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Aims and Scope of IJPHS

The International Journal of Public Health and Health Sciences (IJPHS) aims to publish original research (quantitative research, qualitative research, systematic reviews, and meta-analysis), special article (commission article and an editorial), letter to editor, educational academic and contributions relevant to health professions and medical sciences. IJPHS is published by the Praboromajchanok Institute (PBRI) , Thailand Ministry of Public Health. It is a non- profit, peer-reviewed, open- access, free of charge, fast review process, international, scientific journal that publishes articles in areas of health sciences disciplines. IJPHS also encourages our faculty members to publish their work and support them to develop high quality research and engage with peer-review. Such information and the insight derived from it is required by health policy-makers in order to make informed choices and evidence-based decisions, and this is the focus of the IJPHS.

The scope of the IJPHS covers the following areas: community health, nursing and nursing sciences, health policy and advocacy for health care, global health and sustainable development goals (SDGs), health care services, health promotion, health education and behavioral health, environmental health and climate changes, occupational health and safety, health technology and data management and health sciences.

Authors from above mentioned areas are invited to submit scientific papers and contribute in the IJPHS. All submitted manuscripts will be primarily considered by the editor. Those manuscripts submitted as research articles and found suitable for further consideration, will be subject to peer review by at least two independent expert referees. All peer review is open and submission is online via https://he01.tci-thaijo.org/index.php/ijphs/index Three issues will be published annually: January - April, May - August, and September - December.

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Editorial Statement

I want to take an opportunity to thank you everyone involved in the IJPHS, including, authors, reviewers, editorial team, and all readers. Our reviewers and editorial team deserve a special thanks for providing authors feedback and valuable comments with quick, fair of manuscript submissions. The IJPHS is progressing published, and provides growing incentives and benefits to authors and readers.

With an emphasis on improving the nation's health system in terms of service delivery, disease prevention, and the growth of the health industry, the Ministry of Public Health has unveiled seven major initiatives for 2025. The tax cut for people who take care of their health, which aims to lower chronic non-communicable diseases (NCDs), is one noteworthy feature. The seven key policies of the Ministry of Public Health for 2025 include: 1) Advancing medical technology like telemedicine and artificial intelligence, as well as increasing access to healthcare services across the country, 2) Improving the quality and inclusivity of drug recovery programs and mental health services, 3) Supporting initiatives to lower NCDs through risk factor management and health promotion, like passing legislation to limit tobacco and e-cigarettes, 4) Preparing village health volunteers (VHVs) to be essential in monitoring illnesses and advancing community health, 5) Delivering all-encompassing services and enhancing care for marginalized populations in isolated locations, 6) Promoting traditional Thai medicine and health tourism, and creating Thai herbal goods with a market value of at least 100 billion baht by 2027 and, 7) More medical staff should be produced, and hospital administration should be improved for increased effectiveness and environmental friendliness. By emphasizing disease prevention, providing care for vulnerable populations, and increasing the market value of traditional Thai medicine and herbs, these programs seek to establish a sustainable and inclusive health system.

We are still looking out for good submitted papers. We are improving our management system and fast review process, with just less than 8 weeks average from acceptance to issue publication with free open access online. Now is as good a time as any to submit your good research to our IJPHS.

Finally, we sincerely hope that the members, faculty members, researchers, readers. In this issue, IJPHS consisting of interesting topics covering public health and medical sciences. You can download articles in the journal at the website https://www.tci-thaijo.org/index.php/ijphs. We are also looking forward to your advice, ideas, and collaboration.

I wish you all a very healthy, happy and productive 2025!

