningful social support can hinder emotional well-being and, ultimately, recovery. Spirituality has been identified as important coping strategies when faced with stressor related to aging. Victorino et al. [12] emphasized that environment plays a significant role in facilitating religious coping among Brazilian older adults. Although the study focuses on abandoned elderly, the findings suggest that environmental structures and institutional support system may shape how informants engage in spiritual coping as part of recovery.

The findings extend by reframing solitude as a form of resilience rather than isolation alongside affirmative thinking. When it comes to resilience of the elderlies, previous study emphasized the importance of relational trust [7], while this study showed different pathways such as internal resilience through self-regulation during solitude and resilience promoted by gradually trusting the caregivers despite initial resistance to care. Moreover, meeting the basic needs and security were said to be fundamental in emotional recovery [1]. The findings identified how external support redirected the survival concerns to peace and stability. By addressing a structured policy, this study finds that the progression of policy is proven to be effective to observe a gradual improvement among abandoned elderly individuals. The nurses and caregiver plays a vital role for the abandoned elderly to reflect, understand, and help themselves find strength and development towards recovery for improve well-being. This also shows the nature of the Filipinos to be dedicated and patient to the elderly individuals to provide the appropriate care and foster hope amidst challenges despite.

The researchers followed the concept of reflexivity through the bracketing method, wherein the researchers had to identify and make themselves aware of their own biases, assumptions, and preconceptions that influenced the research process and findings through a reflective journal. Once one becomes aware of biases, there is a significant potential to prevent having them.

While this study provides rich, qualitative insight into the recovery experiences of abandoned elderly individuals in institutional care, several limitations

must be acknowledged. The study was geographically limited to selected residential care facilities in Metro Manila. This urban concentration does not reflect the diversity of experiences among elderly individuals living in rural or smaller institutional settings across the Philippines. Despite its limitations, the study also offers several strength. The purposive sampling method used in selecting informants allowed the study to have rich and authentic content of lived recovery experiences, providing insights of internal and external pathways to resilience.

Conclusion

In conclusion, this research highlights the obstacles, coping mechanisms, and the viewpoints of abandoned elderly individuals, which played a crucial role in their well-being and development towards recovery in a Residential Care Facility. The continuous care, dedication, and understanding from caregivers, nurses, and social workers significantly influence the pace of recovery and the transformation in behaviors and attitudes, which helps to foster hope and attain serenity amidst challenges. By coordinating nursing education, clinical practice, and future research with the expanding system and institutions, Residential Care Facilities in the Philippines adopt a more transformative approach aimed at delivering more efficient and effective care for abandoned elderly individuals. To address the gaps identified in this study, future research should expand its geographical scope beyond Metro Manila to provide a more comprehensive and nationally representative picture of the recovery experiences of abandoned elderly individuals.

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Original Article

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Effectiveness of "Discharge Guidance Programme" on Medication Compliance and Complications among Patients Undergone Heart Valve Replacement

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Abstract

Background: In India, rheumatic heart disease (RHD) affects approximately 5 to 7 out of every 1,000 children aged between 5 and 15 years, with an estimated 1 million individuals living with the condition, with many patients needing valve replacement surgery. While surgery is crucial, effective post-operative counseling and adherence to lifelong oral anticoagulant therapy (OAT) are vital to prevent complications such as thromboembolism or bleeding. Despite the clear need, there's a notable lack of formal research in India assessing how effective counseling truly impacts patient adherence and long-term outcomes after valve replacement.

Methods: A Quasi-experimental research study was conducted from December 2024 to Feb 2025, using a total enumeration method. A structured questionnaire was developed, validated, and administered to 54 patients.

Results: This comparative study involving 54 heart valve replacement patients (experimental group n=27, control group n=27) at KGMU, Lucknow, assessed the effectiveness of a Discharge Guidance Programme on medication adherence and post-operative complications. Baseline demographic and clinical characteristics were statistically comparable between the experimental and control groups, as indicated by non-significant p-values (all $p > 0.05$). The Kolmogorov-Smirnov test revealed that all outcome variables significantly deviated from a normal distribution (all $p < 0.05$); therefore, non-parametric statistical methods were employed for subsequent analyses.At baseline, medication adherence was similar between groups (Chi-square p=0.362; Mann-Whitney U p=0.517). However, the Discharge Guidance Programme significantly improved medication adherence in the experimental group. At 1st week post-discharge, 70.37% of the experimental group demonstrated high adherence compared to 18.51% in the control group (p=0.001), with a significantly higher mean adherence score (experimental: 8.00±0.00; control: 2.79±1.24; p=0.000). This improvement was sustained at 4th week post-discharge, with 88.88% high adherence in the experimental group vs. 51.85% in the control group (p=0.006), and significantly higher mean adherence (experimental: 8.00±0.00; control: 3.02±1.27; p=0.000). The program also significantly reduced post-operative

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complications. At 1st week post-discharge, the experimental group had a lower incidence of complications (7.40%) compared to the control group (44.4%), with a significantly lower mean complication score (experimental: 0.22±0.51; control: 1.00±1.24; p=0.01). By 4th week post-discharge, no patients in the experimental group reported complications (0%) compared to 29.6% in the control group, maintaining a significantly lower mean complication score (experimental: 0.00±0.00; control: 0.29±0.608; p=0.01). Significant positive correlations were found between 1st and 4th week scores for complications (r=0.377,p=0.005) and medication adherence (r=0.311,p=0.022).

Conclusion: The findings of this study demonstrate that the "Discharge Guidance Programme" is an effective intervention for improving medication adherence and reducing the incidence of post-operative complications among patients who have undergone heart valve replacement. The experimental group, which received the guidance programme, exhibited significantly better medication compliance and experienced fewer complications in the crucial 4-week period following discharge compared to the control group receiving standard care. This suggests that a structured discharge guidance programme can play a vital role in enhancing patient outcomes and potentially reducing the burden of post-surgical morbidity.

Keywords: Quasi experimental research study; Discharge Guidance Programme, medication compliance, complications, heart valve replacement.

Introduction

Heart valve surgery significantly effects a patient's quality of life. For individuals receiving mechanical heart valves, regardless of their specific design or material, lifelong chronic anticoagulation therapy is typically required. Managing these patients presents challenges, as attempts to control anticoagulation have sometimes led to unacceptable rates of valve clotting, embolic events, and bleeding complications. Patients undergoing anticoagulation are often advised to maintain consistent dietary habits, avoid alcohol, and manage physical activity levels, as these factors can influence the therapy's effectiveness. [1].

Previous research has highlighted that thromboembolism and bleeding constitute a significant majority (75%) of complications following heart valve replacement, with these issues being more frequent within the initial six months post-operation. During this critical period, insufficient discharge education for both the patient and family can lead to difficulties in managing daily activities such as mobility, nutrition, elimination, respiration, sleep, and rest[4]

Research Approach: Quantitative Approach

Research Design: Quasi experimental research design

Table 1

GROUPS	PRETEST	INTERVENTION	POSTTEST 1 POST DISCHARGE AT 1st WEEK	POST TEST 2 POST DISCHARGE AT 4th WEEK
E	O1	X + R	O2	O3
C	O1	R	O2	O3

Study setting: This study was conducted within the Cardiothoracic and Vascular Surgery (CVTS) ward at King George's Medical University (KGMU) Hospitals, located in Lucknow, Uttar Pradesh, India.

Population and Sampling:

Target population: Patient undergone heart valve replacement available during data collection.

Accessible population: Patient undergone heart valve replacement admitted in cvts ward. The study's participants were patients with valvular heart disease who were admitted to KGMU Hospitals in Lucknow.

Sampling technique: Purposive sampling

- Allocation of subjects in experimental and control group will be done using UHID number the last 2 digit of UHID will be taken into consideration.

- The control group consisted of individuals whose UHID ended with an odd two-digit number.
- The experimental group consisted of individuals whose UHID ended with an even two-digit number.

Criteria for sample collection-

Inclusion Criteria:

- Patients undergone heart valve replacement (Double valve replacement, Mitral valve replacement, Aortic valve replacement.)
- Adults above 18 years old to 80 years old.
- Able to understand hindi.
- Agreed to participate after being informed

Exclusion Criteria:

- Patients with previous knowledge or who had received education on care following heart valve replacement.
- Patients unable to communicate effectively.
- Patients underwent valve repair surgery.

SAMPLE SIZE CALCULATION

$$\textbf{Sample Size: } n = \frac{(Z\alpha/2+Z\beta)^2 * 2 * SD^2}{\Delta^2}$$

- Zα/2 = critical value of the standard normal distribution for a two-tailed test at 95% confidence level (1.96 for α = 0.05)
- Zβ = critical value for 90% power (1.28)
- SD = standard deviation
- Δ(Delta) = minimum detectable difference or effect size (difference between the two means)
- n = sample size of each group

On applying in the above formula

$$n = \frac{(1.96+1.28)^2 * 2 * 1.7^2}{(1.5)^2} = 26.96 \sim 27$$

Zα/2 =1.96 Zβ = 1.28 Sigma = 1.7

Delta=1.5

Materials: The sample size for the study would be 27 subjects for each Group, hence overall 54 samples are required for the study

Estimated sample size is 54

Reference Article

Yaman, Yesim & Bulut, Hulya. (2010). Evaluation of discharge training given to patients who have undergone heart valve replacement. Turkish Journal of Thoracic and Cardiovascular Surgery. 18. 277-283.

Tool for data collection:

Section A: Demographic variables

It includes age, gender, education, income and occupation.

Section B: Baseline clinical data

It includes Previous Surgery, Endocarditis, Type of Sugery

Section C: Complication tool

It includes questions categories as Avoidable complications, Unavoidable complications, Situational complication, readmission was required due to complications.

Section D: Medication adherence tool

The Morisky Medication Adherence Scale (MMAS-8) is a structured, self-report measure used to assess medication adherence, developed from the 4-item Morisky Green and Levine scale, with the first 7 questions being yes/no, and the last using a 5-point Likert scale. The MMAS-8 aims to assess medication-taking behavior, including both unintentional (e.g., forgetfulness) and intentional (e.g., stopping medication due to side effects) reasons for non-adherence.

Development of the Questionnaire

A self-structured questionnaire designed to assess post-discharge complications was developed for this study. Its validity was also confirmed by experts from the CVTS department It includes questions categories as Avoidable complications, Unavoidable complications, Situational complication, readmission was required due to complications. Total 9 experts offered feedback on the tool's clarity and suitability.

Reliability of the Tool:

The reliability of the self-developed tool (the Post Discharge Complication Questionnaire) was evaluated using Cronbach's Alpha, which yielded a reliability coefficient of 0.81.

Intervention

The Discharge Guidance Programme intervention will be standardized and delivered by researcher in which.

1. Exclusive discharge guidance on Medicine compliance to the patient undergone heart vale replacement.

Medications: (5 minutes)

2. Provide Education concerning complication among patient undergone heart vale replacement.

Warning Signs and Complications: (5 minutes)

3 Managing Lifestyle Changes and Risk Factors: (5 minutes)

4. Follow-up Appointments: (5 minutes)

Statistical analysis

The collected data were coded and summarized using Microsoft Excel. Both descriptive and inferential statistics were performed. The Kolmogorov-Smirnov test was used to assess the normality of outcome variables, which indicated a non-normal distribution (all $p<0.05$). Consequently, non-parametric tests were employed for analysis.For comparisons between the experimental and control groups, the Mann-Whitney U test was utilized. The Chi-square test was also applied to assess baseline demographic and clinical comparability, as well as baseline medication adherence. Spearman's rank correlation was performed to examine relationships between variables.

Results

This study enrolled a total of 54 patients, with 27 in the experimental group receiving the Discharge Guidance Programme and 27 in the control group receiving standard care.

Section I: Demographic and Clinical Profile of Subjects Findings

Demographic Comparability: Both the experimental and control groups were found to be statistically comparable across all assessed demographic variables including age, gender, educational status, occupation, income status, marital status,family type, religion, language, and distance from healthcare setting. The p-values for all these variables were greater than 0.05, indicating no significant baseline differences.

Clinical Baseline Comparability: The baseline clinical characteristics of the two groups were also comparable. There were no statistically significant differences in the history of previous surgery ($p=1.00$) or the distribution of the types of valve replacement surgeries (MVR, AVR, DVR) performed ($p=0.152$). All participants in both groups were noted to be free from endocarditis at baseline.

Comparison of demographic profile variable of the experimental andcontrol group. N=54

No.	Demographic variables		f(%)		p-value
			Experimental Group n =27	Control Group n =27	
1	Age	< 20 years	1(3.70)	3(11.11)	0.556
		21-40	19(70.37)	14(51.85)	
		41-60	6(22.22)	9(33.33)	
		61 and above	1(3.70)	1(3.70)	
2	Gender	Male	12(44.44)	8(29.63)	0.398
		Female	15(55.56)	19(70.37)	

Continue.....

3	Educational status	Professional	-	1(3.70)	0.259
		Graduate	-	-	
		Intermediate/Diploma	1(3.70)	3(3.70)	
		Higher School	-	1(3.70)	
		Middle School	5(18.52)	2(7.41)	
		Primary School	1(3.70)	4(14.81)	
		Illiterate	20(74.07)	16(59.26)	
4	Occupation	Professional	-	-	0.115
		Semiprofessional	-	-	
		Clerical/shop/farm	1(3.70)	-	
		Skilled worker	-	-	
		Semiskilled worker	6(22.22)	2(7.41)	
		Unskilled	2(7.41)	7(25.93)	
		Unemployed	18(66.67)	18(66.67)	
5	Income status	>123,322	-	-	0.300
		61,663-123,321	-	-	
		46129-61,662	1(3.70)	-	
		30,831-46,128	-	-	
		18,497-30,830	2(7.41)	2(7.41)	
		6,175-18,496	15(55.56)	10(37.04)	
		<6174	9(33.33)	15(55.56)	
6	Marital status	Married	23(85.19)	18(66.67)	0.203
		Unmarried	4(14.81)	9(33.33)	
		Widow	-	-	
7	Family type	Nuclear	33.3(33.3)	48.1(48.1)	0.406
		Joint	66.7(66.7)	51.9(51.9)	
		Extended	-	-	
8	Religion	Hindu	23(85.19)	23(85.19)	0.499
		Muslim	4(14.81)	4(14.81)	
		Sikh	-	-	
9	Language	Hindi	26(96.30)	27(100.00)	1.00
		English	1(3.70)	-	
10	Distance from health care setting	Approachable within an hour	9(33.33)	5(18.52)	0.283
			17(62.96)	21(77.78)	
		2-4 hours	1(3.70)	-	
		4-6 hours	-	1(3.70)	
		More than 6 hours	-	-	

Comparison of clinical variable of experimental and control group. **N = 54**

S No.	Clinical variables		f (%)		p-value
			Experimental Group n=27	Control Group n=27	
1	Previous surgery	Yes	3.70(3.70)	3.70(3.70)	1.00
		No	96.30(96.30)	96.30(96.30)	
2	Endocarditis	Yes	-	-	-
		No	27.00(100.00)	27.00(100.00)	
3	Type of surgery	MVR	15.00(55.56)	14.00(51.85)	0.152
		AVR	7.00(25.93)	12.00(44.44)	
		DVR	5.00(18.52)	1.00(3.70)	

Section II: Effectiveness of Discharge Guidance Programme Findings

Non-Normal Distribution of Outcome Data: The Kolmogorov-Smirnov test indicated that the data for both complication and medication scores at all time points (baseline, 1st week, and 4th week) significantly deviated from a normal distribution (all $p<0.05$), supporting the use of non-parametric statistical tests.

Baseline Medication Adherence: Prior to the intervention, both the experimental and control groups demonstrated similar levels of medication adherence, predominantly in the low to medium categories. The Chi-square test (p=0.362) and the Mann-Whitney U test for mean scores (p=0.517) confirmed no significant difference in medication adherence between the groups at baseline.

Improved Medication Adherence Post-Intervention: The Discharge Guidance Programme significantly improved medication adherence in the experimental group compared to the control group.

At the 1st week post-discharge, a significantly higher percentage of the experimental group showed high adherence (70.37%) compared to the control group (18.51%) (p=0.001). The mean medication adherence score was also significantly higher in the experimental group (8.00±0.00) than the control group (2.79±1.24) (p=0.000). This improvement was sustained and even increased by the 4th week post-discharge, with 88.88% of the experimental group demonstrating high adherence compared to 51.85% in the control group (p=0.006). The mean medication adherence score remained significantly higher in the experimental group (8.00±0.00) than the control group (3.02±1.27) (p=0.000).

Reduced Complications Post-Intervention: The Discharge Guidance Programme was effective in reducing the incidence of post-operative complications.nAt the 1st week post-discharge, significantly fewer patients in the experimental group reported experiencing complications (7.40%) compared to the control group (44.4%). The mean complication score was significantly lower in the experimental group (0.22±0.51) compared to the control group (1±1.24) (p=0.01).By the 4th week post-discharge, none of the patients in the experimental group reported complications (0%), while 29.6% of the control group still experienced complications. The mean complication score remained significantly lower in the experimental group (0.00±0.00) than the control group (0.29±0.608) (p=0.01). Specific avoidable complications were notably less frequent or absent in the experimental group at both the 1st and 4th weeks compared to the control group.

Correlations Between Scores: Significant positive correlations were observed between complication scores at the 1st and 4th weeks post-discharge (r=0.377, p=0.005) and between medication scores at the 1st and 4th weeks post-discharge (r=0.311,p=0.022). This suggests a degree of consistency in the trends of complications and medication adherence over the post-discharge period. Baseline scores were not significantly correlated with later scores.

Comparison of pretest score of medication adherence among experimental group and control group N=54

S No.	Medication timeline		f(%)		p-value
			Experimental Group n =27	Control Group n =27	
1	At baseline	Low adherence	18	21	0.362
2		Medium adherence	9	6	
3		High adherence	0	0	

**p-value<0.05 -Chi-square value*

Comparison of Post-test score for medication adherence between experimental and control group at 1st week and 4th week post discharge. N=54

S No.	Medication timeline		f (%)		p-value
			Experimental Group n =27	Control Group n =27	
1	At 1st week	Low adherence	6(22.22)	9(33.33)	(0.001)
2		Medium adherence	2(7.40)	13(48.18)	
3		High adherence	19(70.37)	5((18.51)	
1	At 4th week	Low adherence	-	6(22.22)	(0.01)
2		Medium adherence	3(11.11)	7(25.92)	
3		High adherence	24(88.88)	14(51.85)	

Comparison of mean between the experimental and control group.