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Improving Waiting Time in an Oncology Outpatient Clinic at a Tertiary Hospital

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Abstract

Background: Long waiting times are a common problem in public referral centers. Thus, this study examines the effectiveness of a decision-making scheduling system that was implemented to reduce the waiting time in an oncology outpatient department (OPD) at a tertiary hospital in southern Thailand. **Methods:** We propose a new scheduling approach based on the Lean management system to reduce OPD waiting time without increasing healthcare resource use. In addition to the scheduled appointment slot, we applied a new scheduling system based on the following three key points: (1) review the necessity of laboratory tests for each patient before the visit date, (2) inform the patient regarding blood draws at arrival and obtain blood results before the doctor's consultation, and (3) reschedule new patients with their planned treatment start date. Using an in-house electronic hospital information system, we retrospectively reviewed patients who visited oncology OPD between January 2015 and December 2017, then compared the waiting time and number of patient visits before and after implementing the new scheduling system. The waiting time were determined and analyzed by Wilcoxon rank-sum test. **Results:** The total OPD waiting time of new patients significantly decreased from 361 minutes (interquartile range [IQR] 218.2–454) to 293 minutes (IQR 217–375; $p < 0.001$). The rate of new patients who received anticancer treatment within two visits was increased from 75.4% to 97% ($p < 0.001$). Correspondingly, the total OPD waiting time of follow-up patients was also significantly reduced from 213 minutes (IQR 113–332) to 122 minutes (IQR 53–217; $p < 0.001$). In addition, the new scheduling system reduced the average OPD time by 11.4% ($p < 0.001$). **Conclusion:** A decision-making scheduling system based on the use of existing capacity can effectively reduce waiting time in an oncology outpatient clinic.

Key Words: Outpatient clinics, Waiting time, Oncology, Appointments and Schedules, Real-world data

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Introduction

Cancer has been identified as one of the leading causes of morbidity and mortality worldwide, with approximately 19.3 million new cases and 10 million cancer-related deaths reported in 2020 (Sung et al., 2021). In Thailand, the age-standardized cancer incidence rate per 100,000 people was 173.1 in men and 159.0 in women. Moreover, the age-standardized cancer mortality rate per 100,000 was 122 in men and 83.6 in women (International Agency for Research on Cancer, 2021).

Songklanagarind Hospital is one of the largest referral centers in southern Thailand. At our academic tertiary hospital, we provide multidisciplinary care for cancer patients in the southern part of Thailand. In 2019, the oncology outpatient clinic of our institute had 12,092 outpatient visits, which then increased to 13,220 outpatient visits in 2020. Based on our data, the number of outpatient visits has increased every year. However, the outpatient clinic has become more complicated and difficult to manage due to increasing patient numbers, higher patient expectations, multiple subspecialty medical care teams, teaching activities, and ongoing research. Most patients must spend long periods of time waiting. Some patients even have to go the hospital a couple of times before receiving any specific treatment for their diseases. This has resulted in a huge negative impact on both patients and their families (Naaz & Mohammed, 2019). It also affects doctors, nurses, and other medical providers (Luther et al., 2017; Rosenberg & Mechatie, 2018). The oncology outpatient clinic is usually run until late and often overtime.

Thus, to improve waiting times while maintaining the quality of care, we have applied the Lean management system (Lean) to focus on improving the value of healthcare services and minimizing waste. Lean is a principle-based management system for continuous quality improvement, originally derived from the Toyota Production System, which has been applied to healthcare to enhance the quality and cost-effectiveness of services. Important performance indicators of a Lean organization in a healthcare system include the waiting time and repeat visits (Young et al., 2004).

Using our in-house electronic medical records (EMR), Songklanagarind Hospital utilizes scheduled appointment slots to avoid overbooking patients per clinic session. However, the problem of overcrowding in the oncology clinic due to a large number of patients with cancer and a suboptimal number of attending oncologists remains unresolved. Thus, to improve the ordinary appointment system, we introduced a new appointment scheduling system in September 2015. In this system, a dedicated staff reviews the medical history of new patients, the necessity for preliminary blood tests, and their appointments with other clinics. Staff members inform the patient regarding blood draws upon arrival at the clinic that day and obtain their blood test results, which are then processed before the doctor consultation (Figure 1). In addition, staff then reschedules appointments for the same date with other clinic or for the treatment start date. In some cases, staff contacts patients to obtain the preliminary investigations from other hospitals, in order to reduce the number of visits and free up appointment slots for other patients.

The most important expected benefit of the proposed appointment scheduling system is expected to be significantly beneficial as it will reduce patient waiting time in the oncology clinic and minimize repeated visits of new patients. Thus, this study aims to evaluate the efficacy of the different appointment scheduling systems as a means of reducing patient waiting time, which might lead to an increase in capacity and efficiency of the oncology outpatient clinic at a tertiary hospital.

Methodology

Study Design

This study was a retrospective cross-sectional study conducted among patients attending the oncology outpatient clinic at Songklanagarind Hospital, Hat Yai,

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Songkhla, Thailand, between January 2015 and December 2017. The data were extracted from the EMR by the Division of Digital Innovation and Data Analytics (DIDA), Faculty of Medicine, Prince of Songkla University. We included all patients aged ≥18 years old who visited the oncology outpatient clinic during the data collection period. The electronic medical record was reviewed retrospectively. The data were collected and entered in Microsoft Excel version 2019.

Outcomes

In this study, the outcome measured was the waiting time before and after the initiation of an appointment scheduling system in the oncology outpatient clinic. Waiting time was defined as "the time that the patient waits for services in the oncology clinic per visit" and was measured from the time the patient registered at the oncology clinic to the time the patient left the clinic. Captured data included the following time points: T0, time of registration at the oncology clinic; T1, time of blood obtained; T2, time of blood results reported; T3, time of attendance by an oncologist; and T4, time of discharge from the clinic. The waiting times for each process were collected for individual patients as follows: waiting time before blood obtained (T1–T0), waiting time before receiving blood test results (T2–T0), waiting time before consulting doctor (T3–T0), and total waiting time in the oncology clinic (T4–T0). We have also recorded the number of visits that occurred before the patient received anticancer treatment (Figure 1).