Timeline		Group		
		Experimental	Control	p- value
		Mean±.Standard Deviation	Mean±.Standard Deviation	
Medication	At baseline	3.37±0.97	3.23±0.97	0.517
	At 1st week	8.00±0.00	2.79±1.24	0.000
	At 4th week	8.00±0.00	3.02±1.27	0.000

Comparison of pretest score of Surgery complication among experimental and control group N=54

Complication (54)		At baseline			
	Experimental group		Control group		
		Yes n (%)	No n (%)	Yes n (%)	No n (%)
Q1. Do you experience any complications in at the time of Discharge , Last 1st / 4th weeks post discharge?		27 (100)	-	27 (100)	-

Continue.....

Avoidable complications	Q2a) 1-Redness, swelling or fluid flowing from the stitch site?	27 (100)	-	27 (100)	-
	Q2a) 2-Do you have swelling in your legs?	1 (3.70)	26 (96.3)	1 (3.7)	26 (96.3)
	Q2a) 3-Do you ever suddenly have trouble in breathing?	-	27 (100)	-	27 (100)
	Q2a) 4-Do you ever feel irregularities in your heartbeat?	-	27 (100)	-	27 (100)
	Q2a) 5-Does your wound ever bleed for a long time?	5 (18.51)	22 (81.48)	3 (11.11)	24 (88.88)
	Q2a) 6-Do you found blood in your stool or urine?	-	27 (100)	-	27 (100)
	Q2a) 7-Do you have unbearable chest pain?	10 (37.03)	17 (62.96)	12 (44.4)	15 (55.6)
	Q2a) 8-Do you ever get itching or rashes?	1 (3.70)	26 (96.3)	-	27 (100)
	Q2a) 9-Do you have fever?	4 (14.81)	23 (85.18)	7 (25.92)	20 (74.1)
	Q2a) 10-Do you have difficulty resuming normal activities?	18 (66.66)	9 (33.33)	16 (59.26)	11 (40.74)
Unavoidable complications	Q2b) 1-Recurrence of the heart valve problem	-	27 (100)	-	27 (100)
	Q2b) 2-Valve leakage	-	27 (100)	-	27 (100)
	Q2b) 3-Valve stenosis	-	27 (100)	-	27 (100)
	Q2b) 4-Arrhythmias	-	27 (100)	-	27 (100)
	Q2b) 5-Stroke	-	27 (100)	-	27 (100)
Situational complication	Q2 - Situational complication	-	27 (100)	-	27 (100)
Q3-Whether readmission was required due to complications?		-	27 (100)	-	27 (100)
Q4-Readmission was done in the treating hospital (KGMU)		-	27 (100)	-	27 (100)

Continue.....

Q5 -What was the length of stay?	-	27 (100)	-	27 (100)
Q6-Whether any procedure/Surgery was performed?	-	27 (100)	-	27 (100)

Mean Comparison of Complication and Medication Scores Between Experimental and Control Groups

N=54

Timeline		**Group**		
		Experimental	**Control**	**p- value**
		Mean±.Standard Deviation	**Mean±.Standard Deviation**	
Complication	At baseline	3.4±.891	3.4±1.121	0.847
	At 1st week	0.22±.51	1±1.24	0.01
	At 4th week	0.00±0.00	.29±.608	0.01

Noted: Mann-Whitney U test**p-value<0.05*

Normality test of complication and medication scores

Timeline		**Kolmogorov-Smirnov test.**		
		Statistic	**df**	**p – value**
Complication	At baseline	0.245	54	0.000
	At 1st week	0.393	54	0.000
	At 4th week	0.517	54	0.000
Medication	At baseline	0.453	54	0.011
	At 1st week	0.284	54	0.000
	At 4th week	0.427	54	0.000

*Noted: *p-value<0.05*

Spearman's Rank Correlation Between Complication and Medication Scores at 1st and 4th Weeks **N=54**

Timeline			**At 1st week**	**At 4th week**
Complication	At baseline	Correlation value	0.177*	0.090*
		p – value	0.201	0.520
	At 1st week	Correlation value		0.377*
		p – value		0.005
Medication	At baseline	Correlation value	0.195*	-0.010
		p – value	0.157	0.941
	At 1st week	Correlation value		0.311
		p – value		0.022

*Noted: *p-value<0.05*

Discussion

The present study unequivocally demonstrates the effectiveness of the "Discharge Guidance Programme" in significantly enhancing medication adherence and reducing the incidence of post-operative complications among patients who have undergone heart valve replacement surgery. At baseline, both the experimental and control groups

exhibited comparable and generally suboptimal levels of medication adherence, evidenced by non-significant differences (p=0.362 and p=0.517). This finding underscores the widespread challenge of adherence in this patient population prior to targeted interventions. The introduction of the Discharge Guidance Programme led to a profound and statistically significant improvement in adherence within the experimental group. By the first week post-discharge, a remarkable 70.37% of experimental patients achieved high adherence, a stark contrast to only 18.51% in the control group (p=0.001). Crucially, this improvement was sustained and increased by the fourth week post-discharge, reaching 88.88% high adherence in the experimental group (compared to 51.85% in the control group, p=0.006). These results strongly align with existing literature emphasizing the critical role of patient education and support for essential therapies like anticoagulation. The structured nature of the guidance program appears to effectively bridge knowledge gaps and facilitate adherence. Beyond adherence, the DGP also proved instrumental in reducing post-operative complications. The experimental group exhibited a significantly lower mean complication score at both the first week (0.22±0.51 vs. 1±1.24,p=0.01) and the fourth week (0.00±0.00 vs. 0.29±0.608,p=0.01). By the fourth week, no patients in the experimental group reported complications (0%), while 29.6% of the control group still experienced issues. The observed reduction in specific preventable complications further underscores the program's efficacy. Given the well-documented risks of complications like thromboembolism and bleeding in patients with mechanical valves, this significant reduction strongly suggests that improved anticoagulant adherence, facilitated by the guidance program, played a pivotal role in mitigating these risks.

Limitation of the study

- The study's relatively small sample size (n=54) drawn from a single center (KGMU, Lucknow) may significantly limit the extent to which the findings can be generalized to patients in other geographical areas or different healthcare settings. The reliance on a specific patient population within one specialized ward affects external validity.
- The four-week post-discharge follow-up period is relatively short. A longer follow-up (e.g., three to six months or more) is necessary to provide a more robust understanding of the sustained long-term impact of the intervention on critical clinical outcomes such as readmission rates, quality of life, and mortality.
- The primary assessment of complications relied on a self-structured, self-report questionnaire. While the tool's validity and reliability were established by experts, integrating objective measures (e.g., verifying complications and readmissions with medical records or clinical data) would have provided superior validation and strengthened the rigor of the findings.
- The study evaluated the overall "Discharge Guidance Programme". However, it did not explore the individual effectiveness of its specific components (e.g., education on medications, warning signs, lifestyle changes, or follow-up). Future research should investigate this to identify which specific elements are most impactful and resource-efficient.
- The allocation method based on the UHID number's last two digits is transparent but may introduce an unintended selection bias if the digit sequence is not truly random or if the researcher was aware of the sequence during patient enrollment. Full disclosure on blinding and allocation concealment would improve the perceived rigor.
- The results lack specific findings related to the frequency of individual complications assessed, such as thromboembolism, bleeding complications, wound infections, or others within the self-developed categories (Avoidable, Unavoidable, Situational). Furthermore, **s**pecific data on complications leading to readmission were not detailed, which limits the clinical understanding of the program's targeted effect on preventing life-threatening post-surgical issues.

Practical Implications of the study

Nursing Practice: Nurses must view discharge guidance as a critical intervention, utilizing standardized protocols for heart valve replacement

patients covering medication, complications, activity, diet, and follow-up. Active education on medication adherence, especially anticoagulants, is crucial, explaining purpose, dosage, and side effects. Patients and families need clear instructions on identifying and reporting post-operative complications.

Nursing Education: Programs should dedicate resources to effective discharge planning for complex cardiac patients, focusing on assessing health literacy, tailoring content, and using diverse teaching methods.

Nursing Research: Future research should involve extended follow-up periods to assess long-term effects on outcomes like readmissions and quality of life.

Nursing Administration: Administrators must allocate sufficient staff, time, and educational materials for comprehensive discharge planning.

Conclusion

The findings of this study demonstrate that the "Discharge Guidance Programme" is an effective intervention for improving medication adherence and reducing the incidence of post-operative complications among patients who have undergone heart valve replacement. The experimental group, which received the guidance programme, exhibited significantly better medication compliance and experienced fewer complications in the crucial 4-week period following discharge compared to the control group receiving standard care. This suggests that a structured discharge guidance programme can play a vital role in enhancing patient outcomes and potentially reducing the burden of post-surgical morbidity.

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Ethical approval and consent to participate: The institutional ethical committee of KGMU provided ethical clearance. The study was conducted in Lucknow, with reference letter no. 3141/Ethics/2025.

Availability of data and materials: The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Competing interest: Not Applicable

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Original Article

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Development of a Care Model for Substance use Patients with Mental Disorders and Aggressive Behavior in Lomkao Crown Prince Hospital

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Abstract

Background: Substance use in patients with mental disorders and aggression poses significant challenges to care quality and safety. However, a critical gap exists regarding integrated care models to overcome the lack of coordinated care from various departments. This study aimed to develop and evaluate a comprehensive care model for substance use patients with mental disorders and aggressive behavior.

Methods: A randomized control trial (RCT) was employed, with 80 participants randomly assigned to intervention (n=40) or control (n=40) groups from May 2025 to October 2025 through structured questionnaires. The intervention group received an integrated care model and post-discharge monitoring via the LINE application. Outcomes were measured using the Overt Aggression Scale (OAS) and adherence at baseline and 4-month follow-up. A mixed-effects linear regression model was used to assess the effect of the intervention on OAS scores over time while chi-square tests were used to compare categorical variables. t-tests were used to compare continuous variables.

Results:At baseline, there was no significant difference between the intervention and control groups. A significant reduction in OAS scores from baseline to 4-month follow-up (β = -35.800, $p < 0.001$). While the group×time interaction was statistically significant (β = 13.500, $p < 0.001$).Post-discharge adherence was higher in the intervention group, including LINE tracking (82.5%), medication adherence (77.5%), and appointment reminders and attendance (87.5%) ($p < 0.001$).

Conclusion: The integrated care model significantly improved outcomes for substance use patients with mental disorders and aggressive behavior. Its success highlights the importance of interdisciplinary collaboration, staff training, and digital follow-up systems. The model offers a scalable solution for similar settings.

Keywords: Substance use, Mental disorders, Aggressive behavior, Integrated care model, Overt Aggression Scale

Introduction

Globally, there has been an upsurge in the use of drugs. An estimated 292 million people used drugs in 2022, which means a 20% increase compared to

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the previous decade. Cannabis is the most used substance, followed by opioids and amphetamines. It is estimated that about 64 million people have drug use disorders, only one in eleven people receive treatment.[1] The drug problem in Thailand remains equally concerning, particularly among youth who show increased substance use.[2] Trend in use of drugs are increasing especially methamphetamine, and cannabis which a significant rise in treatment admissions for methamphetamine was rising from 150,121 in 2023 to 177,533 in 2024.[3] Substance use is a notable issue among adolescents in rural communities, with lifetime prevalence at 24.4% and one-year prevalence at 16.7%.[4]

Patients with drug abuse problems often experience severe psychiatric symptoms such as auditory hallucinations, delusions, and paranoia. These symptoms can result from continuous substance use, affecting brain chemistry and causing changes in the nervous system that lead to uncontrollable psychiatric symptoms, which can result in aggressive behavior.[5] Patients with drug problems and psychiatric symptoms present complex cases requiring close medical supervision. These patients often develop psychiatric conditions from continuous substance use, impacting mental health and behavior.[6]

Substance use affects over 70% of psychiatric patients in Thailand which exacerbated by a treatment budget.[7] The rise in psychiatric cases linked to amphetamines [8,9], particularly among men more likely to self-medicate through substance use, complicating treatment.[10,11] Additionally, permanent psychiatric symptoms may develop, such as psychotic disorders and bipolar disorder, which may result from long-term substance use.[12] The majority of individuals who suffer from substance-induced psychosis make a full recovery. Chronic psychosis is more likely to occur in people who begin using drugs at a young age, abuse them for a long period of time.[13] These findings underscore the urgent need for a comprehensive care model that integrates early screening for risk factors, sustained psychiatric follow-up, and targeted interventions for aggressive behavior. Such a model should be emphasized.

The treatment of substance use patients with psychiatric symptoms and violent aggressive behavior requires a holistic approach with clear procedures.[14–16] This begins with preparing patients and their families to create understanding of the treatment model and the roles of all involved parties. Detoxification is the next step, requiring close monitoring to reduce both physical and psychological complications that may arise. This is followed by rehabilitation processes focused on modifying patient behavior and thinking patterns, using group activities to build positive social relationships.[17–19] Finally, follow-up care is provided to support patients in living valuable lives in society. This care must also consider the safety of patients and surrounding individuals to prevent recurrence of aggressive behavior.[20]

The number of substance use patients with psychiatric symptoms and violent behavior in treatment at Lomkao Crown Prince Hospital surged from 30 in 2022 to 160 in 2025, raising urgent care system needs. Several challenges exist in uncoordinated interdepartmental care create gaps, the absence of post-discharge follow-up applications limits patient monitoring, aggressive behavior of the patients is dangerous to the staff and other patients, and inaccurate local patient data makes effective planning and resource allocation impossible. Therefore,This study aimed to develop and evaluate anintegrated care model for substance use patients with mental disorders and aggressive behavior, creating an efficient holistic system for the care model of substanceuse patients with psychiatric symptoms and violent aggressive behavior between various departments, will help to improve the quality of care for substance use patients with psychiatric symptoms.

Methods

Research Design

Arandomized control trial designwas utilized from May 2025 to October 2025.

Population

Substance use patients with mental disorders and aggressive behavior in Lomkao Crown Prince Hospital, Lom Kao District, Phetchabun Province, Thailand.

Sample sizeand sampling techniques

The primary outcome was whether the care model intervention decreased aggressive behaviors more than standard care as reflected by changes in OAS. Between-group differences were assessed with Chi-Square tests evaluating patients achieving specific OAS thresholds at follow-up. A priori power analysis based on effect size (w) of 0.5 from pilot data with significance level (α) of 0.05 and power (1-β) of 0.95 was performed. A required sample of 62 participants was determined based on this calculation. Accounting for 20% dropout yielded a target enrollment of 78 participants, 39 per group. The study actually enrolled 80 participants, 40 per group.

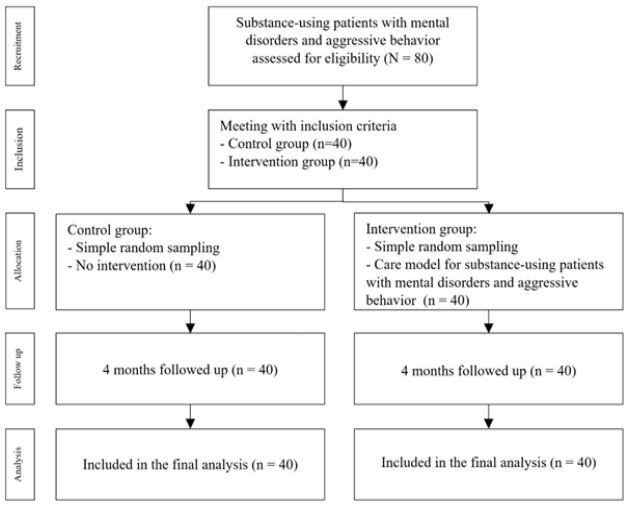
Patients who used substances and had current diagnosed mental disorders with documented aggressive behavior (either from clinical records or from baseline OAS) were included in the study, aged 18-65 years, and received treatment from Lomkao Crown Prince Hospital, Phetchabun Province, Thailand. They had to be medically stable and willing to participate. Exclusion criteria included the following: severe cognitive impairment that prohibited study comprehension, risk to self or others, refusal to adhere to protocols, currently enrolled in another trial, had acute medical conditions that would interfere with participation, and having legal/custodial restrictions without voluntary consent.

The sample size was determined by simple random sampling. A total of 80 patients were assessed for eligibility and who met the inclusion criteria and provided informed consent were enrolled in the study. A computer-generated randomization sequence was used to assign these 80 participants to either the intervention group (n=40) or the control group (n=40).

Data Collection

Data was collected through a structured process involving informed consent, staff training, patient interviews, and follow-up monitoring. Before participation, eligible patients were provided with detailed information about the study, including its purpose, procedures, potential risks, and benefits. Written informed consent was obtained from all participants, ensuring voluntary participation and confidentiality. The study spanned six months, beginning with a two-month training phase for staff, where the first month focused on foundational knowledge (e.g., mental disorders, substance use, and aggression management) and the second month emphasized care planning and therapeutic interventions. Following training, patient data was collected through a structured questionnaire, which captured demographic information and OAS. To maintain data quality, staff were trained in standardized protocols, and measures such as double-data entry were implemented. Post-discharge monitoring was conducted via the LINE Official Account application to track medication adherence, symptom progression, and appointment reminders, while community-based follow-ups ensured continuous assessment.

Due to the nature of the intervention, participants and clinical staff could not be blinded to group assignment. However, outcome assessors conducting 4-month follow-up OAS evaluations were blinded to group allocation. Data analysts remained blinded until primary analyses were complete.



Intervention

Care model for substance use patients with mental disorders and aggressive behavior

Months	Topic	Details
1st	Foundational Knowledge of Psychoactive Substances	- Common types of psychoactive substances - Physiological and psychological effects - Withdrawal syndromes
	Common Psychiatric Symptoms in Substance Users	- Depressive disorders - Anxiety disorders - Delusional disorders - Hallucinations
	Aggressive and Violent Behavior	- Etiology and risk factors - Violence risk assessment - Management strategies
	Emergency Management	- De-escalation and situational control - First aid
	Patient Communication	- Appropriate communication techniques - Building therapeutic rapport - Active listening and empathy
2nd	Patient Care Planning	- Risk assessment - Treatment goal setting - Pharmacological and therapeutic modalities - Post-discharge care planning
	Interdisciplinary Teamwork	- Coordination with relevant agencies - Developing a patient care network
	Therapeutic Interventions	- Pharmacotherapy: Administered under medical supervision. - Psychotherapy: Cognitive Behavioral Therapy (CBT), Dialectical Behavior Therapy (DBT), and group therapy. - Behavioral Therapy: Emotional regulation and problem-solving skills training. - Rehabilitation: Vocational training, physical exercise, occupational therapy. - Counseling: Provided for patients and their families. - Community Linkage: Fostering community relationships and participation.