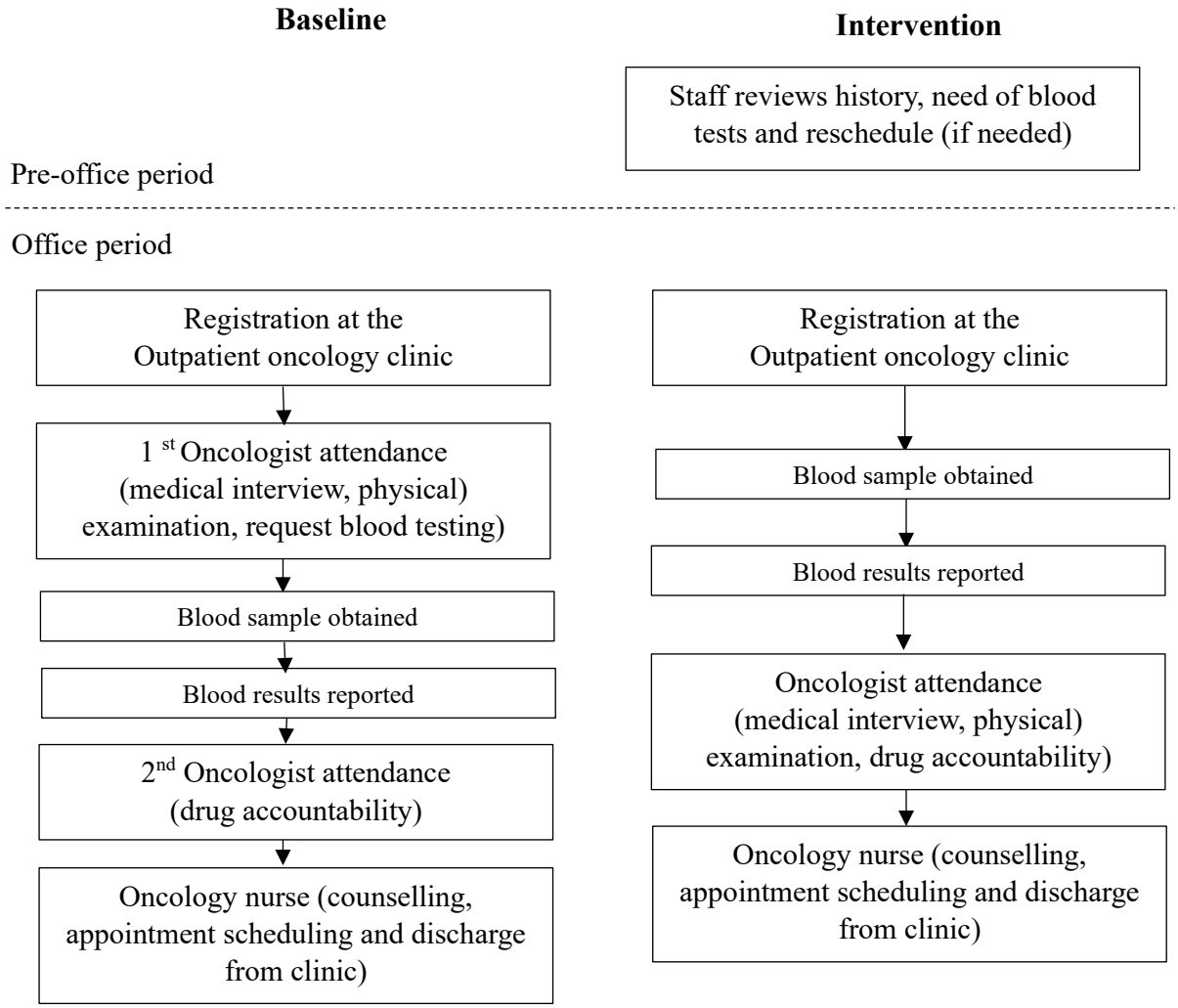

Figure 1. Schema of the oncology outpatient clinic flow in the new patient group.

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Data Collection and Measurements

The measurement process of our in-house EMR captured the occurrences of events as discrete time points within each patient's visit. These data were automatically recorded when the patients were contacted at each service point. The captured data were validated and maintained in a computerized database for analysis.

Statistical Analysis

We performed statistical analyses using R program version 4.1.1 (R Core Team (2021), n.d.). Descriptive statistics were used in this study. Continuous data were presented as medians and interquartile ranges (IQR). The Wilcoxon rank-sum test was used to test the differences in waiting time between groups. Chi-square was used to test the difference in categorical variables between groups. The level of statistical significance was set at $p < 0.05$.

Ethical Considerations

This study was approved by the Ethic Committee on Human Research (Ref No. REC 60-165-14-1) of the Faculty of Medicine, Prince of Songkla University, in accordance with the principle of the Declaration of Helsinki and the International Conference on Harmonization in Good Clinical Practice. No personal data were collected in this study. All information with regard to the patients' personal identification was concealed. The analyses were performed on aggregated data.

Results

In total, 4,124 patient visits were included in this study. Most were follow-up visits (3,127 visits), and the remainder were new patients (997 visits) who attended the oncology clinic for the first time. Among these new patients, 464 patients were in the preintervention period (baseline), whereas 533 patients were in the postintervention period.

After the new appointment scheduling system was introduced, the average waiting time of the new patient group was noted to decrease significantly [time to blood drawn (59.5 vs 152 minutes, $p < 0.001$), time to blood test reported (134 vs 228 minutes, $p < 0.001$)], except for the time to doctor consultation (162 vs 135 minutes, $p = 0.33$), because patients in the intervention group had their blood tests processed before the doctor consultation. However, this difference was not statistically significant (Table 1).

Table 1 Average waiting time baseline and after the intervention period

Waiting time	Average waiting time (minutes)					
	New patients			Follow-up patients		
	Baseline (n = 464) Median (IQR)	Intervention (n = 533) Median (IQR)	*P*-value [a]	Baseline (n = 1,456) Median (IQR)	Intervention (n = 1,671) Median (IQR)	*P*-value [a]
Before blood drawn	152 (102.5–222)	59.5 (32–118)	<0.001*	97.5 (57.5–202)	59 (25–85.5)	<0.001*
Before blood test reported	228 (183–287.5)	134 (39.2–192.8)	<0.001*	67 (44–108)	62 (39.5–90)	<0.001*
Before doctor consultation	135 (58.2–271)	162 (66–264.5)	0.33	144 (50–252.5)	81 (26–161)	<0.001*
Total waiting time	361 (218.2–454)	293 (217–375)	<0.001*	213 (113–332)	122 (53–217)	<0.001*

[a] Wilcoxon Rank sum test. * Statistical significance (*P*-value < 0.05)

During the preintervention period, the average total time spent of the new patient group in the oncology clinic was 361 minutes (approximately 6 hours; IQR 218.2–454) from the time the patient arrived until discharge from the clinic. However, the average total time was significantly reduced to 293 minutes (approximately 5 hours; IQR 217–375) during the postintervention period ($p < 0.001$; Table 1 and Figure 2).

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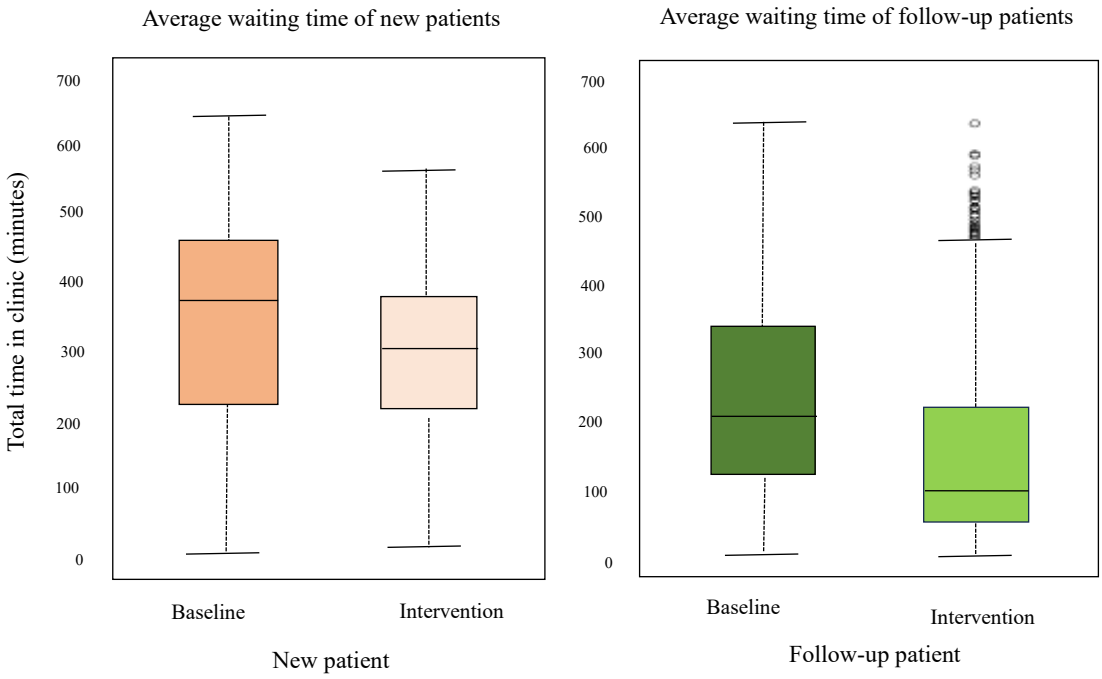

Figure 2. Average total time of each patient group spent in the oncology clinic at baseline and after the intervention period

After the introduction of the new appointment scheduling system, the average waiting time was significantly reduced at all time points in the follow-up patient group (Table 1). After the intervention, patients went to their doctor consultation at 81 minutes after registration (IQR 26–161), as compared with 144 minutes (IQR 50–252.5) in the preintervention period ($p < 0.001$). Likewise, after the intervention was introduced, the average total time spent in the clinic was 122 minutes (approximately 2 hours; IQR 53–217) as compared with 213 minutes (approximately 3.5 hours; IQR 113–332) before the intervention ($p < 0.001$; Figure 2).

Among the follow-up patient group, 58.7% of patients spent more than 3 hours in the oncology clinic before the new appointment scheduling system was introduced, as compared with 33.4% of patients after its implementation (Table 2). However, no significant difference was observed in the new patient group ($p = 0.93$).