Continue.....

Months	Topic	Details
3rd-6th	Implementation	A. Initial Assessment: Screening in the clinics or ERs involves vital signs, weight, and complete history, which includes symptoms, treatments, substance use, and allergies. Basic psychiatric screening also identifies urgent needs. B. Psychiatric Diagnosis: Specialists execute mental status tests and apply standardized tools. The team interprets the underlying causes, formulates nursing diagnoses, and refers the patient for physician evaluation to plan appropriate treatments. C. Multimodal Treatment: Psychiatrists devise plans that involve medication management, psychotherapy (CBT, DBT, group), behavioral therapy for emotional regulation, rehabilitation, vocational, occupational, and family counseling. D. Follow-Up & Community Follow-through: The team coordinates follow-up and referrals. Digital tools (LINE) engage in monitoring compliance, monitoring symptoms, counseling, and reminders. Community partnerships help in ensuring continued monitoring and support.

The control group received standard hospital care for substance use patients with mental disorders. This care protocol included an initial psychiatric evaluation and diagnosis, followed by detoxification with necessary medical monitoring. Patients also received standard psychiatric medication management, along with discharge planning that involved scheduling follow-up appointments.

Measurement tools

The current study utilized a three-section questionnaire which spanned demographics, the OAS, and adherence tracking. Demographics included a total of eight items: gender, age, education, marital status, income, occupation, and substance use duration and frequency.

The primary outcome measure was the OAS, a standardized instrument for assessing aggressive behavior in clinical settings. It scores four types of aggression: verbal aggression, physical aggression against objects, physical aggression against self, and physical aggression against others. Each type has five severity levels (0-4). Scores are weighted and summed to produce a total score ranging from 0 to 100.[21]

Adherence was measured by LINE adherence, medication, and appointments. The response rate of LINE adherence was classified into three categories: high (>80%), moderate (50-80%), or low (<50%). Medication adherence, as self-reported through LINE, was categorized into fully (>80%), partially (50-80%), or non-adherent (<50%). Appointment attendance, cross-checked with the hospital records, was categorized into attending all or missing.

Statistical analysis

Descriptive statistics summarize the demographic and clinical characteristics at baseline across intervention and control groups. Summary statistics presented categorical variables, such as gender, education, marital status, occupation, as frequencies and percentages. Continuous variables, such as age, income, and duration of substance use, and OASwere summarized as means and standard deviations.

The primary outcome was the change in OAS from baseline to 4-month follow-up. A mixed-effects linear regression model was utilized to assess the effect of the intervention on OAS scores over time. This model included fixed effects for group (intervention vs.

control), time (baseline vs. 4-month follow-up), and the group×time interaction term. It indicates whether the rate of change in OAS is significantly different between the intervention and control groups. Secondary outcomes included: 1) LINE tracking adherence 2) Medication adherence 3) Appointment attendance were categorical dataand analyzed by chi-square test. All analyses were performed using SPSS version 26 with $\alpha = 0.05$.

Ethical considerations

The study was approved by the Institutional Review Board (IRB) at Phetchabun provincial public health office on April 2, 2025(Approval No.025/2568).

Results

Demographic characteristics of the participants

A total of 80 participants were included in the final analysis, with 40 in the intervention group and 40 in the control group. The demographic characteristics of both groups were comparable at baseline with no statistically significant differences. In the control group, 87.50% were male, with a mean age of 36.10 years (SD = 9.79). A higher proportion had completed education beyond primary school (65.00%). Similar to the intervention group, most were single (62.50%), and the primary occupation was freelance (45.00%). The average income was 6,125.00 baht (SD = 1,136.52), and the mean duration of substance use was 5.13 years (SD = 1.47). The majority (75.00%) reported using substances 3-4 times per week (Table 1).

Overt Aggression Scale scores at baseline and 4-Month Follow-up

The Overt Aggression Scale (OAS) scores were analysedfor both the intervention and control groups at baseline and after 4 months of follow-up. At baseline, the OAS scores were 43.55 (SD = 9.79) in the intervention group and 42.30 (SD = 1.94) in the control group ($p = 0.658$). After 4 months, the intervention group showed a reduction in OAS score with 7.75 (SD = 0.48) and 20.00 (SD = 0.41) in the control group. The mean difference between the groups at 4th month follow-up was statistically significance (Mean diff. = -12.25 ((95% CI of Mean diff. = -13.50 - -11.00), $p < 0.001$) (Table 2).

Mixed-effects linear regression analysis of the effect of the care model for substance use patients with mental disorders and aggressive behavior on overt aggression scale scores

The mixed-effects linear regression analysis evaluates the impact of the integrated care model on OAS scores over time. At baseline, there was no significant difference between the intervention and control groups ($\beta = -1.250$, $p = 0.540$). A significant reduction in OAS scores from baseline to 4-month follow-up ($\beta = -35.800$, $p < 0.001$). While the group×time interaction was statistically significant ($\beta = 13.500$, $p < 0.001$). This significant interaction effect demonstrates that the integrated care model provided substantial added value beyond standard care with the outcomes in reducing aggressive behavior among substance use patients with mental disorders (Table 3).

Post-discharge monitoring outcomes

Post-discharge monitoring at the 4-month follow-up revealed significant differences between the intervention and control groups across all measured aspects. A high level of adherence (>80% response rate) to the LINE tracking application was observed in 82.50% of the intervention group, compared to 42.50% in the control group. 77.50% of participants were fully adherent to their medication in the intervention group, whereas this figure was only 27.50% in the control group. A significant majority of the intervention group attended all their follow-up appointments (87.50%). In contrast, only 37.50% of the control group attended all appointments, with 62.50% missing one or more. The differences in post-discharge monitoring outcomes between the intervention and control groups were all statistically significant ($p<0.001$) (Table 4).

Table 1: Demographic characteristics of the participants

Demographic characteristics	Intervention group		Control group		P-value
	n	%	n	%	
Gender					0.723**
Male	36	90.00	35	87.50	
Female	4	10.00	5	12.50	
Age (years)					
Mean (SD)	35.93 (7.99)		36.10 (9.79)		0.382*
Min - Max	21.00 – 57.00		18.00 - 59.00		
Educational level					0.175**
No education	0	0.00	0	0.00	
Primary school	20	50.00	14	35.00	
Higher than Primary school	20	50.00	26	65.00	
Marital status					0.893**
Single	27	67.50	25	62.50	
Marriage	8	20.00	9	22.50	
Divorce	5	12.50	6	15.00	
Occupation					0.092**
Farmer	12	30.00	6	15.00	
Business	8	20.00	16	40.00	
Freelance	20	50.00	18	45.00	
Income (Baht)					
Mean (SD)	6,100.00 (1,150.25)		6,125.00 (1,136.52)		0.906*
Min - Max	4,000.00 - 9,000.00		4,000.00 - 9,000.00		
Duration of substance use (Years)					
Mean (SD)	4.98 (1.41)		5.13 (1.47)		0.075*
Min - Max	3.00 – 9.00		3.00 – 9.00		
Frequency of substance-use per week					0.095**
1-2 times	17	42.50	10	25.00	
3-4 times	23	57.50	30	75.00	

Note: * Independent t-test** Chi-square test

Table 2: Overt aggression scale scoresat baseline and 4-Month Follow-up

Total overt aggression scale scores	Intervention group	Control group	P-value
Baseline			0.658
Mean (SD)	43.55 (2.04)	42.30 (1.94)	
Min - Max	32 -72	20 - 72	
Mean diff. (95% CI of Mean diff.)	1.25 (-4.36 – 6.86)		
4th Month follow up			<0.001
Mean (SD)	7.75 (0.48)	20.00 (0.41)	
Min - Max	2 - 18	13 - 25	
Mean diff. (95% CI of Mean diff.)	-12.25 (-13.50 - -11.00)		

Note: t-test test used for comparing mean between groups

Table 3: Mixed-effects linear regression analysis of the effect of the care model for substance use patients with mental disorders and aggressive behavior on overt aggression scale scores

Variable & Effect	Coefficient (β)	Std. Error	95% CI of β	P-value
Overt aggression scale scores				
Group (Intervention vs. Control)	-1.250	2.040	-5.249 - 2.749	0.540
Time (vs. Baseline)				
4th Month follow-up	-35.800	2.024	-39.768 - -31.833	<0.001
Group × Time Interaction				
Intervention×4thMonth follow-up	13.500	2.863	7.889 - 19.111	<0.001
Constant	43.550	1.443	40.723 - 46.377	<0.001

Table 4: Post-discharge monitoring outcomes at follow up

Monitoring aspect	Intervention group		Control group		P-value
	n	%	n	%	
LINE Tracking adherence					<0.001
Low	2	5.00	10	25.00	
Moderate	5	12.50	13	32.50	
High	33	82.50	17	42.50	
Medication adherence					<0.001
Non-adherent	2	5.00	10	25.00	
Partially adherent	7	17.50	19	47.50	
Fully adherent	31	77.50	11	27.50	
Appointment reminders and attendance					<0.001
Missed one or more appointments	5	12.50	25	62.50	
Attended all follow-up appointments	35	87.50	15	37.50	

Note: Chi-square test used for comparing categories between groups

Discussion

The findings demonstrate that the intervention group, which received the integrated care model for substance-use patients, showed a statistically significant reduction in aggressive behavior and improved post-discharge outcomes.

The demographic profile of our participants was primarily maleand engaged in freelance work is consistent with previous studies in rural settings.[4,20] Additionally, Our observed patterns of methamphetamine use align with documented increases in amphetamine-related psychiatric admissions in Thailand and globally which particularly relevant to populations experiencing a rising burden of amphetaminerelated psychiatric hospitalizations.[8,9]

The success of our model in significantly reducing aggressive behavior in the intervention group confirms that integrated models must be multifaceted to effectively address the complex interactions among substance use, mental health, and behavioral disorders.[14,22] Similarly, the Thai context reported that applying structured nursing processes and interpersonal theory could effectively calm aggressive patients with methamphetamine addiction.[19] Our model's success can be attributed to several key components: structured staff training in de-escalation and risk assessment, a clear clinical pathway from screening to community reintegration,

and the use of a digital follow-up platform. These elements address common systemic gaps such as fragmented interdepartmental coordination and inadequate post-discharge support, which have been noted as barriers to effective care.[15,23] However, despite evidence supporting integrated approaches, implementation remains limited which integrated care in addiction treatment settings faces significant barriers, including resource constraints and organizational challenges.[24]

In addition, the care model used the LINE Official Account for post-discharge monitoring and demonstrated significantly higher adherence to tracking, medication, and appointments in the intervention group. This finding contributes to the growing evidence supporting mobile health (mHealth) interventions in addiction treatment. This shown their potential to improve treatment engagement and reduce relapse rates by providing real-time support, monitoring, and reminders.[25,26]

A component of this care model was the utilization of the LINE application for post-discharge monitoring. This supports mobile health (mHealth) technologies can bridge the gap between patient care and community reintegration that continuing care approaches.[17] Our results are consistent with a patient-centered medication management app improved adherence to medication changes following hospital discharge.[27] While on telemonitoring, remote monitoring systems reduce unnecessary outpatient visits and improve patient support parallels our findings in a psychiatric context.[28] These results emphasized the importance of embedding digital health tools within holistic care frameworks to sustain gains achieved during treatments, improve long-term adherence behaviors, and reduce relapses in substance use patients.

However, our study cannot isolate the specific effect of LINE monitoring from the integrated care model, as the intervention group received multiple enhancements to care. The improved adherence may reflect increased contact with healthcare providers rather than the digital platform.

The strengths and limitations

This randomized control trial design allows this study to produce strong, real-world evidence for the model. The comprehensive intervention included staff training, structured patient pathways, and innovative community follow-up. Using the validated OAS instrument ensured a reliable primary outcome, while the integration of LINE into post-discharge care represented a practical strength of mHealth.

This is a single-hospital study and may limit generalizability. Though powered, a larger multi-center study is required. Post-discharge, some data, such as medication adherence, were based on self-reporting and hence prone to bias. The 4-month follow-up was also short regarding long-term recovery and relapse.

Implications for Community Nurses

The present study reinterprets community nurses as main coordinators within a holistic model, connecting hospital services such as ER, psychiatry, and social work. This integration allows the nurse to access a complete, multi-faceted patient view regarding medication, psychosocial stressors, and symptoms. In the case of dual-diagnosis patients, successful LINE-based follow-up clearly underlines the nurse's important role in utilizing digital tools for monitoring and adherence. Continuous-model-trained nurses can therefore offer early warning signs that may proactively enable timely intervention, reduction of rehospitalization, and shifting of focus from acute to long-term recovery within the community.

Recommendations

Based on our findings, we recommend that healthcare facilities in similar regional contexts consider adopting this integrated care model. Prioritizing interdisciplinary staff training and integrating mHealth solutions for post-discharge follow-up are key strategies to improve patient engagement and outcomes.

Future research should focus on conducting multi-center trials to establish broader generalizability and on implementing longer-term follow-up (12 months or more) to evaluate sustained recovery and relapse prevention. A formal cost-effectiveness analysis of the model is also needed.

For health policymakers, our results support the promotion of integrated service delivery for mental

health and substance use disorders. Investing in and supporting the integration of accessible digital health technologies into standard care protocols can help bridge critical gaps in the management of these chronic, complex conditions.

Conclusion

The developed care model proved to be a highly effective intervention for reducing aggression and improving treatment adherence among substance use patients with mental disorders. By successfully integrating evidence-based strategies within a specific regional context, this study provides a practical, real-world example of how established best practices can be implemented effectively. The integration of staff training, a structured care pathway, and an accessible digital follow-up system offers a scalable solution to a growing public health problem. It is recommended that this model be adopted more broadly and that future research focuses on its long-term impact, cost-effectiveness, and adaptability to other settings.

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Declarations

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Conflict of interest: The authors declare that there is no conflict of interest.

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Original Article

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Effect of Exposure to Asynchronous Virtual Clinical Environments on Actual/ Perceived Competence in Drug Dosage Calculation: A Pilot Study

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Abstract

Introduction: Nursing students are expected to be 'practice ready' on qualifying. This includes safe medication administration. This pilot study investigates the relationship between exposure duration to asynchronous virtual drug dosage calculation scenarios and nursing student actual and perceived competence.Methodology design planned for larger scale main study was tested and piloted.

Methods: A randomised quasi-experimental research design (pre- and post-test) was used. Purposive sampling was used to recruit six groups of second/third-year pre-registration undergraduate nursing students from six sites (UK and Canada). Students were randomly assigned to four groups of different exposure to the safeMedicate® COVID-19 education module.

Results: Student actual competence increased across all four groups, and their perceived competence mirrored this. There was no clear dose-response relationship demonstrated.

Conclusion: Valuable insights into the effects of asynchronous virtual learning on drug dosage calculation competence among nursing students were generated. Improvement in actual and perceived competence was found, but no clear dose-response relationship. Further research on a larger scale is needed to explore the impact of instructional design, feedback, and interaction on learning outcomes.

Keywords: medication errors; medication calculation; simulation; competence; nursing student; patient safety.

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Introduction

Administering medications is one of the most high-risk tasks in health care. Few studies have examined the barriers nurses experience, and the strategies used to prevent medication related harm. The World Health Organisation (WHO) highlight medication errors as a serious global issue. It is the third leading cause of death in the USA[1]; 1:20 patients globally experience preventable medication-related harm[2]. In 2017 WHO launched' Medication Without Harm' to address medications as a top priority [2] and stressed the topic's importance in healthcare curriculum[3][4].

Medication competence is complex and requires strong theoretical pathophysiology, pharmacology knowledge, critical analysis, numeracy and calculation skills[5][6]. Nursing students report increased anxiety about medication calculation and administration, which can result in medication errors, near misses or actual patient harm[7][8]. These frequently occur at administration due to inaccurate dosage calculation[9][10]. Nursing student under-reporting of medication errors may be due to shame, guilt, fear of repercussion, decreased confidence, and anxiety[11][12]. It is prudent to understand the complexity of how nurses are educated in preparing to administer medication.

Since the COVID-19 pandemic, medication safety concerns have continued due to the pandemic's lasting impact on the ongoing global nursing shortage. COVID-19 triggered a call for nursing students to be practice ready and competent in calculating and administering medication on qualifying[4][13][14][15][16][17][18]. The pandemic highlighted that all nurses must be ready to safely practice where rapid mobilization/ healthcare resource adaptation was needed to minimize COVID-19's impact on populations and health systems[19][20][21][22][23].

Medication administration is a practice-based skill. Nurses need the opportunity and right environment to acquire this skill before administering medications to real patients. Consistency and practice opportunity availability throughout each nursing curricula year is important for improving medication safety competence and confidence[5][24][25]. These may not be routinely available in practice settings[28][8]. Medication errors account for 38% of adverse practice events reported by undergraduate nursing students[3][10]; difficulty in dosage calculations and poor mathematics skills are key contributory factors[12][26][27]. Traditional clinical learning environments are not the best, safest or only locations for students to develop competency and confidence in medication calculation and administration skills[7][29][30].

safeMedicate® developed an international COVID-19 version of its Authentic Virtual Drug Dosage Calculation Clinical Learning Environment (VLE) in 2020 to support RN competence adaptation. It included typical COVID-19 therapies for hospital patients with pneumonia and pyrexia and for patients requiring critical care therapies.[39][40]

Given the knowledge and experience of the nursing student sample in this study, actual competence assessments excluded critical care therapies, focussing on minimal requirements for safe pandemic practice[41]. The 12 test items included varied drug formulations/administration routes and complexity levels (Table 1). Perceived competence is a pertinent corollary for investigation given the commonly reported decreased confidence and anxiety associated with drug dosage calculation, i.e. how confident students perceive they correctly solve each test-item.

Simulation-based education has a positive effect on developing knowledge and confidence for medication administration[31][32][33][6]. There is opportunity to understand how simulation-based education and technology may improve medication administration due to increased use of technology-driven strategies to support quality and safety teaching in nursing education[34][35][36][37].

Table 1: 12-item-safeMedicate® COVID-19-specific drug therapy test of actual competence

Number of Pre- & Post-Test items (questions)	Drug Formulation	Drug Administration Route (PO=Oral; IV= Intra-venous)	Item Rubric (Complexity) Level	Item- Score weighted by total problem-solving phases (% per phase)	Total Score
2	Tablets & Capsules	PO	Unit Dose	3 x (33.3%)	6
2	Oral Suspension	PO	Multiple Unit-Dose	3 x (33.3%)	6
1	Intravenous Injection	IV	Slow IV-Injection (Timed)	4 x (25%)	4
2	Intravenous Infusion	IV	Intermittent Infusion (Standard Dose)	3 x (33.3%)	6
5	Intravenous Infusion	IV	Intermittent Infusion (Bodyweight-Based Dose)	6 x (16.6%)	30
					52

Method

Aim

To investigate the effect of exposure to asynchronous online virtual clinical environments of differing duration on actual and perceived competence in COVID-19 related drug dosage calculation.