Table 2 Overall waiting time in the oncology clinic

	New patients		*P*-value [a]	Follow-up patients		*P*-value [a]
	Baseline, n (%)	Intervention, n (%)		Baseline, n (%)	Intervention, n (%)	
<3 hours	89 (19.2)	100 (18.8)	0.93	600 (41.3)	1,112 (66.6)	<0.001*
>3 hours	375 (80.8)	433 (81.2)		853 (58.7)	557 (33.4)	

[a] Chi-square. * Statistical significance (*P*-value < 0.05)

In the new patient group, the median number of visits before starting anticancer therapy was two visits before implementation of the new appointment scheduling system (IQR 1–2) compared with one visit after its implementation (IQR 1–2; $p < 0.001$). In the preintervention period, 75.4% of new patients received anticancer treatment within two visits, which increased to 97% in the postintervention period ($p < 0.001$; Table 3).

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Table 3 Number of visits before receiving anticancer treatment among the new patient group at baseline and after the intervention period

Number of visits	Baseline, n (%)	Intervention, n (%)	*P*-value [a]
1–2	350 (75.4)	517 (97)	<0.001
≥3	114 (24.6)	16 (3)	

[a] Chi-square. * Statistical significance (*P*-value < 0.05)

The interventional appointment scheduling system was also noted to significantly reduce the average total OPD time by 11.4% as compared with conventional patient scheduling (Table 4). The average total OPD time during the preintervention period was 587 minutes (9 hours 47 minutes; IQR 550.8–627), and it was significantly reduced to 520 minutes (8 hours 40 minutes; IQR 483–555.5) in the postintervention period ($p < 0.001$).

Table 4 Average clinic time at baseline and after the intervention period

Average clinic time (minutes)		*P*-value [a]	Percent decrease
Baseline Median (IQR)	Intervention Median (IQR)		
587 (550.8–627)	520 (483–555.5)	<0.001	11.4

[a] Chi-square. * Statistical significance (*P*-value < 0.05)

Discussion

The waiting time in an outpatient clinic has been identified to be an important indicator of the efficiency of the health facility and is also related to patient satisfaction (Al-Harajin et al., 2019). A long waiting time can have a huge negative impact on both patients and families, for example, in terms of stress, frustration, traveling costs, reduction in adherence, and so forth (Hamel et al., 2014). In addition, it also affects doctors, nurses, and other medical providers. Extended work shifts are associated with increased physical fatigue, exhaustion, and lower quality of care (Luther et al., 2017). Thus, reducing waiting time can lead to an enhancement in outpatient clinic circulation, improvement in patient satisfaction, and better performance of medical personnel. Therefore, projects that aim to improve waiting time are justified primarily by the reduction in waiting time and number of visits required before starting treatment.

Measuring patient wait time allows for determining and monitoring the effectiveness of the clinic's performance. The Patient's Charter of the United Kingdom (UK) Government recommends that all patients must be seen within 30 minutes of their appointment time (Lee et al., 2022). In this study, although a statistically significant reduction in waiting time was accomplished using the new scheduling system, we have not yet met the 30-minute recommendation. Long patient waiting times are common in health facilities in developing countries. Several studies have shown that patients often spend 2 to 4 hours in the outpatient clinic before a consultation with their physician (Biya et al., 2022).

In the tertiary clinic setting, common reasons for the long waiting time include a large number of patients, the complexity of disease, and an insufficient number of attending physicians. Highly specialized clinics can have various challenges that require different interventions to overcome these contributing factors. Previous studies have shown that an appropriate scheduling system improved the patient waiting time, for example, a staggered appointment system that is based on expected consultation time (Barlow, 2002; Hong et al., 2013; Su & Shih, 2003). However, there is no standard guideline on the most optimal consultation time. Therefore, to achieve the standard of

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care with an appropriate waiting time, the scheduling system should be adjusted to the requirements of health facilities and the type of patients attending the clinic.