Research Questions

1. What is the effect of exposure duration to an online virtual clinical environment on nursing students' actual competence in COVID-19 support drug therapy?
2. What is the effect of exposure duration to an online virtual clinical environment on nursing students' perceived competence in COVID-19 support drug therapy?

Design

A pilot pre/post-test randomised quasi-experimental research design was used.

Sample/setting

Second- and third-year pre-registration Bachelor of Science nursing students were recruited via purposive sampling from four UK sites: University of Chichester, Anglia Ruskin University and Bournemouth University (England), and Robert Gordon University (Aberdeen, Scotland), and two Canadian sites: Nipissing University and Queen's University. We recruited 128 students (n=38 completed the study following high attrition rates); the International Standard Randomised Controlled Trial Number registry identifies a sample size of 30-40 for feasibility studies[38].

Data Collection

Ethical approval was obtained from each site in late 2022. The target population received an invitation-to-participate email from the study administrator. Controls were put in place for numeracy skill variation and orientation to the virtual learning environment (VLE) (safeMedicate® VLE/ competence-perceived competence metric). Data was collected January-October 2023 at each site using:

1. 12-item-safeMedicate® COVID-19 specific drug therapy test (0%-100%) to measure actual competence.
2. safeMedicate® VLE/competence-perceived competence metric(0%-100%) to measure perceived competence.

Concept and Operational Definitions

Actual Competence is an objective measure of individual knowledge, skills and abilities in a specific context. The safeMedicate competence model was used as the operational definition.

Supplementary Material: Video 1[42]: Models drug dosage calculation problem-solving and error diagnosis for:

- Conceptual competence: Dose/Rate of infusion equation set-up ability.
- Calculation competence: Dose/Rate of infusion computation ability.
- Measurement/Technical Measurement competence: Dose/Rate of infusion measurement ability.

Perceived competence is a psychological construct based on individual self-evaluation of capability in a specific context. We defined it as how confident students were that a test-item was correctly solved. A slide-bar scale metric (range 0%–100%) was used to record perceived competence. We looked for any discrepancy between actual and perceived competence, i.e. were students under/over-confident, or accurate in their perception of their actual competence.

The intervention used the safeMedicate® Authentic Virtual Drug Dosage Calculation Clinical Learning Environment (VLE) to engage students. The VLE is based on an adapted cognitive apprenticeship model[42]. This is a method for externalizing expert problem-solving processes that are often obscured from students. It uses constructivist-based modelling, coaching, scaffolding and abstracted replay feedback that facilitate learners' understanding, development and application of competence, and reflection on their own and expert problem-solving practice[42].

Students undertook authentic diagnostic assessments compared with expert problem-solving models (**Supplementary Material: Videos 2, 3 & 4**)[42]. They had detailed diagnostic reports and feedback on their actual and perceived competence assessment activities and outcomes compared to correct answers throughout the study. Abstracted replay feedback loops and error diagnosis help students identify their strengths and areas needing remediation. They had variable 0–3-week exposure to the safeMedicate COVID-19 Education Support Module (Intervention).

Supplementary Material: Video 2: Illustrates a comparison of student conceptual, calculation and technical-measurement competence assessment processes and outcomes, compared with an expert problem-solving model.

Supplementary Material: Video 3: Illustrates an example of abstracted-replay feedback, diagnosis of an actual competence problem-solving error, and self-rated over-estimation of competence. Over-estimation of competence was a limited finding in the study (Figure 2). It has been illustrated here to highlight early diagnosis of patient-safety critical errors, and how this can act as a powerful learning event in the education process.

Supplementary Material: Video 4: Shows diagnosis of actual-competence development, and self-rated under-estimation of competence. Under-estimation of competence was a common finding (Figure 2).

Healthcare Numeracy Assessment

The safeMedicate® 25-item Healthcare Numeracy Assessment (HNA) assessed student baseline competence in 14/20 essential healthcare numeracy skills[41]. Test items focused on fundamental mathematics stripped of specific nursing contexts. Test item-score reliability was used as a criterion for item selection. HNA test results were used to assign students to four groups via stratified competence profiling. This controlled for student numeracy skill variability.

Procedure

Phase	Activity	Group	Weeks							
			1	2	3	4	5	6	7	8
1	Orientation	All								
	HNA Assessment	All								

Continue.....

2	Group assignment	All								
3	safeMedicate orientation module	All								
4	12 item COVID-19 Pre-Test	All								
5	Exposure to safeMedicate COVID-19 Education Support module intervention	Control								
		1								
		2								
		3								
6	12 item COVID-19 Post-Test	Control								
		1								
		2								
		3								

Figure 1: Study design

Figure 1 documents the study design. It sets out project activities and timelines.

Ethics considerations

Ethics approval was obtained at all sites.

Data analysis

Data analysis methodology consisted of:

(a) Descriptive and inferential statistical analyses conducted using SPSS V29. Data were quantified using means and standard deviations (SDs). Non-parametric statistical tests were carried out as participant attrition resulted in a dataset (n=38) that did not meet assumptions for parametric analysis. Statistical significance was set at an alpha level of $p < 0.05$.

(b) Piloting analysis of correlation between actual and perceived competence [Spearman's Correlation]; and analysis of treatment effect for pre-test/post-test actual and perceived competence [ANCOVA] as part of methodology design testing. This will be used for larger sample size data analysis in the main study.

Results

Study Assessments

Students' actual competence and perceived competence results were compared before/after variable exposure to the intervention. The four groups were homogeneous at baseline, i.e. no differences in the mean pre-test assessments. Actual and perceived competence mean scores increased in the post-test assessments, including the control group which did not have any intervention exposure (Table 2; Figure 2). However, abstracted replay pre-test competence/error diagnostic feedback (see Video 3) may have acted as a learning event; this will be considered during the design of the main study.

Table 2: Analysis of difference between mean HNA and pre-test to post-test actual and perceived competence percentage scores (*Based on Kruskal-Wallis test)[43]

Intervention Group	Statistic	HNA	Pre-Test		Post-Test	
			Actual Competence	Perceived Competence	Actual Competence	Perceived Competence
Group 1	N	15	15	15	15	15
	Mean	83.47	77.18	64.53	95	82.78
	SD	14.09	22.6	27.05	6.77	25.45
	Min	52	38.46	15.83	80.77	0
	Max	100	100	99.17	100	100
	Median	88	86.54	77.33	98.08	91.25

Continue.....

Group 2	N	11	11	11	11	11
	Mean	88.73	79.72	73.48	87.94	83.9
	SD	11.98	24.16	22.89	21.71	20.98
	Min	60	32.69	39.42	34.62	38.25
	Max	100	100	100	100	100
	Median	92	86.54	77	100	92.92
Group 3	N	8	8	8	8	8
	Mean	81.5	78.85	77.93	95.67	97.68
	SD	17.75	24.59	20.92	5.51	3.78
	Min	48	40.38	39.83	86.54	89
	Max	100	100	100	100	100
	Median	86	87.5	79.79	98.08	99.17
Control Group	N	4	4	4	4	4
	Mean	84	67.31	66.98	84.62	82.63
	SD	13.86	19.8	24.75	20.05	9.31
	Min	64	44.23	40.83	55.77	69.25
	Max	96	86.54	99.58	100	89.5
	Median	88	69.23	63.75	91.35	85.88
Group Comparison*	p-value	0.712	0.682	0.627	0.738	0.085

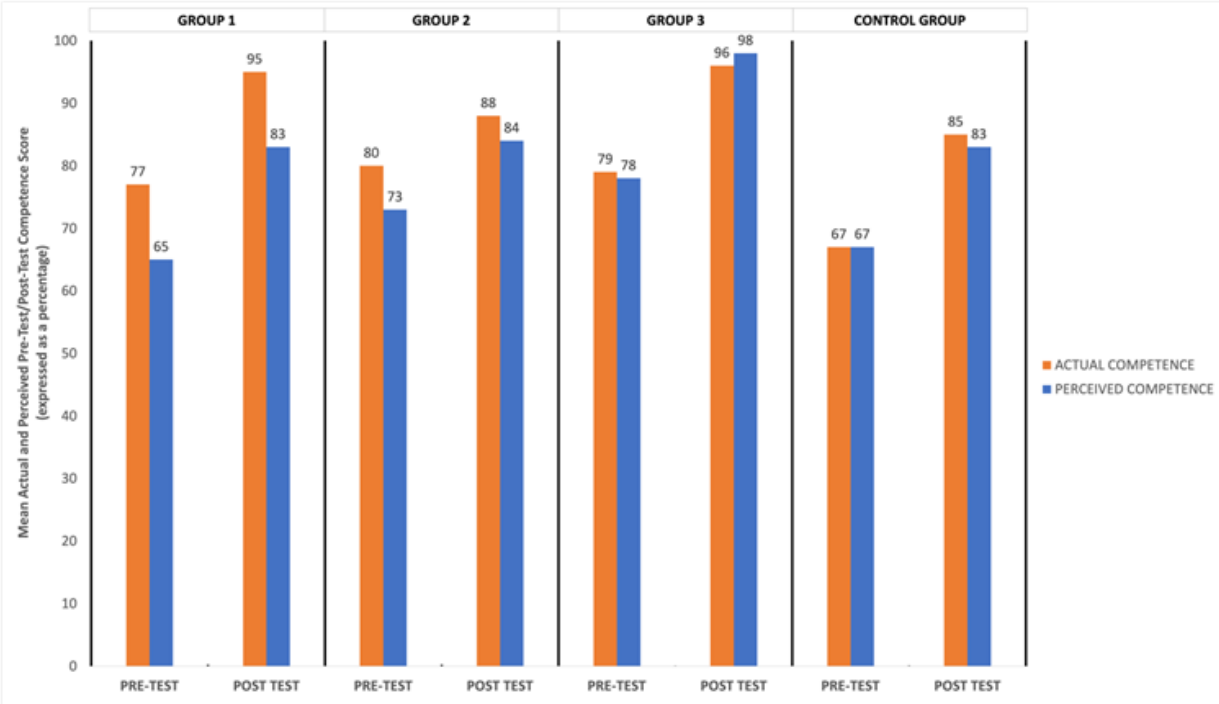

Figure 2: Mean pre-test/post-test actual/perceived competence scores

Students performed better on the 12 item COVID-19 post-test of actual competence after the intervention. Figure 3 shows the change between individual student pre-test score and post-test score. Table 3 shows the change in average pre-test score (mean 77%; median 87%), to post-test score (mean

92%; median 98%). A Wilcoxon Test indicated this was statistically significant (p <0.0004). Although a small pilot study sample, students achieved these outcomes over 0-3 weeks rather than the typical 3-4 years associated with pre-registration/licensure nurse education programmes.

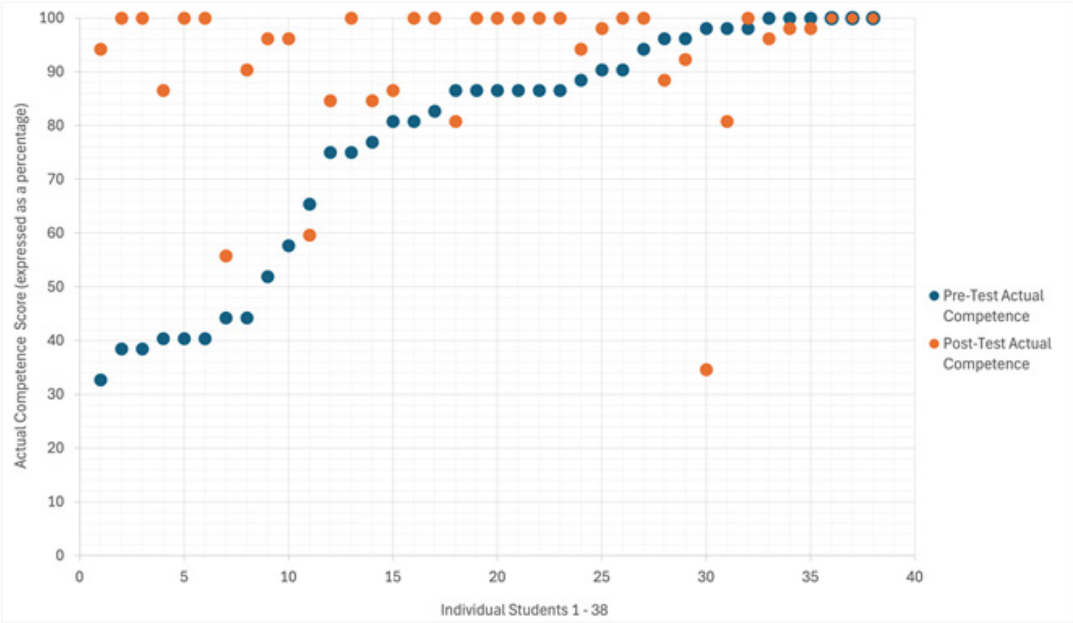

Figure 3: Change in Pre-Test/Post-Test Actual Competence scores

Table 3: Wilcoxon Signed Rank Test Analysis

Descriptive Statistics

						Percentiles		
	N	Mean	SD	Minimum	Maximum	25th	50th (Median)	75th
Pre-Test Actual Competence	38	77	22.59	32.69	100	59.61	86.54	96.15
Post-Test Actual Competence	38	92	14.16	34.62	100	88.94	98.08	100

Ranks

	Mean Rank	Sum of Ranks
Pre-Test Actual Competence	20.5	532.5
Post-Test Actual Competence	10.8	97.5

Rank Differences

Negative Ranks	26
Positive Ranks	9
Ties	3
Total	38

Test Statistics

p-values	
1-tail	0.0002
2-tail	0.0004

Discussion

Findings suggest general improvement across all groups in actual and perceived competence including the control. Significant outcome differences between groups with varied exposure duration were not evident. Increasing exposure time did not translate into substantial competence improvement.

Improvement in actual and perceived competence suggests initial VLE and baseline assessment exposure might have enhanced competency. Assessment outcome feedback can foster incremental learning, boosting competence and confidence[44][42]. Increased post-test perceived competence aligns with research on VLE and self-assessment influence on learners' perceived proficiency[45] [46]. Lack of significant

differences between groups with varying exposure durations contradicts earlier studies advocating for prolonged engagement with VLEs to achieve competence[47].

Our findings indicate a shift in students' self-awareness and competence perception. This counters existing evidence that suggests students overestimate their competence[48]. Our work suggests students are cautious in overestimating their competence, which is an understandable safety conscious response.

Our study included VLE feedback on student performance for review, and indicates that simulation-based intervention effectiveness is based on instructional design and not dependent on exposure time. Findings may be related to small sample size and need repeating with a larger sample. The differences in perceived competence before/after intervention highlight the psychological and confidence-building value of VLEs, consistent with previous research on self-efficacy enhancement effects of digital learning[36] [49].

The results suggest revisiting VLE design. Prolonged exposure alone did not result in significantly better outcomes. Our findings indicate the potential of short-term exposure to VLEs to positively influence actual and perceived competence. Brief, focused interventions may rapidly bolster nursing students' confidence and awareness. This may be valuable in pandemic preparedness or acute care settings where speedy upskilling to mobilize healthcare staff adaptation is critical. However, we would strongly advocate for repeated periodic assessment to evaluate competence retention and address any skill decay.

Implications

This pilot study provides valuable insights into the use of asynchronous virtual learning environments (VLEs) for developing drug dosage calculation competence i.e. brief exposure, actual competence development, and feedback design.

Repeated simulation exposure is associated with improvements in nursing students' self-efficacy, perceived competence, and learning satisfaction[50]. However, our findings suggest that even brief exposure to accessible, simulation-based learning with structured feedback and opportunities for repetition, can enhance actual as well as perceived competence. This has practical implications for nursing education and healthcare provider strategies where rapid upskilling is required, such as public health emergency response or workforce shortages.

Our study adds weight to Koukourikos et al's findings[51] of increased perceived clinical competence through VLE use during COVID-19, by showing positive changes in actual competence. Although we faced challenges as a multisite, international collaboration over differing time zones, this allows us to share diverse perspectives on undergraduate nursing learning strategies in a global context. Our findings echo Bae et al's systematic review[52]. This supports using VLEs to enhance clinical reasoning, problem-solving, and communication competencies when traditional clinical placements are limited and may not provide consistent or safe opportunities for skill acquisition. Our work helps educators incorporate targeted, technology-driven interventions to complement traditional clinical placements.

The results show the importance of feedback design, where instructional strategies may be more influential than exposure duration alone. Future research should expand on these findings by using larger samples, and longitudinal designs to assess skill retention and explores stematic integration of VLEs into curricula to build confidence and competence in drug dosage calculation.

Limitations

This study has several limitations. First, the small sample size (n=38) as a result from the high attrition rate, limit the statistical power of the findings and restrict generalizability beyond the study population. As a pilot study, results should be interpreted with caution until replicated with larger, more diverse cohorts. Second, participants were recruited from selected universities in the UK and Canada; therefore, findings may not reflect the experiences of students in other regions or curricula. Third, the reliance on self-reported measures of perceived competence introduces the possibility of response bias, as students may have under- or over-estimated their abilities despite efforts to mitigate this through diagnostic

feedback. Fourth, the short duration of exposure (0–3 weeks) provides only a snapshot of competence development; longer-term retention of knowledge and skill decay were not assessed. Finally, while the intervention targeted drug dosage calculations related to COVID-19 therapies, exclusion of critical care scenarios limits insight into competence in more complex, high-acuity contexts.

Conclusion

This pilot offers valuable insights into the effects of asynchronous VLEs on drug dosage calculation competence among nursing students. Improvements were observed in actual and perceived competence, but lack of a clear dose-response relationship points to future research to explore the impact of instructional design, feedback, and interaction on learning outcomes. Simulation-based education remains a promising avenue, but its implementation should be refined to maximize actual and perceived competency in high-risk tasks like medication administration.

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Ethical Clearance : This research received Ethical approval from the Research Ethics Board at Nipissing University, North Bay, Ontario, Canada.

Conflicts of interest statement

Dr Keith W. Weeks, Alex Weeks and Matt Brown are directors of Authentic World Ltd, a nursing spin-out company of the University of South Wales and Cardiff University, UK.