We have designed a new scheduling system to overcome these challenges. In this study, we demonstrated that the new appointment scheduling system can improve the quality of outpatient care by reducing waste in the form of waiting time and unnecessary repeated visits. An insufficient number of attending staff is a known factor for lengthy waiting times in outpatient clinics (Oche & Adamu, 2013). To minimize this confounding factor, we retrospectively collected patient data between January 2015 and December 2017, on account of the same two oncologists attending the outpatient clinics during this period. Although the number of patient visits was higher in the postintervention period, the total waiting time was decreased significantly among both new patients and follow-up patients. In addition, the average total clinic time was also significantly reduced after implementing the new scheduling system. These results thus reflect the effectiveness of the new scheduling system in terms of reducing waiting time in an oncology outpatient clinic at our institute.

From our results, appropriately scheduling new patients can have an influence on the waiting time of follow-up patients as well. After implementing the new scheduling system, the waiting time of the follow-up patients was significantly reduced at all service time points. In addition, a significantly greater number of follow-up patients spent less than 3 hours in the clinic compared with the preintervention period. As a result of reducing patient waiting time, the total clinic time was shortened, despite the higher number of patients in the postintervention period. This was probably due to the better sequence of patients in a clinic session and an improvement in service flow within the clinic. In addition, the application of the new scheduling system has also significantly reduced the number of visits required before initiating anticancer therapy.

This study also reflected the overcrowding oncology outpatient clinic in the referral hospital and the insufficient number of specialists in a real-world situation. An ordinary solution usually depends primarily on adding additional human workers. By improving the scheduling system, a more effective flow can reduce patients' waiting time without adding any human resources in the clinic. A key strength of this study was the accurate time recorded by the computerized EMR. However, the limitations of this study are as follows: First, there were no data on patient and medical personnel satisfaction. The doctor consultation time was also not included in the study. In addition, we did not report the nonattendance rates of new cases. Finally, this study did not include the time required for bill payment, medication pickup at the pharmacy, or chemotherapy administration. Thus, further studies are needed to assess patient satisfaction with clinic services and the duration of waiting time as well as the satisfaction of medical personnel regarding improving their services to patients.

Overall, the findings of this study suggest that the new appointment scheduling system in our oncology outpatient clinic based on using existing capacity (structure and personnel) more effectively and improving schedule planning resulted in a reduction in OPD waiting time. This finding has several implications for both OPD practice and hospital operations.

Conclusions

An appointment system with adaptive decision-making is able to decrease OPD waiting time and clinic overtime. Hence, we propose the implementation of this appointment scheduling system in oncology outpatient clinics.

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Conflict of Interest

The authors declare no potential conflict of interest.

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Factors Predictor and Self-care Behavior for Urinary Incontinence among the Elderly Females in Khon Kaen Province, Thailand: Cross-sectional Study

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Abstract

The purposes of this research were to study the factors predicting Urinary Incontinence (UI) and self-care behavior in caring for UI among elderly females. Explained using Orem's Self-Care Theory. The sample group consisted of 288 elderly female living in Daeng Yai Sub-district, Mueang District, Khon Kaen Province. Multistage sampling was conducted using a demographic interview form, screening form, factors that cause UI form, and self-care behavior in caring for UI in elderly females' form. Also, reliability by Kuder-Richardson20 (K-R20) equals 0.89 and Cronbach's alpha coefficient equal to 0.90 and 0.87 respectively. Data were analyzed using chi-square (Z^2), Pearson product-moment correlation coefficient, and stepwise multiple regression.

The results showed that factors predicting UI in elderly females include pelvic muscle exercise, exercise, constipation, environmental barriers, water intake, and activities. The overall self-care behavior of caring for UI among elderly females was at a moderate level. When considering each dimension, UI self-care behavior was moderate for overall prediction, behavioral changes, and self-care performance. This factor predicted the occurrence of UI in elderly females by 56.1% (R^2=0.561, F= 4.053, p=0.05). Health policymakers should develop and implement strategic plans for UI in health setting services to screening and establish a more effective and efficient model of care.