Authentic World Ltd was the first joint university nursing spin-out company in the UK (founded 2004), and its Thought Leadership team is responsible for the international translational research, knowledge transfer, design, development, health professional education technology evaluation and international distribution of the safeMedicate® suite of authentic virtual medicines calculations and nursing mathematics clinical education environments. Dr David Pontin is a director of Numeric Generics Ltd, an associate company of Authentic World Ltd.

A university-engaged statistician independent of the research team carried out the data analysis reported here.

The authors declare no conflict of interest in the completion of this research.

Supplementary Material

1. Supplementary Material: Video 1: safeMedicate competence model https://safemedicate.com/publications/comp_pilot study/sm model..html
2. Supplementary Material: Video 2: Example of safeMedicate authentic actual/perceived competence pre-test assessment process. https://safemedicate.com/publications/comp pilot study/sm pre assessment.html
3. Supplementary Material: Video 3: Example of safeMedicate pre-test abstracted-replay feedback on student and expert problem-solving processes. https://safemedicate.com/publications/comp_pilot_study/sm_pre_feedback.html
4. Supplementary Material: Video 4: Example of safeMedicate post-test abstracted-replay feedback on student and expert problem-solving processes. https://safemedicate.com/publications/comp pilot_study/sm post feedback.html

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Original Article

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Effectiveness of Fenugreek Seed Powder (Trigonella Foenum- Graceum) As Adjuvant Therapy Among Prediabetic Hospital Employees In Kerala, India.

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Abstract

Introduction: Prediabetes is a lifestyle disease and dietary modifications are effective for its management and prevention. Prediabetes is a greater risk factor for type 2 diabetes mellitus, cardiovascular disease, renal failure and stroke, and is one of the most critical issues regarding human health. There are economic reasons for the above statistics. Healthcare professionals play a crucial role in developing innovative strategies to safeguard public health. Integrating evidence-based traditional home remedies into dietary practices may support the maintenance of blood glucose levels within the normal range.

Methodology: A quantitative approach with Pre Experimental one group Pretest- Post-test design was adopted for this study. One hundred hospital employees with Prediabetes who were aged between 25-65 years were selected for the study by Convenience Sampling Technique. Data were collected and analyzed by Descriptive and Inferential statistics.

Conclusion: The present study indicating that the fenugreek seed was effective on reducing the blood sugar level in Prediabetes hospital employees. The study recommends strongly to consumptions of fenugreek seed as a cost effective management of Prediabetes in all healthcare setting and community. With this regard, the researcher would like to suggest to take more number of adjuvant therapies to treat lifestyle diseases for the wellbeing of society which would turn in to better outcome.

Key words: Fenugreek seed, Prediabetes, Trigonella Foenum – Graceum, Adjuvant Therapy

Introduction

Diabetes is a major global health concern which has emerged as a serious metabolic disorder and a growing life-threatening condition. The burden of diabetes has been steadily rising over the past few decades worldwide, including in India[1.] It is well established that diabetes reduces life expectancy, increases mortality rates, and predisposes individuals to acute metabolic complications. Insulin plays a

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vital role in facilitating the entry of glucose from the bloodstream into body cells, thereby providing essential energy for cellular function. A defect in insulin secretion, insulin action, or both disrupts the normal metabolism of carbohydrates, fats, and proteins, ultimately leading to the development of diabetes-related complications[4]. According to **World Health Organization (2022)** published data shows that in 2016, an estimated 1.6 million deaths were directly related to diabetes and all deaths occur before the age of 70 yrs. Healthy diet, regular physical activity, maintaining a normal body weight and avoiding tobacco use are the ways to prevent or delay the onset of full blown diabetes mellitus. With the capital rise of diabetes and premature death, the National Health Policy of India in 2017 increases the screening programmes and treatment for up to 80% of people with diabetics and aims to reduce premature deaths that are occurring from diabetes by 25% within 2025[11].**Diabetics organization report (2021)** focus that Diabetes is the major cause for morbidity and mortality among people, especially in developing countries like India. In India different states have variable trends in prevalence of diabetes. Among the states, Kerala is considered as the "Diabetic Capital" of India with the highest prevalence of 19.4% of diabetes. In Kerala, Pathanamthitta, Malappuram and Kozhikode district were identified as the major chronic state of diabetes among population[7].

Before the occurrence of full blown disease of diabetes, Individuals enters a prior state called "Prediabetes" when a person has pre diabetes, their body cannot use insulin effectively. The term **"Prediabetes"** is introduced by American diabetes association in 2002 as a state between normal blood sugar and type 2 diabetes[14]. Pre diabetes is one of the leading risk factor for type 2 diabetes with a warning alarm to the life. It is also a sign that determines the disturbances in the metabolic process of the body. Pre diabetes is a pre-diagnosis of diabetes[3]. It is the prior stage before diabetes mellitus in which not all symptoms required to diagnose diabetes and the blood sugar level ranges between 120 and 140 mg/dl. This stage is often referred to as the "grey area".

Prediabetes is a condition where blood sugar levels are higher than normal but not yet high enough to be called type 2 diabetes. It is a warning stage that can still be reversed with proper lifestyle changes. Without treatment, about 70% of people with prediabetes eventually develop type 2 diabetes (International Diabetes Federation, 2023)[7]. India has one of the highest rates of diabetes in the world, and Kerala shows especially high numbers due to sedentary habits and unhealthy diets (Mohan et al., 2020)[32]. Hospital employees are also at risk because of irregular work shifts and stress. This makes healthy lifestyle changes, particularly in diet, very important for prevention[17].

Fenugreek (Trigonella foenum-graecum), a common herb used in Indian cooking, is known for its health benefits. It contains soluble fiber, saponins, and 4-hydroxyisoleucine—natural compounds that help increase insulin release and slow down sugar absorption in the body (Kumar et al., 2022). This study aimed to find out how effective fenugreek seed powder could be as an additional therapy to help lower blood sugar levels in prediabetic hospital employees in Kerala[26].

Materials and Methods

The research methodology involved a six-month data collection period at Chitra Multispecialty Hospital and Lifeline Multispecialty Hospital in Pathanamthitta District, Kerala, following the receipt of formal written permission from the respective medical superintendents. The purpose of the study was explained to hospital employees clearly, and informed consent was obtained individually from those identified as prediabetic.

Screening for prediabetes was conducted by assessing blood glucose levels over a 10-day period, with a minimum of three readings considered for classification. Individuals with fasting blood glucose levels between 100–125 mg/dL were categorized as prediabetic. Data collection was carried out on all days of the week during daytime hours. A convenience sampling technique was used to recruit participants, and a pre-experimental one-group pretest–posttest design was employed.

The sample size was limited to 100 participants, reflecting the focus on hospital employees and the practicality of assessing their health status. Power analysis was conducted to ensure adequate statistical

strength and to enhance the likelihood of detecting true effects, thereby strengthening the study's validity.

Inclusion Criteria

- Hospital Employees who were available during the time of data collection.
- Hospital employees who are willing to participate in the study.
- Hospital Employees those who were age above 25 years and below 65 years.
- A employee whose blood sugar level was between 100 -125mg/dl
- Hospital Employees who were both males and females.
- Hospital Employees who were regularly working in the setting.
- Hospital Employees who were able to read and write English and Malayalam.

Exclusion Criteria:

- Prediabetic hospital employees who refused to participate in this study.
- Hospital Employees with complications like Hormonal disorder and seriously having Gastric trouble towards fenugreek.
- Employees who were pregnant and lactating mothers.

The total sample size was limited to 100 participants, as the study focused exclusively on hospital employees, allowing for convenient access and reliable assessment of their health status. Sample size was determined using a intial power analysis for a paired t-test, assuming an expected mean reduction of 10 mg/dL in fasting blood glucose, a standard deviation of 25 mg/dL, a two-tailed α of 0.05, and 80% power. The calculated sample size was 97; therefore, a total of 100 participants were recruited to account for potential attrition. Individuals with fasting blood glucose levels between 100–125 mg/dL were classified as prediabetic. Screening was conducted over a 10-day period, during which a minimum of three fasting blood glucose readings on separate days was required to confirm eligibility.

Eligible participants were instructed to consume 15 grams of fenugreek powder mixed with warm water every morning before breakfast for a period of three months. After consuming the fenugreek powder, participants were instructed to refrain from eating for one hour. Adherence to this routine throughout the intervention period contributed to a progressive reduction in blood glucose levels, demonstrating the effectiveness of the regimen. Data collection was carried out continuously throughout the intervention. Following completion of the intervention, post-intervention blood pressure levels were assessed using standard clinical parameters. Ethical approval for the study was obtained from the Institutional Human Ethics Committee (Project No. CCON 11/007/2018, dated 09/08/2018)

Statistical analysis

Statistical analysis was performed using Statistical Package for Social Science (SPSS)/PC, Version 20. The data analysis plan comprised descriptive analysis, where frequency and percentage distributions were computed to examine demographic variables. Mean and standard deviation calculations were employed to analyze the pre- and post-test levels of mental health characteristics. Significance levels were set at $p < .001$ for high significance and $p < 0.01$ for significance. Inferential statistics utilized a paired t-test to compare pre- and post-levels of prediabetes. An unpaired t-test was applied to evaluate prediabetes levels between the control and intervention groups. Additionally, a post-hoc Scheffe test was conducted for multiple comparisons of clinical variables in the intervention group post-test, with statistical significance set at $p < 0.01$.

Results

Sample characteristics. N = 100

S.NO	DEMOGRAPHIC VARIABLE	FREQUENCY	PERCENTAGE
1	Identification of Data		
	1. Age (years)	20	20
	a. 25-35	38	38
	b. 36-45	27	27
	c. 46-55	15	15
	d. 56-65		
2	Gender		
	a) Male	30	30
	b) Female	70	70
3	Marital status		
	a. Married	51	51
	b. Unmarried	28	28
	c. Widow / Widower	12	12
	d. Separated	9	9
4	Religion		
	a. Hindu	57	57
	b. Muslim	25	25
	c. Christian	18	18
5	Type of family		
	a. Nuclear Family	53	53
	b. Joint family	41	41
	c. Extended family	6	6
6.	Educational status		
	a. Primary	16	16
	b. Secondary	27	27
	c. Higher Secondary	21	21
	d. Collegiate	36	36
7	Occupational status		
	a. RegularEmployee	48	48
	b. Contract Employee	52	52
8.	Type of work		
	a. Sedentary Work	26	26
	b. Moderatework	41	41
	c. Heavy work	33	33

9.	Monthly income		
	a. BelowRs.1000	35	35
	b. Rs.10001 – Rs.20000	39	39
	c. Rs.20001-Rs.30000	18	18
	d. above Rs.30001	8	8
10	Dietary pattern		
	a. Vegetarian	26	26
	b. Non vegetarian	74	74
11.	Practice of exercise		
	a) Routine	20	20
	b) Not Routinely	80	80
12	Smoking status		
	a) Active	21	21
	b) Passive	13	13
	c) No Smoking	66	66
13	Alcohol consumption		
	a) Yes	31	31
	b) No	69	69
14	History of Hyper cholesterol		
	a) Yes	35	35
	b) No	65	65
15	History of Hypertension		
	a) Yes	68	68
	b) No	32	32
16	Family history of Diabetes Mellitus		
	a) Yes	61	61
	b) No	39	39
17	Body Mass Index		
	a) Underweight (below 8.5)	0	0
	b) Healthy weight (18.5-24.9)	64	64
	c) Over weight (25.0-29.9)	36	36
	d) Obesity (30.0 and above)	0	0
18	Waist Circumference		
	a) Low risk(M-80-99 cm, F- 70-89cm)	73	73
	b) High risk(M- 100-120 cm, F-90-110 cm)	26	26
	c) Very high risk(M- Above 120cm, F- Above110cm)	01	01

Overall among the sample100 participants, the majority (38%) were between 36–45 years of age, and mostly were females (70%). More than half (51%) were married, and the predominant religion was Hinduism (57%). Most participants belonged to nuclear families (53%) and had collegiate education (36%). Employment status was almost evenly split between regular (48%) and contract (52%) employees, with most engaged in moderate (41%) or heavy (33%) work. The majority (74%) earned below ₹20,000 per month and followed a non-vegetarian diet (74%). Only 20% reported exercising routinely. Most participants were non-smokers (66%), while 31% consumed alcohol. A significant proportion had a history of hypercholesterolemia (35%) and hypertension (68%), and 61% reported a family history of diabetes. Based on BMI, 64% were within a healthy range and 36% were overweight. Regarding waist circumference, 73% were categorized as low risk and 26% as high risk.

Assessment of the Effectiveness of Adjuvant Therapy on Fenugreek Seed Powder Among Prediabetes Hospital Employees.

Sl.No	Clinical Profiles	Pretest		Posttest		t test	P value
		Mean	SD	Mean	SD		
1	Body weight	69.36	0.6	65.01	0.6	4.9947	<0.05
2	BMI	24.59	0.2	22.99	0.2	6.6341	<0.05
3	Waist Circumference	86.95	1.1	82.26	1.0	3.1410	<0.05
4	Glucose Profile						
	a. HbA1C	5.84	0.0	5.35	0.0	19.8691	<0.05
	b. FBS	117.75	0.8	95.18	0.6	22.2144	<0.05
	c. Oral Glucose Tolerance	165.98	1.6	139.14	1.5	11.8840	<0.05
5	Lipid Profile						
	a. Total Cholesterol	229.33	1.6	196.86	2.3	11.6276	<0.05
	b. Triglycerides	179.50	2.6	153.84	2.1	7.6298	<0.05
	c. HDL	41.85	0.7	61.80	1.5	11.9999	<0.05
	d. LDL	168.09	2.0	142.07	2.1	8.8442	<0.05

The table shows the pretest and the posttest mean of the clinical parameters of blood sugar level among prediabetic hospital employees. The table shows that there is mean reduction in all the clinical profiles after the administration of the fenugreek seed powder. The mean difference in Body weight is 4.35, BMI is 1.6, Waist Circumference is 4.68 HbA1C is 0.49, FBS is 23, Oral Glucose Tolerance is 26.84, Total Cholesterol level is 32.47, Triglycerides is 25.66 and LDL is 26.2. There is an increased mean for HDL of 19.95. The difference was statistically significant at $P < 0.05$.this shows that fenugreek seed powder administration had significant reduction in the clinical profiles hence the research hypothesis H1 is accepted.

Discussion

The findings of this study indicate that the daily intake of fenugreek seed powder produced a statistically significant improvement in both glycemic control and lipid profile parameters among prediabetic hospital employees. The hypoglycemic effect of fenugreek can be attributed to its rich soluble fiber content, particularly galactomannan, which slows gastric emptying and reduces intestinal glucose absorption, thereby preventing postprandial hyperglycemia. Additionally, the presence of 4-hydroxyisoleucine, an amino acid unique to fenugreek, plays a crucial role in stimulating pancreatic insulin secretion and enhancing peripheral glucose utilization, contributing to improved glucose homeostasis (Patwardhan et al., 2019)[28.24]. Moreover, the observed increase in HDL cholesterol and the decrease in LDL cholesterol and triglyceride levels suggest potential cardio protective effects, consistent with the findings of Khan et al. (2021). These improvements not only indicate better metabolic regulation but also a reduced risk of cardiovascular complications, which are commonly associated with prediabetes and metabolic syndrome.

Importantly, the intervention was cost-effective, safe, and well-tolerated by participants, with no reported adverse effects. Given its accessibility and ease of administration, fenugreek seed powder can be recommended as an effective adjunct to lifestyle modification programs**.** This makes it a feasible option for large-scale community-based and workplace wellness initiatives aimed at preventing the progression from prediabetes to type 2 diabetes mellitus[29,11,14].

Results revealed that there was a significant decrease in clinical parameters which were found to be above normal such as Body weight, BMI, waist circumference, HbA_1C, FBG, OGT, total cholesterol, triglyceride, HDL and LDL. The mean difference in Body weight is 4.35, BMI is 1.6, Waist Circumference is 4.69 HbA1C is 0.48, FBS is 23, Oral Glucose Tolerance is 26.84, Total Cholesterol level is 32.47, Triglycerides is 25.66 and LDL is 26.2. There is an increased mean for HDL of 19.95. The difference was statistically significant at $P < 0.05$. This shows that fenugreek seed powder administration had significant reduction in the clinical profiles hence the research hypothesis H1 is accepted. Zaw et al. (2021) conducted a national survey in Myanmar to assess the prevalence and risk factors of diabetes and prediabetes. Using multistage proportional cluster sampling, 8,575 participants from 52 townships were included. Ethical approval was obtained from the Department of Medical Research (Lower Myanmar). Fasting plasma glucose and a 2-hour OGTT were used for diagnosis, along with interviews on lifestyle and anthropometric measurements. Data were analyzed using STATA version 13 with multinomial logistic regression. The study found a 10.8% prevalence of diabetes (11.5% males, 9.2% females) and 19.7%prevalence of prediabetes(16.5% males, 23% females).Older age, larger waist circumference, and higher triglyceride levels were significant risk factors. The findings of this study highlight several important directions for future research. More diligent study designs, particularly randomized controlled trials, are needed to verify the causal effect of fenugreek on glycemic control and to address potential confounding factors. Long-term follow-up studies would help determine whether the improvements in blood glucose observed over three months are sustained over time. Research involving varied doses of fenugreek could clarify the optimal therapeutic amount, whilst studies conducted in more diverse populations would enhance the generalizability of the results beyond hospital employees. Besides, future investigations should include broader metabolic indicators—such as HbA1c, lipid profiles, and insulin resistance measures which help in provide a more comprehensive understanding of the intervention's physiological impact. Strengthening adherence monitoring and assessing dietary and lifestyle influences will further improve the accuracy of findings. At last, exploring the underlying mechanisms of fenugreek's hypoglycemic effects and examining its practical application in community and workplace health programs may offer valuable insights for advancing diabetes prevention strategies.

Ethical and Safety Considerations:

Participant safety was closely monitored throughout the intervention period. Regular follow-up appointments and telephone callbacks were conducted to identify any adverse events or side effects, including dizziness, drowsiness, headache, or symptoms of hypoglycemia. All participants were informed about potential reactions and instructed to report any concerns immediately, ensuring continuous monitoring and prompt management. The costs associated with biochemical assessments, including lipid profiles and HbA1c testing, were fully supported by the principal investigator in collaboration with the hospital. HbA1c analysis was facilitated through institutional support funded by the Chairman of the College of Nursing, while lipid profiling was conducted using a cholesterol analyzer available at the facility. Blood glucose measurements were obtained using the BeatO monitoring device, which provided both cost efficiency and reliable accuracy for repeated glucose assessments.

Conclusion

Medicinal plants have played an important role in treating and preventing a various diseases throughout the world. Fenugreek seed powder has an effect to reduce the blood sugar level. The study assessed the effectiveness of fenugreek seed powder on the blood sugar level of Prediabetic hospital employees. The findings of the present study revealed that fenugreek seed powder was highly effective.

After the administration of fenugreek seed power, the samples become familiar and found themselves comfortable and expressed satisfaction and they shared their experiences with the family members and others. They recommended others to follow the same. This ensures that administration of 05 grams of fenugreek seed powder daily helps to reduce the clinical profiles on blood sugar level among Prediabetic hospital employees and also it will help to reduce morbidity and mortality rate of employees with diabetes to live a healthy life.

Thus it can be concluded that administering fenugreek seed powder is one of the easy, cost effective and simple non-pharmacological interventions to solve the problems of subjects with Prediabetes.

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Conflict of Interest

The authors declare that there is no conflict of interest in this study.

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Original Article

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The Power of Spiritual Well-Being in Relation to Illness Acceptance among Women with Cancer in Aceh Province

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Abstract

Objective: Cancer in women is one of the most significant global health issues, with incidence and mortality rates continuing to rise each year according to World Health Organization. Modern healthcare generally follows a biomedical model that focuses more on physical care and psychological interventions, often neglecting the spiritual dimension. This pose a question of does spiritual well-being influences how patients interpret their life experiences while facing cancer, as well as in finding peace and hope during treatment? Although there is evidence that spirituality plays an important role in improving well-being and helping to cope with chronic conditions, the gap in acceptance of illness remains. Thus, the aim of this study is to identify the relationship between spiritual well-being and disease acceptance in women with cancer.

Material and Method: The design of this study is a cross-sectional study with a sampling technique using total sampling. Data were collected via selfreport questionnaires self-report technique through data collection tools consisting of demographic data and questionnaires, (SWBS) *Spiritual Well Being scale*, (AIS) *Acceptance of Illness,* involving 131 female cancer survivors with the following inclusion criteria: patients aged ≥ 18 years, patients with compos mentis consciousness and in stable condition, female cancer survivors (ovarian, breast, cervical), patients diagnosed with cancer ≤ 6 months ago who underwent chemotherapy cycles 1-II. Exclusion criteria were: patients with mental disorders, patients with impaired consciousness, and patients with physical and psychological impairments that prevented them from participating in this study.

Results: The results showed a significant relationship between spiritual well-being and acceptance of illness in female cancer patients undergoing treatment (p-value 0.000). Respondents in cycles 1-II who had high spiritual well-being with an OR of 9.524 were 9 times more likely to accept their illness.

Conclusion: This study confirms that spiritual well-being plays an important role in improving patients' illness acceptance of cancer. Thus, it is recommended that collaborative programs be developed between hospitals and clergy, and that nurses provide education through a spiritual well-being support approach. The implementation

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of this program is expected to improve the quality of life and treatment outcomes of cancer patients.

Keywords: *Gynecologic cancer, breast cancer, Spirituality, Chemotherapy, Acceptance of Illness*

Introduction

Cancer in women is one of the most significant global health issues, with incidence and mortality rates rising each year based on the World Health Organization (WHO),[2]. It is a disease that attacks the body's cells, causing them to mutate and change function, resulting in uncontrolled growth and proliferation of abnormal cells[1].In 2020, there were more than2.1million cases of cancer in women, with estimates that women account for 49.5% of all cancer cases in the global population.[2]better cancer registration, and cancer detection. The number of risk factors of BC is significant and includes both the modifiable factors and non-modifiable factors. Currently, about 80% of patients with BC are individuals aged >50. Survival depends on both stage and molecular subtype. Invasive BCs comprise wide spectrum tumors that show a variation concerning their clinical presentation, behavior, and morphology. Based on mRNA gene expression levels, BC can be divided into molecular subtypes (Luminal A, Luminal B, HER2-enriched, and basal-like Throughout 2020, the five most common types of cancer affecting women in 2020 were breast cancer (25.8%), colorectal cancer (9.9%), lung cancer (8.8%), cervical cancer (6.9%), and thyroid cancer (5.1%).[3]

Cancer in women not only affects their physical condition, but also their psychological well-being.[5] One of the most common problems is reproductive dysfunction and changes in the role of women, which can affect intimacy, sexual relations within marriage, and a decrease in sexual desire. This ultimately has an emotional impact, both on oneself and on one's partner.[4] Cancer treatment generally involves chemotherapy, surgery, radiotherapy, or hormone therapy.[5] Although intended to cure or control disease, cancer treatment also causes various side effects. Some common physical side effects include mucositis[6] and fatigue.[7] This condition has the potential to reduce the patient's quality of life and affect their behavior and level of acceptance of the disease they are experiencing, starting from the moment of diagnosis, during the treatment process, to the final stage of life. This is why acceptance of the disease is a very serious issue, which will affect all aspects of physical, mental, emotional, social, and spiritual well-being.[8] Acceptance of the disease is an important aspect that must be considered in the care of cancer patients, as it plays a role in determining the success of psychosocial adaptation and the quality of life of patients.[9] Low acceptance levels can worsen patients' physical, mental, emotional, social, and spiritual conditions. In this context, spiritual well-being plays a very important role.[10] Spiritual well-being is a source of strength and a coping strategy that helps cancer survivors adapt to the disease they are facing.[11] This pose a question: Does spiritual well-being influences how patients interpret their life experiences while facing cancer, as well as in finding peace and hope during treatment?[14] There is a low level of integration of spirituality into the healthcare system. Modern healthcare generally follows a biomedical model that focuses more on physical care and psychological interventions, often neglecting the spiritual dimension. Although evidence shows that spirituality plays an important role in improving well-being and helping to cope with chronic conditions, the gap in illness acceptance remains. Therefore, the aim of this study is to identify the relationship between spiritual well-being and disease acceptance in women with cancer. The significance of this studyis to help in the health care system understanding how spirituality can help patients accept their illness. By understanding the relationship between spirituality and illness acceptance, as well as the impact of spiritual well-being interventions on the quality of life of cancer patients, we can address this gap and improve more holistic care. This study is categorized into five (5) sections which includes: section one is the introduction, section two is the materials and Methods used, section three is the results and discussion, section four is the conclusion and section five is the research limitation of this study.

Materials and Methods

Research design and setting:

This study employed a crosssectional study design. This approach was conducted at the same period of time where the independent variable data and dependent variable data were collected

simultaneously to see the relationship between the two variables at the Aceh Regional General Hospital. This study was conducted after completing the ethical review process, which was approved by the Ethics Committee with approval number 304/ETIK-RSUDZA/2024. All respondents provided written consent to participate in this study.

Population and sample:

All female cancer patients undergoing chemotherapy at the provincial hospital in Aceh, Indonesia. Based on the sampling technique used in this study, total sampling was employed, meaning all female cancer patients undergoing chemotherapy cycles I-II were included. Over the three-month study period, 131 samples were successfully collected. This sample size is considered sufficiently representative as the respondents were directly drawn from the target population of female cancer patients. This sample size allows for stronger and more accurate data analysis, thereby enhancing confidence in the study results. This sampling method was chosen due to time constraints for educational purposes.

Inclusion criteria: patients aged ≥ 18 years, patients with compos mentis consciousness and stable condition, female cancer survivors (ovarian, breast, cervical), patients with a cancer diagnosis ≤ 6 months undergoing chemotherapy cycles 1-II. Exclusion criteria were: patients with mental disorders, patients with impaired consciousness, patients with physical and psychological disorders that prevented them from participating in the study.

Procedure of study:

The researchers prepared the enumerators carefully through briefing sessions using questionnaires. The study was conducted at the Oncology Center. Two health students assisted in the research process. The study was conducted using self-reports through data collection tools consisting of demographic data and questionnaires.(SWBS) *Spiritual Well Being scale*.[16]The instrument used to assess the patient admission stage is *Acceptance Of Illness Scale* (AIS).[17]The research was conducted from December 20, 2024 to February 21, 2025.

Results

Based on research conducted on female cancer survivors, the results of the respondents are presented in Table 1. A total of 131 respondents were studied, with the majority falling into the adult age category of 19–44 years (63 respondents, 48.1%). The majority had completed high school (46 respondents, 35.1%). The majority of female cancer survivors were farmers/ laborers (41 respondents, 31.3%). the majority of marital status was Married, with 71 respondents (54.2%), the majority of income was (<Rp 3,700,000), with 95 respondents (72.5%), the chemotherapy cycle was dominated by respondents undergoing Cycle II therapy, with 76 patients (42%), and the majority of patients lived with their families, with 94 patients (71.8%). As shown in Table 1.

Table 1: Distribution of Sociodemographic in Cancer Patients (n = 131)

No	Respondent Demographics	Frequency	Percentage (%)
1	Age		
	Adult(19- 44 year)	63	48.1
	Pre-elderly (45- 59 year)	53	40.5
	Elderly (≥ 60 year)	15	11.5
2	Latest education		
	Elementary school	23	17.6
	Junior high school	34	26
	High school	46	35.1
	Higher Education	28	21.4

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3	Occupation		
	Civil Servant	17	13
	Farmers/Laborers	41	31.3
	Private Employee	37	28.2
	Self-employment	16	12,2
	Housewife	6	4.6
	Unemployed	14	10.7
4	Marital Status		
	Unmarried	26	19.8
	Married	71	54.2
	Life/death divorce	34	26
5	Income/monthly		
	< Rp 3.414.666 = < USD 240	95	72.5
	≥ Rp 3.414.666 =≥ USD 240	36	27.5
6	Chemotherapy Cycle		
	I	55	42
	II	76	58
7	Currently living with		
	Family	94	71.8
	Child	24	18.3
	Alone	13	9.9

Table 2: Distribution of Spiritual Well-Being of women with cancer (n = 131)

No	Spiritual	Frequency	Percentage
1	Moderate	60	45.8
2	High	71	54.2

Table 2 shows that the spirituality level of female cancer patients was in the high category with 71 respondents (54.2%). Most female cancer patients have a high spiritual frequency, which means they have a strong connection with their spiritual beliefs and practices. This finding implies that health workers, especially nurses, should consider the spiritual needs of their patients, as spirituality can play a significant role in dealing with cancer.

Table 3 Distribution of Acceptance of Cancer in Women(n = 131)

No	Acceptance of illness	Frequency	Percentage
1	Low & Moderate	45	34.4
2	High	86	65.6

Table 3 shows that the level of acceptance of the disease of female cancer patients is in the high category, as many as 86 respondents (65.6%).

Table 4: Spiritual connection with acceptance of cancer in female (n = 131)

Acceptance of illness							
Spiritual	**High**		**Moderate & Low**		**Total**		
	n	**%**	**n**	**%**	**n**	**%**	**p-value**
Moderate	25	29.1	35	77.8	60	45.8	0.000
High	61	70.9	10	22.2	71	54.2	

Table 4.11 shows that out of 71 people with high spirituality, 61 people (70.9%) had high disease acceptance in female cancers undergoing treatment. Conversely, out of 60 people with low spirituality, 35 people (77.8%) had low acceptance of illness. There is a significant relationship between Spiritual Well-Being and acceptance of illness (p-value 0.000).

Discussion

The results show a significant relationship is a significant relationship between spiritual well-being and acceptance of female cancer at the RSUD in Aceh Province, Indonesia, spiritual well- being p-value = 0.000 with OR = 9.524, it can be concluded that good spiritual well being will increase acceptance of disease 9 times higher than poor spiritual well being. Spirituality is an important source of strength and coping for cancer patients to adapt to their illness. Spiritual well being has a positive effect on the hope of women with cancer.[18]New findings in this study such as older women tend to have higher levels of illness acceptance, which may be related to their life experiences and spiritual outlook.

Religion is a fundamental aspect of human life that plays a significant role in shaping the way individuals perceive reality, including in dealing with health conditions and illness. In the field of nursing, religion is understood not just as a belief system, but as a determinant factor that influences individuals' perceptions, behaviors, and psychological and social responses to illness.[19]Aceh Province, which is known to have a majority Muslim population, religious values are clearly integrated in the social and cultural life of the community. In the context of cancer patients, engagement in spiritual activities becomes an important part of coping strategies, reflected through active participation in various religious rituals, such as prayer and other personal worship. Especially for Muslim patients, these spiritual practices are generally realized through the contemplation of Qur'anic verses and dhikr using tasbih as an effort to get closer to God and gain inner peace during the treatment process.[20]

This research is supported byIke & Rahadian S (2024), that there is a significant relationship among women with cancer who have received chemotherapy, spiritual well being accounts for 22% of the variance in psychological acceptance (R2 = 0.22, p < 0.05), so it can be concluded that the level of spirituality of women can have a positive effect on acceptance of the disease and psychological. Spirituality involves all of an individual's internal resources, including religion, the will to live, and believing everything that happens is a trial from God.[21]Spiritual Well-Being dapat melindungi pikiran terhadap bunuh diri, putus asa, keinginan untuk tidak melakukan pengobatan pada penyintas kanker.[16]Research from Dabo (2021)reported that, spiritual well being is a significant predictor of quality of life and acceptance, Spirituality can make individuals accept the disease they experience, feel close to God and do not blame God but consider the pain as a gift from God.Besides, social support from family can provide motivation to undergo treatment.[22]

Study results found byYıldırım Üşenmez et al., (2023) mSupporting the results of this study, that there is a significant relationship among women with female cancer in Turkey who have received chemotherapy, spirituality accounts for 22% of the variance in illness acceptance (R2 = 0.22), So it can be concluded that the level of spirituality of women can have a positive effect on illness acceptance. Spirituality involves all of an individual's internal resources, including religion, will to live, and commitment to life. Dimensional support, spiritual well being can strengthen an individual's ability to deal with negative situations, such as cancer.[23]

Another study conducted among men found that spiritual well-being, especially the meaning/

peace aspect, had a strong relationship with depression levels in men with prostate cancer. More specifically, men who felt they had meaning in life and inner peace tended to experience lower levels of depression. These spiritual aspects served as mediators between religiosity and depression, suggesting that the presence of meaning and peace is more important in reducing psychological stress than religious activity alone.[24]The findings are in line with research from Krupski *et al.*, (2006)that men who have higher levels of spirituality tend to show better adaptation to their disease condition. They experienced less psychosocial distress, such as lower levels of anxiety and better emotional well-being, and faced fewer sexual function problems and urinary disorders. This suggests that spirituality may serve as a coping mechanism that helps men accept and adjust to the diagnosis and accelerate the healing process psychologically and physically.[25]

Conclusion

This study findings reveal that spiritual well-being factors were associated with higher levels of acceptance of illness in female cancer survivors undergoing treatment. This suggests that spiritual support is crucial for patients in coping with the uncertainty and stress of a cancer diagnosis. Nurses need to integrate aspects of spiritual well-being in care, creating a supportive environment where patients feel comfortable sharing their feelings. Training in spiritual communication and empathy is necessary. In addition, nurses should refer patients to spiritual support resources, such as counselors or religious leaders, to strengthen spiritual well-being. With this approach, patients will be better able to accept their condition and find meaning in the healing process.

Limitations of the Study

This study has limitations in assessing causal relationships due to the design used. In addition, other factors of social conditions such as cancer-related stigma may influence the way participants share their experiences, leading to potential bias in reporting. Participants may feel pressured to hide their negative feelings or vulnerability, which may lead to inaccurate self-presentation of spiritual well-being. Cultural and economic factors have not been considered in this study, and the absence of long-term data limits understanding of changes in acceptance of illness over time.

Recommendation

Further research is recommended using a more comprehensive design and a wider range of methods to obtain more in-depth results. Additionally, it is recommended that further research be conducted with a longitudinal design or mixed methods to gain a deeper understanding of the dynamics.

Ethical Consideration

The research approval was given by the Health Research Ethics Committee at dr. Zainoel Abidin General Hospital, Banda Aceh, under approval number 304/ETIK-RSUDZA/2024.

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Original Article

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The Relationship Between Case Manager Roles and Inpatient Operational Efficiency: A Cross-Sectional Study in Indonesian Referral Hospital

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Abstract

Background: Hospitals globally face increasing pressure to enhance operational efficiency without compromising care quality. In this context, the case manager role is pivotal, yet empirical evidence of its direct impact on quantitative efficiency metrics remains limited, particularly in developing countries.

Objective: This study aimed to analyse the relationshipbetween case manager roles and the operational efficiency of inpatient wards at a public referral hospital in Indonesia.

Material and Method: A cross-sectional design was employed, including all 39 head nurses selected through total sampling. Data were collected using a validated questionnaire assessing case manager roles, with high reliability (Cronbach's Alpha = 0.963). The Spearman Rho correlation test was used for analysis.

Results: The results demonstratedthat the overall efficiency revealed that a significant majority of inpatient wards were classified as inefficient.Furthermore,a significant relationshipwas found between the overall role of case managers and operational efficiency (p = 0.036). Analysis of sub-variables also revealed significant relationships: coordination of health services (p=0.009), communication (p=0.048), care planning (p=0.024), prevention of intervention duplication (p=0.025), and supervision (p=0.046).

Conclusion: The study concludes that despite a significant majority of inpatient wards (71.8%) being classified as inefficient, the case manager's role is significantly associated with key operational efficiency indicators. Therefore, optimizing this role through structured training, clear protocols, and enhanced interprofessional collaboration is recommended as a crucial strategy for hospital management to improve resource utilization and service quality.

Keywords: Case Manager Role, Operational Efficiency, Inpatient Care

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Introduction

Hospitals worldwide operate in an increasingly complex environment characterized by rising healthcare costs, growing patient expectations, and pressure to deliver high-quality care with limited resources [1]. A central challenge within this landscape is achieving and maintaining operational efficiencythe optimal utilization of inputs like beds, staff, and equipment to produce maximum outputs of quality patient care. Inefficient operations can lead to prolonged patient wait times, bed shortages, staff burnout, and ultimately, financial instability for the institution. Therefore, continuous pursuit of enhanced operational efficiency is not merely an administrative goal but a fundamental imperative for sustainable healthcare delivery systems globally[2, 3].

This challenge is particularly acute in Indonesia, following the implementation of the Indonesian National Health Insurance (Jaminan Kesehatan Nasional - JKN) scheme. The JKN system, while dramatically expanding population coverage, has intensified financial pressures on hospitals through its case-based funding model [4, 5]. Hospitals must now meticulously manage resources, especially in high-cost areas like inpatient wards, where metrics such as Bed Occupancy Rate (BOR) and Length of Stay (LOS) directly impact financial viability and service capacity[6]. Consequently, Indonesian hospital administrators are urgently seeking innovative management strategies to optimize internal processes without compromising the quality of care mandated by national accreditation standards[7, 8].

One strategic role promoted to address these challenges is the case manager. Initially emerging from managed care systems in the United States, the case manager's function is to coordinate patient care across the continuum, ensuring it is timely, appropriate, effective, and efficient [9]. In Indonesia, the role was formally introduced through the hospital accreditation standards by the Hospital Accreditation Commission, positioning the case manager as a key agent in care coordination and integration [10]. The core premise is that a dedicated professional overseeing the patient's journey can prevent delays, reduce duplication of services, and streamline discharge processes, thereby positively influencing key operational metrics.

The effectiveness of a case manager hinges on the execution of several interconnected roles[11]. As outlined by Mailoa, Dedi, and Trihapsari [12] these include (1) coordination of interdisciplinary team meetings and patient rounds; (2) effective communication with patients, families, and healthcare providers; (3) collaborative care planning for complex cases; (4) prevention of duplication of diagnostic tests or interventions; and (5) ongoing supervision and follow-up to ensure adherence to the care plan. Each of these roles is theorized to contribute directly to smoothing patient flow, which is the bedrock of inpatient operational efficiency.

Despite strong theoretical support and regulatory mandate, empirical evidence demonstrating the direct impact of case manager activities on quantitative hospital efficiency indicators in the Indonesian context remains strikingly limited. Previous domestic studies have primarily focused on qualitative assessments of implementation challenges. For instance, Auladi [13] qualitatively found the role to be not yet fully effective in a Bandung hospital, while Herlina [14] reported a lack of visible case manager activities in Rokan Hulu. Internationally, while studies like that of Alshabanat [15] have shown that case management can reduce length of stay in specific patient groups, a comprehensive analysis linking all case manager roles to a full suite of efficiency indicators (BOR, LOS, TOI, BTO) in a general inpatient setting is lacking. This creates a significant knowledge-practice gap.

The specific problem is that hospital management lacks robust, data-driven evidence to justify investment in strengthening the case manager role. Decisions regarding staffing, training, and protocol development for case managers are often made without a clear understanding of their measurable return on investment in terms of operational performance. To bridge this gap, a validated and holistic measurement framework for efficiency is required. The Barber-Johnson Index, which synthesizes the four critical indicators (BOR, ALOS, TOI, BTO) into a single graphical efficiency analysis, provides a robust tool for this purpose [16]. Its application offers a comprehensive view of ward performance that is superior to analyzing each indicator in isolation.

In response to this identified gap, this study aims to quantitatively analyze the relationship between the perceived performance of case manager roles and the operational efficiency of inpatient wards, as measured by the Barber-Johnson Index. The study was conducted at dr. Zainoel Abidin Hospital, a large referral hospital in Aceh Province, Indonesia.

Method

This study employed a quantitative, descriptive correlational design with a cross-sectional approach. The design was chosen to examine the relationship between case manager roles and inpatient operational efficiency at a single point in time. The study was conducted across all inpatient wards of dr. Zainoel Abidin Hospital, Aceh Province Indonesia, a provincial referral and teaching hospital in Banda Aceh, Indonesia. This setting was selected due to its implementation of the case manager model and its representative profile as a large, public Indonesian hospital.The study population comprised all head nurses of inpatient wards (N=39) at the hospital. A total sampling technique was employed, meaning the entire accessible population was invited to participate, eliminating sampling error and providing a comprehensive overview of the phenomenon within the institution. The inclusion criteria were: (1) serving as a head nurses of an inpatient ward and (2) having worked with the case manager team for at least six months. These criteria were established to ensure that all respondents possess adequate, sustained experience and exposure to the implemented case manager model within their respective wards, thereby providing a reliable and informed perception of the case manager's operational impact on efficiency. Data were collectedusingtwoprimaryinstruments,

(1) Case Manager Role Questionnaire: This instrument was developed based on the theoretical framework of Mailoa, Dedi, and Trihapsari[12] and KARS[10], measuring five keyroles: coordination, communication, careplanning, prevention of duplication of interventions, and supervision. It consisted of 25 items rated on a 5-point Likert scale (1=Strongly Disagree to 5=Strongly Agree). The total score for each role was categorized as "Good" (16-25) or "Poor" (5-15). The questionnaire was rigorously validated; content validity was established through expert review, and construct validity was confirmed with all items having a correlation coefficient (r) > 0.423. Reliability testing yielded an excellent Cronbach's alpha coefficient of 0.963, indicating very high internal consistency. (2) Operational Efficiency Observation Sheet: Operational efficiency, the dependent variable, was measured using the Barber-Johnson Index method. Data on four key indicators were extracted from the hospital's medical records and management information systems for the period January-April 2025: Bed Occupancy Rate (BOR), Average Length of Stay (ALOS), Turn Over Interval (TOI), and Bed Turn Over (BTO). These individual indicator values were analyzed descriptivelyto provide context for the overall efficiency classification. An inpatient ward was classified as "Efficient" if its indicators fell within the ideal Barber-Johnson parameters (BOR: 75-85%, ALOS: 3-12 days, TOI: 1-3 days, BTO: ~30-50 times per year) and "Less Efficient" if one or more indicators deviated from these ranges. The Data collection was carried out from April to June, 2025. Prior to distribution, ethical approval was obtained from the Health Research Ethics Committee of dr. Zainoel Abidin Hospital (Ethical Approval No: 140/ETIK-RSUDZA/2025). The researchers distributed the questionnaires directly to the head nurses of inpatient wards after explaining the study's objectives and obtaining written informed consent. Access to the retrospective operational efficiency data (BOR, ALOS, TOI, BTO) from the hospital's central management records was formally granted by the Hospital Director and was covered under the same ethical approval protocol.

Data analysis was performed using Statistics analysis software. The univariate analysis was conducted to describe the frequency and percentage distributions of all variables. Bivariate analysis was conducted using the Spearman's Rho correlation test. This non-parametric approach was specifically selected because the primary variables—case manager roles (categorized as Good/Poor) and operational efficiency (classified as Efficient/Less Efficient)—were measured on ordinal scales and consequently did not meet the assumption of normality required for parametric correlation. The analysis tested the strength and direction of the correlation between the overall case manager role score and efficiency, as well as each of the five sub-roles.A p-valueof< 0.05 was considered statistically significant for all tests.

Results

The study involved all 39 head nurses of inpatient wards. The majority of respondents were female (92.3%), and held a Bachelor Nurse as their highest education (74.4%). Most were experienced, with 43.6% serving as ward heads for 4-9 years. The detailed characteristics are presented in table 1.

Furthermore, the assessment of the case manager's performance by the heads of inpatient wards is presented in table 2. Among the specific functions, coordination of health services received the highest positive rating (82.1%), followed by communication (79.5%) and prevention of duplication of Interventions (76.9%). The functions with the lowest «Good» ratings, though still representing a majority, were Supervision (71.8%) and careplanning (69.2%), indicating potential key areas for performance improvement.

The analysis of overall efficiency revealed that a significant majority of inpatient wards were classified as inefficient. Specifically, only 11 out of 39 wards (28.2%) met the established criteria for ideal efficiency, while the remaining 28 wards (71.8%) were found to be operating inefficiently. This finding highlights the presence of widespread systemic operational challenges within the hospital's inpatient care system.The detailed overall efficiency are presented in Tabel 3.

Table 1. Characteristics of the Respondents (N=39)

No.	Variabel	f	%
1	**Gender**		
	a. Male	3	7.7
	b. Female	36	92.3
2	**Age (Years)**		
	a. 26-35	1	2.6
	b. 36-45	19	48.7
	c. 46-60	19	48.7
3	**Work As Head nurses (Years)**		
	a. 1-3	11	28.2
	b. 4-9	17	43.6
	c. 10-20	11	28.2
4	**Education**		
	a. Bachelor Nurse	29	74.4
	b. Magister's Degree	10	25.6

Table 2. Case Manager Roles by Head Nurses of Inpatient Wards (N=39)

No.	Variabel	f	%
1	**Health Care Coordination**		
	a. Good	32	82.1
	b. Poor	7	17.9
2	**Communication**		
	a. Good	31	79.5
	b. Poor	8	20.5
3	**Nursing Plan**		
	a. Good	27	69.2
	b. Poor	12	30.8
4	**Prevention of Duplication of Interventions**		
	a. Good	30	76.9
	b. Poor	9	23.1
5	**Supervision**		
	a. Good	28	71.8
	b. Poor	11	28.2

Table 3. Hospital Operational Efficiency Indicators in Inpatient Wards

No.	Hospital Operational Efficiency Indicators	f	%
1	Efficient	11	28.2
2	Inefficient	28	71.8

Tabel 4. Relationship Between Nurse Case Manager Roles on Hospital Operational Efficiency

Case Manager Roles	Hospital Operational Efficiency				Total		r	α	P value
	Efficient		Inefficient						
	f	%	f	%	f	%			
Health Care Coordination									
Good	10	31.3	22	68.8	32	100	0.411	0.05	0.009
Poor	1	14.3	6	85.7	7	100			

Continue.....

Communication									
Good	8	25.8	23	74.2	31	100	0.319	0.05	0.048
Poor	3	37.5	5	62.5	8	100			
Nursing Plan									
Good	7	25.9	20	74.1	27	100	0.362	0.05	0.024
Poor	4	33.3	8	66.7	12	100			
Prevention of Duplication of Interventions									
Good	9	30.0	21	70.0	30	100	0.359	0.05	0.025
Poor	2	22.2	7	77.8	9	100			
Supervision									
Good	10	35.7	18	64.3	28	100	0.321	0.05	0.046
Poor	1	9.1	10	90.9	11	100			
Case Manager Roles									
Good	11	38,2	23	67,6	34	100	0,337	0,05	0,036
Poor	0	0	5	100	5	100			
Total	11		28		39	100			

The results Tabel 4 above demonstrated a significant relationship between the case managers role and inpatient operational efficiency. Analysis of sub-variables also revealed significant associations: coordination of health services (p=.009), communication (p=.048), nursing plan (p=.024), prevention of duplication of intervention (p=.025), and supervision (p=.046).

Beyond the statistical findings, the observed significant positive association between the case manager's role and operational efficiency (Spearman's rho = 0.337, p= 0.036) holds substantial practical significance. This suggests that enhancing the execution of case manager responsibilitiesparticularly in coordination and resource managementserves as a tangible, high-leverage intervention point for hospital administrators seeking to address the pervasive inpatient inefficiency observed in this study. In essence, improvements in the case manager function translate directly into better utilization of bed resources and reduced length of stay.

Discussion

This study demonstrates a significant positive relationship between the role of the case manager and the operational efficiency of inpatient wards at dr. Zainoel Abidin General Hospital.

Prior to examining the role of the case manager, a fundamental finding of this study was the confirmation of underlying operational challenges, as detailed in Table 3. It was observed that a significant majority of inpatient wards (71.8%) were classified as inefficient according to the Barber-Johnson index. This reality depicts a situation where patient care processes are likely hindered, leading to implications such as prolonged waiting times, suboptimal resource utilization[17], and financial strain on the institution under the JKN's INA-CBGs case-based funding model[6, 18]. Therefore, identifying factors that can reverse this condition becomes crucial. It is within this framework that the significant relationship between case manager performance and operational efficiency, uncovered in this study, gains its paramount importance. The strong positive correlation indicates that strengthening the case manager role could represent a strategic intervention pathway to improve the suboptimal operational performance prevalent across most wards.

The overall perception of the case manager's role was positive, with specific strengths noted in health care coordination (82.1% rated good) and communication (79.5% rated good). These findings align with contemporary research emphasizing the case manager's pivotal function as a coordinator and communication hub within interdisciplinary healthcare teams [12, 19]. Effective coordination ensures

that patient information from medical records is utilized optimally, preventing delays and redundant interventions, which are critical for efficient bed turnover and patient flow.

The significant correlation (p=0.009) between the case manager's coordination and operational efficiency underscores its foundational importance. This result is consistent with the literature stating that case managers facilitate formal forums like case conferences and patient rounds, which are essential for aligning multidisciplinary actions and streamlining care processes [20, 21]. Inefficient coordination often leads to prolonged patient stays and suboptimal bed utilization, as reflected in the Barber Johnson indicators where 71.8% of wards were classified as inefficient.

Communication emerged as another critical factor significantly linked to efficiency (p=0.048). The case manager's role in disseminating clear and timely information to healthcare professionals mitigates misunderstandings and prevents service duplication. However, the study also revealed that socialization regarding the case manager's functions remains incomplete among operational staff, a challenge previously noted by Mailoa, Dedi [12]. This indicates that while communication is effective among those who understand the role, broader awareness is needed to maximize its impact on hospital efficiency.

The Nursing plan function of case managers, though rated good by a smaller majority (69.2%), showed a significant influence on operational efficiency (p=0.024). This involves comprehensive patient assessment and collaborative discharge planning, which directly affects key metrics like Length of Stay (LOS). Similar findings were reported by Auladi [13, 22], who noted that integrated care planning for complex patients is crucial for reducing unnecessary hospitalization days and optimizing resource use, ultimately reflected in improved Bed Turn Over (BTO) rates.

Furthermore, the case manager's role in preventing duplication of interventions was perceived positively (76.9% good) and was statistically significant (p=0.025). This function involves coordinating with attending physicians to schedule multidisciplinary meetings and ensure aligned interventions. This finding corroborates the study by Ulfa, Agustin [23, 24], which highlighted that preventing redundant services through proactive case management is a key strategy for enhancing cost-effectiveness and operational throughput in hospitals accredited under national standards.

Supervision, which includes patient follow-up and compliance monitoring, was also a significant predictor of efficiency (p=0.046). Intensive monitoring by case managers ensures that treatment plans are adhered to, reducing complications and readmissions. This aligns with the standards set by the Case Management Society of America [25, 26], which advocates for continuous oversight to maintain care quality and efficiency. However, the study notes that this function requires full support from hospital management and other health professionals to be fully effective.

The positive correlation across all sub-variables indicates that the case manager operates as a multidimensional role. Its effectiveness is not reliant on a single function but on a synergistic combination of coordination, communication, planning, prevention, and supervision. This holistic approach is essential for navigating the complexities of inpatient care and achieving systemic efficiency[27].

In conclusion, the findings strongly support the strategic importance of the case manager in enhancing hospital operational efficiency. The role's functions are significantly interrelated with key performance indicators like BOR, LOS, TOI, and BTO. To maximize this impact, hospitals should invest in standardized training for case managers, ensure comprehensive socialization of their role across all operational staff, and strengthen support from hospital management. For policymakers, these results advocate for the formal integration and strengthening of case management roles within national health insurance (JKN) frameworks to promote cost-effective and efficient hospital care.

Limitations of the Study

The findings of this cross-sectional study should be interpreted within the context of several limitations. First, the cross-sectional design prevents the establishment of a temporal or causal relationship between the case manager's role and operational

efficiency. Future longitudinal studies are needed to confirm causality. Second, the data collection for case manager roles relied on a questionnaire measuring head nurses' perceptions, which may be subject to reporting bias or social desirability bias, even though the instrument demonstrated high reliability. Third, the study was conducted at a single Indonesian referral hospital. While this provides depth, the generalizability of the efficiency findings (Barber-Johnson Index results) to other healthcare settings with different patient populations or management structures may be limited. These limitations should be considered when applying the study's conclusions.

Conclusion and Suggestions

This study confirms that the role of the case manager significantly and positively influences the operational efficiency of inpatient wards at dr. Zainoel Abidin General Hospital, as evidenced by key Barber Johnson indicators (BOR, LOS, TOI, and BTO). The results demonstrate that effective case management particularly through coordination, communication, care planning, prevention of duplicated interventions, and supervisionis strongly associated with enhanced hospital efficiency. To fully leverage case manager in optimizing operational performance, hospital administrators should establish standardized training programs to strengthen case managers' competencies, promote role clarification through systematic socialization across all operational units, and cultivate interdisciplinary collaboration. For policymakers, these findings support the formal integration and reinforcement of the case manager role within national health insurance systems to advance sustainable, efficient, and high-quality patient care. Further multi-center studies with longitudinal designs are recommended to investigate causal mechanisms and contextual factors affecting case management effectiveness.

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Original Article

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Development of the Parent-Focused Intervention to Improve Fruit and Vegetable Intake Among Elementary School Children in Myanmar

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Abstract

Background: Fruit and vegetable (FV) intake among children in Myanmar remain below the WHO-recommended 400 g/day, with national averages around 230 g/day and substantial regional variation. Early dietary behaviours are strongly shaped by parents and the home environment, yet there is a lack of culturally adapted, parent-focused interventions in Myanmar. The SWITCH (Supporting Wellness in Children Through Home-based Change) intervention was developed to address the gap using Social Cognitive Theory (SCT).

Methods: Intervention development followed the GUIDED framework to ensure transparent and systematic reporting. Evidence from the literature, national dietary reports, and baseline assessments in a Yangon school identified key determinants, including low FV knowledge, limited parental self-efficacy, reduced home availability of FV, and high sugary drink intake. These findings informed the design of an eight-week parent-focused program featuring weekly in-person sessions, home-based challenges, digital reinforcement through Viber and Facebook, and child engagement activities. Materials including recipe cards, cooking videos, FV shopping guides, and lunchbox templates were culturally adapted to the Myanmar context. Prototype materials were pre-tested with 10 parents using structured feedback questionnaires with Yes/No ratings and responses were summarized descriptively.

Results: The finalized intervention incorporated eight weeks addressing FV knowledge, healthy cooking, meal planning, label reading, home-environment improvements, and coping strategies. Pre-testing demonstrated high acceptability: 90% found materials easy to understand, 80% found them culturally relevant, 100% considered them useful, and 90% indicated willingness to follow strategies. Cultural adaptation and digital reinforcement enhanced feasibility for urban Myanmar families.

Conclusion: SWITCH is a culturally grounded, SCT-based intervention designed to improve FV intake among schoolchildren by empowering parents. Its systematic development ensures theoretical coherence, contextual relevance, and high feasibility, providing a strong foundation for evaluation in a forthcoming quasi-experimental trial.

Keywords: intervention, behaviour, fruit, vegetable

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Background

Adequate consumption of fruits and vegetables (FV) is fundamental to healthy child growth and prevention of non-communicable diseases (NCDs). The World Health Organization (WHO) recommends a minimum daily intake of 400 g which is also equivalent to five servings and this target is rarely achieved across Southeast Asia[1]. Insufficient FV intake has been linked to elevated risks of cardiovascular disease, gastrointestinal cancers, and premature mortality[2]. Globally, inadequate FV consumption is estimated to contribute to nearly 3.9 million deaths each year, underscoring the urgent need for interventions to promote healthier dietary patterns[3].

Dietary intake patterns and food preferences begin to form early in childhood and often persist into adolescence and adulthood, largely shaped by parental influences[4]. A substantial body of evidence emphasizes the critical role of the home environment in establishing children's eating behaviors, as it represents the primary setting where children first acquire dietary habits[5]. Children tend to adopt eating patterns similar to those of their parents, reflecting the powerful environmental and behavioural modeling that occurs within the household[6].Multiple factors have been associated with children's fruit and vegetable consumption, including demographic characteristics (such as age and sex), socioeconomic status, and parental education levels[7].

In 2021, global FV consumption reached only 34.4% and 62.7% of optimal intake levels, with an average intake of 121.8 g/day for fruit and 212.6 g/day for vegetables; intake was marginally higher among females than males[8]. A study on five Southeast Asian countries stated that 76.3% of children had inadequate FV consumption[9].The national average FV consumption was 230g/day in Myanmmar. Although WHO recommends a minimum of 400 g/day, the national average was falling well below the requirement. Tanintharyi region records the lowest intake at 150 g/adult equivalent/day, while Sagaingregion reaches 301 g/adult equivalent/day. These findings highlight both an overall national shortfall and substantial regional disparities in FV consumption[10]. In Myanmar, FV intake among school-aged children was notably low. National and regional dietary assessments report limited vegetable consumption alongside increasing intake of fried foods, sugary beverages, and other energy-dense snacks[11].Despite this, Myanmar has very few structured nutrition programs that focus specifically on parents or address these key determinants. Existing interventions are limited, and most have not been culturally adapted to Myanmar's food habits, affordability challenges, or local cooking practices.

Social Cognitive Theory (SCT)[12] offers a comprehensive framework for influencing dietary behaviors by addressing personal factors (e.g., knowledge, self-efficacy), behavioral patterns (e.g., meal planning, food choices), and environmental conditions (e.g., home availability of FV). SCT constructs such as behavioral capability, observational learning, reinforcement, and environmental restructuring are well suited to guide interventions aimed at improving children's diets[13]. While SCT-based nutrition programs[14, 15] have been widely applied in other countries, similar evidence-based intervention development efforts are largely absent in Myanmar.

Although Social Cognitive Theory–based, parent-focused nutrition interventions exist, SWITCH is novel in several key respects. It integrates structured in-person parent sessions with low-burden digital reinforcement via Viber and Facebook—widely used platforms in Myanmar—providing continuous support between sessions. The intervention was developed de novo through triangulation of international evidence, national dietary data, and local formative assessments, rather than adaptation of an existing program. SWITCH also emphasizes home-environment restructuring and parental modeling using culturally familiar, affordable foods and cooking practices, and incorporates child-engagement activities within a parent-focused design to strengthen reciprocal learning. Together, these features extend prior SCT-based interventions by combining theoretical rigor with contextually grounded delivery suited to urban low- and middle-income settings.

The SWITCH (Supporting Wellness in Children Through Home-based Change) intervention was therefore designed to address this gap. Developed as a culturally grounded, theory-driven program,

SWITCH aims to improve FV intake among elementary schoolchildren by enhancing parental knowledge, skills, confidence, and home food environments. This paper details the systematic development of SWITCH following the GUIDED (GUIDance for the rEporting of Intervention Development)[16] and applying Social Cognitive Theory as its guiding framework.This paper reported intervention development and pre-testing findings only; no effectiveness or behavioral outcome data are presented, as evaluation will be conducted in a forthcoming quasi-experimental study.

Methods

The intervention development and pre-testing were conducted using a convenience sample of parents from a single private elementary school in urban Yangon. This approach was selected to support iterative intervention development; however, it may introduce selection bias, as participating families may differ from those in public schools or other socioeconomic settings.

The development of the SWITCH intervention followed a systematic, theory-driven, and transparent process informed by both the Intervention Development Reporting Checklist (IDRC) and the GUIDED (GUIDance for the rEporting of Intervention DEvelopment) framework. Together, these methodological standards emphasize comprehensive documentation of the evidence base, theoretical rationale, stakeholder involvement, contextual considerations, design decisions, material development, and refinements made prior to evaluation.

Each stage of the intervention development process (Sections 1–6) was explicitly aligned with relevant items of the GUIDED framework to facilitate transparent reporting and methodological appraisal.

1. Evidence Review and Assessment

The primary aim of the development work was to design a culturally appropriate and feasible parent-focused intervention to improve fruit and vegetable (FV) intake among Grade 1–2 schoolchildren in Yangon, Myanmar. Intervention development was informed by a targeted, non-systematic literature review conducted between January and March 2023 using PubMed, Scopus, and Google Scholar. Studies published between 2005 and 2023 were identified using key terms related to FV intake, children, parents, home food environments, nutrition interventions, and Social Cognitive Theory. Additional evidence was drawn from Myanmar and regional nutrition reports and from reference screening of relevant reviews.

The review aimed to identify key behavioral determinants, effective intervention components, and theoretical applications rather than to synthesize effect sizes. Local epidemiological data indicated consistently low FV intake among children (110–230 g/day) alongside increasing consumption of sugary beverages[10].

The intervention was developed in collaboration with a private elementary school in urban Yangon. Participating parents were primarily from middle-income households with secondary or tertiary education, reflecting an urban socio-demographic profile. Baseline assessments[17]conducted in the school provided context-specific insights, revealing parental knowledge gaps, limited home availability of FV, frequent consumption of fried snacks and sweetened beverages among children, and inconsistent family mealtime routines. Stakeholder consultations with school directors, teachers, and parents further identified practical barriers, including time and cost constraints, children's picky eating, and limited ideas for preparing vegetables in appealing ways. A cultural dietary review ensured that intervention materials reflected commonly consumed Myanmar foods, such as roselle leaves, gourds, watercress, pumpkin, and papaya.

The target population comprised parents of Grade 1–2 children aged 5–6 years who were primary food preparers, used Facebook or Viber, and resided in urban Yangon. Socioeconomic context and local cooking practices were considered to ensure feasibility and relevance. Consistent with GUIDED principles, evidence from baseline data, stakeholder input, and dietary reviews highlighted key behavioral and environmental barriers, including limited knowledge of FV recommendations, low parental self-efficacy in vegetable preparation, constrained home availability, and habitual sugary-drink consumption.

2. Theoretical Foundation

Social Cognitive Theory (SCT) was selected as the guiding framework for SWITCH due to its emphasis on reciprocal interactions between personal, behavioral, and environmental determinants of health and its strong empirical support in dietary interventions. Eight SCT constructs—behavioral capability, self-efficacy, outcome expectations, self-regulation, environment, observational learning, reinforcement, and coping—were identified based on relevance and feasibility in the Myanmar context and were operationalized through a structured mapping table (Table 1) linking each construct to specific intervention components.

A simplified logic model illustrated pathways from identified behavioral and environmental determinants to SCT constructs, corresponding behavior change techniques and expected short- and intermediate-term outcomes. SCT constructs guided all intervention activities: cooking demonstrations and peer sharing supported observational learning and self-efficacy; home challenges and goal setting strengthened self-regulation; strategies to increase FV availability targeted environmental restructuring; and approaches to managing picky eating and time constraints addressed coping.

Consistent with GUIDED recommendations, explicit mapping of constructs to mechanisms and techniques ensured theoretical fidelity and transparency in the design of the SWITCH program.

Table 1. Mapping of SCT Constructs to SWITCH Intervention Components

SCT Construct	Definition	Corresponding SWITCH Component
Behavioral capability	Knowledge & skills needed to perform behavior	FV types, nutrients, cooking methods, meal planning
Self-efficacy	Confidence in performing behavior	Cooking demonstrations, simple recipes, peer-sharing
Environment	External factors influencing behavior	Home FV availability, family meals, lunchbox planning
Self-regulation	Goal-setting and monitoring	Weekly goal-setting sheets, home challenges
Observational learning	Learning through observation	Cooking videos, parent modeling during meals
Reinforcement	Rewards and encouragement	Stickers, certificates, praise
Coping	Strategies to manage barriers	Picky-eating strategies, time-saving tips, cost adaptations

3. Identification of Behavioral Determinants and Change Objectives

Behavioral determinants were identified through triangulation of evidence from literature, baseline assessments, and stakeholder input as shown in *Table 2*.Key determinants included limited knowledge of FV types, nutrients, and recommended intake; low parental confidence in preparing vegetables acceptable to children; environmental constraints such as low home availability and reliance on convenience foods; negative outcome expectations (e.g., perceptions of high cost or children's reluctance to eat vegetables); and unhealthy habits, including frequent sugary drink consumption and irregular family meals.

In response, the intervention aimed to modify both parental behaviors and the home food environment. Objectives included supporting parents to provide at least five daily FV servings, increase FV availability and visibility at home, and model FV consumption during meals. Additional goals were to reduce sugary drink and unhealthy snack intake, improve lunchbox quality and consistency, and strengthen parental self-efficacy in managing challenges such

as picky eating. All objectives were explicitly aligned with Social Cognitive Theory constructs to address both individual and environmental determinants of behavior.

Table 2. Behavioral Determinants and Corresponding Change Objectives

Behavioral Determinant	Change Objective
Limited FV knowledge	Parents understand FV types, benefits, and daily recommendations
Low self-efficacy	Parents gain confidence preparing FV-rich meals children will accept
Poor home environment	FV are purchased, stored visibly, and consistently available
High sugary drink intake	Sugary drinks reduced and replaced with water and FV options
Irregular meal routines	Family meals occur more frequently with parental modeling
Picky eating	Parents apply strategies to overcome refusal and promote tasting

4. Intervention Design

The SWITCH program was designed as an eight-week, parent-focused intervention delivered through weekly one-hour in-person group sessions, supported by home-based challenges, digital reinforcement via Viber and Facebook, and child engagement activities (e.g., tasting activities and sticker-based FV monitoring) in Table 3. A 16-week follow-up period was included to support maintenance of behavior change.

The intervention comprised eight thematic modules mapped to Social Cognitive Theory (SCT) constructs, covering FV types and health benefits, healthy cooking and demonstrations, meal planning and portion control aligned with the WHO 5-A-Day recommendation, creation of a supportive home food environment, smart food choices and label reading, coping with barriers (picky eating, cost, time), and review with goal-setting.

SCT-aligned behaviour change techniques, consistent with the Michie taxonomy, were embedded throughout, including information provision, demonstrations, graded challenges, self-monitoring, social support, home-environment restructuring, rewards, and problem-solving.

Intervention materials were iteratively developed and culturally adapted and included a parent handbook, slides, cooking videos, FV shopping guides, lunchbox templates, recipe cards, and child-friendly monitoring tools. Digital reinforcement consisted of two to three facilitator-led messages per week. Sessions were delivered to small parent groups (12–20 participants) by trained facilitators using standardized manuals to ensure fidelity.

Table 3. Structure of the 8-Week SWITCH Intervention

Week / Module	Content Focus	Materials Used
Week 1 – FV Types & Food Groups	Introduction to fruit and vegetable types; understanding food groups	Parent handbook pages; visual food-group charts; printed posters
Week 2 – Nutrients & Health Benefits	Importance of FV for growth, immunity, and health	Slide deck; fact sheets; simplified English/Burmese handouts
Week 3 – Healthy Cooking Methods	Stir-fry, soups, salads, child-friendly FV preparation	Live cooking demo; cooking demonstration videos; recipe cards
Week 4 – Meal Planning & 5-A-Day	Portion sizes; weekly meal planning; healthy lunchbox ideas	Meal-planning sheets; lunchbox templates; FV portion guide

Continue.....

Week 5 – Healthy Home Environment	Increasing FV availability and accessibility	Affordable FV shopping guide; home-challenge task sheets
Week 6 – Smart Food Choices & Label Reading	Reading sugar labels; selecting affordable healthy foods	Label photos; decision-making handouts; comparison charts
Week 7 – Coping With Barriers	Managing picky eating, cost concerns, time constraints	Scenario cards; problem-solving worksheets; parent discussion guide
Week 8 – Review, Sharing & Goal Setting	Celebrating progress; long-term goal setting	Certificates; success-sharing sheets; long-term goal forms

5. Pre-Testing and Refinement

Prototype materials were pre-tested with a convenience sample of 10 parents representing the target population using think-aloud interviews and structured feedback forms to assess clarity, cultural relevance, usefulness, feasibility, and engagement. Feedback identified the need for simpler language, more culturally relevant food examples, shorter videos, and additional strategies for managing picky eating.

In line with GUIDED principles, materials were iteratively refined. Revisions included simplifying English terminology, adding images of commonly consumed Myanmar dishes, incorporating low-cost FV substitutions, shortening cooking videos for mobile accessibility, and expanding Burmese-language instructions.

Acceptability was assessed using brief yes/no questions, with percentages calculated as the proportion of parents responding positively. Given the small sample size and developmental purpose, qualitative feedback was analysed descriptively to inform refinement. These revisions were incorporated before finalising the SWITCH intervention.

6. Implementation Considerations

The intervention was designed for flexible and feasible implementation within typical Myanmar family schedules. Weekly sessions were intentionally kept short to accommodate busy parents and were scheduled on weekends based on parent preference. Recipes featured inexpensive and widely available ingredients, and cooking methods required minimal equipment to reflect typical household kitchens. Digital reinforcement was provided through Facebook and Viber, which are widely used among the target population. To monitor fidelity, the program employed a standardized facilitator manual, attendance checklists, weekly progress reporting for home challenges, and consistent messaging templates for digital reminders.

Ethical Consideration

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

Results

The final SWITCH intervention consisted of an eight-week, parent-focused program integrating multiple components grounded in Social Cognitive Theory (SCT). Each component was mapped to relevant SCT constructs to target parental capability, motivation, and environmental supports. Nutrition knowledge sessions addressed behavioral capability by improving parents' understanding of FV types, recommended intake, and health benefits. Cooking demonstrations and recipe activities enhanced observational learning and self-efficacy, providing parents with practical skills to prepare FV-rich meals acceptable to children.

Weekly goal-setting sheets and home-based challenges strengthened self-regulation by encouraging parents to plan meals, track FV servings, and practice new behaviors at home. Reinforcement strategies—such as praise, stickers, and weekly achievements—were incorporated to sustain engagement. Home-environment restructuring, including guidance on purchasing, storing, and visibly displaying FV, targeted environmental determinants shown to influence children's dietary

intake[18]. Parent modeling of FV consumption was included to strengthen social learning pathways, given consistent evidence that children imitate parental food choices[19].

Cultural adaptations were central to the intervention's feasibility. All recipes and recommendations included widely available and affordable Myanmar foods—such as roselle leaves, gourds, beans, banana, papaya, and pumpkin—and relied on simple cooking methods familiar to Myanmar households. Digital reinforcement through Viber and Facebook provided timely cues to action, peer encouragement, and reminders, aligning with Myanmar's high mobile phone and social media usage.

Pre-testing results demonstrated strong acceptability. Among the ten parents who reviewed the intervention materials, 90% rated the content as easy to understand, 80% found it culturally appropriate and relevant to daily routines, 100% considered it useful for improving their child's diet, and 90% indicated they were likely to apply the strategies. Feedback led to refinements such as simplifying language, including more images of Myanmar dishes, offering low-cost substitutions, and expanding strategies for picky eating and time-saving.

The finalized intervention was therefore considered feasible, culturally appropriate, and well-aligned with known determinants of children's FV intake, forming a robust foundation for future evaluation in the quasi-experimental trial.

Discussion

This intervention development study produced a culturally tailored, SCT-based parent-focused program designed to improve FV intake among elementary schoolchildren in Myanmar. By integrating evidence from literature, local assessments, and stakeholder inputs, SWITCH addresses multiple behavioral and environmental determinants known to shape children's dietary habits. The high acceptability of SWITCH during pre-testing underscores the value of grounding interventions in local cultural practices and parental experiences.

The emphasis on parental modeling, capability-building, and environmental restructuring reflects well-established evidence that parents serve as powerful influencers of children's dietary behavior[19]. Research across diverse settings indicates that improving parental self-efficacy, knowledge, and home FV availability is strongly associated with higher FV intake among children[18, 20]. SWITCH directly targets these determinants through cooking demonstrations, meal-planning tools, FV visibility strategies, and reinforcement-based home challenges.

SCT provided an effective framework for designing the intervention. Constructs such as self-efficacy, observational learning, and reinforcement have been consistently linked to successful dietary behavior change in young populations[21]. The explicit mapping of SCT constructs to intervention activities strengthens the theoretical fidelity of SWITCH, an important requirement for intervention development and for understanding mechanisms of change[22].

Cultural adaptation was central to SWITCH's design. Intervention materials incorporated locally familiar, low-cost foods and simple cooking methods commonly used in Myanmar households. High acceptability during pre-testing indicated strong alignment with parents' needs and everyday constraints, while iterative refinements—such as simplifying language, using familiar dishes, and addressing cost, picky eating, and time barriers—enhanced cultural relevance and feasibility.

This study has limitations. Pre-testing involved a small convenience sample from one urban private school, which may limit generalizability across Myanmar's diverse socioeconomic contexts. Although the development process was rigorous, intervention effectiveness will be assessed in a planned quasi-experimental study.

Scalability may be constrained by reliance on digital platforms and facilitator-led cooking demonstrations, particularly in lower-resource or rural settings. However, core SCT-based elements—behavior change objectives, parental modeling, and home-environment restructuring—should be retained, while delivery modes can be adapted without compromising theoretical fidelity. Overall, SWITCH program adds to the limited evidence on culturally adapted, theory-driven nutrition interventions in Southeast Asia and provides a transparent foundation for future scale-up.

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Competing interest statement

The authors declare that they have no competing interests.

Conclusion

The SWITCH intervention was developed through a systematic, theory-driven, and culturally informed process aimed at improving children's fruit and vegetable intake in Myanmar by empowering parents as agents of change. Grounding the intervention in Social Cognitive Theory enabled the integration of personal, behavioral, and environmental determinants into practical, contextually relevant strategies. Pre-testing results demonstrated excellent acceptability, reinforcing the intervention's feasibility. SWITCH offers a promising approach for addressing poor dietary patterns in early childhood and provides a replicable model for designing parent-focused nutrition interventions in similar low-resource settings. The next step is to evaluate its effectiveness through a quasi-experimental study.

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