Keywords: Self-care behavior, Urinary incontinence, Elderly female, Predictor

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Introduction

UI is commonly found in the elderly or also known as "Giant geriatric syndrome" (Morley, 2017) affects physical, mental, social and economic cystitis, social activity limitation, daily routine limitation, low self-valued (World Health Organization, 2017), low quality of life, the risk for an accident, abnormal sleep behavior and depression (Eshkoor, Hamid, Shahar & Mun, 2017).

For Thailand, especially regarding the health of Thai people the 6th time found that Thai population aged 60 years and over seen to have UI 24.4 % (Ekphakorn, 2021) found in elderly females in the Ban Phru community, Songkhla Province 21.3-30% (Fumaneechote & Phakthongsuk, 2017) found in the elderly Na Siew Subdistrict, Mueang District, Chaiyaphum Province 20.8% (Chompoowisate, Laokhompruttajarn & Laokhompruttajarn, 2022) found Natan Subdistrict, Tha Khan Tho District, Kalasin Province 44.4% (Rattanawisai, Srichaikul & Songkhasri, 2017).

Factors related to UI that can be modified include overweight, environmental barriers, alcohol and caffeine intake, smoking, exercise (Padungkul & Mantangkul, 2017), pelvic floor weakness (Chaisri, Sarit-apirak, Udomsubpayakul & Monomai, 2017; Radziminska, Rajek, Straczynska, Podhorecka, Kozakiewlcz & Kormatowska, 2018; Torres-Lacoma, Navarro-Brazalez, Yuste-Sanchez, Sanchez-Sanchez, Prieto-Gomez & Vergara-Perez, 2022; Zhang, Wang, Gao, Jia, Sun & Wang, 2022), and constipation (Condon, Mannion, Molloy & O'Caoimh, 2019). And factors related to UI that cannot modify include: diabetes, high blood pressure, dependence, (Padungkul & Mantangkul, 2017), Alzheimer's disease, depression (Padungkul & Mantangkul, 2017; Zhang, Wang, Gao, Jia, Sun & Wang, 2022), activity limitation (Shuo, Zhao, Shi, Wei, Xiao-long, Guan-qun et al, 2023; Zhang, Wang, Gao, Jia, Sun & Wang, 2022). However, UI in elderly females is completely different, based on the context of the population, geography, environment, society, culture, and personal traits. UI is mostly found among elderly females (Kim, Shin, Choi, Park & Lee, 2018; Saboia, Firmiano, Bezerra, Vasconcelos, Oria & Vasconcelos, 2017), and increases with advancing age (Shi, Zhao, Cui, Wang, Liu, Si et al, 2022).

Self-care for UI in elderly females was 99% to avoid smoking, 96.6% giving genital parts a proper clean, and 93% urinating before traveling or outside. Moreover, the research found that only a few elderly females who experienced the condition received appropriate treatment. Research from the Muang Ban Pru community in Hat Yai District, Songkhla Province, found that only 8% of patients received adequate consideration from doctors (Padungkul & Mantangkul, 2017).

Providing appropriate care for UI in elderly females can help prevent complications and improve the quality of life. Furthermore, the results may lead to the development of intervention programs for elderly Thai females. Policymakers should consider modifying UI preventive recommendations for this population after identifying the obstacles they experience. Thailand has become a completely ageing society (Hachanda, 2022; Watakit, 2024; Zangphukieo, 2020). This research utilized the World Health Organization (World Health Organization, 2017) and the International Continence Society (ICS) (Sultan, Monga, Lee, Emmanuel, Norton, & Santoro, 2017) adaptation of the definition concept of UI as a research tool incorporated with Orem's self-care deficit theory (Orem, 2001), which focuses on patients' ability to care for themselves as a research concept.

Utilizing Orem's self-care deficit theory to investigate the influence of self-care agency and self-care deficits, a crucial aspect of Orem's theory, on UI administration in elderly females. This may involve examining how individuals' perceptions of their ability to perform self-care behaviors impact their management strategies and adherence to treatment.

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Objectives

Current research indicates a scarcity of studies on UI in elderly females. Consequently, the main goal of this study was to investigate the factors that predict UI. The secondary objective was to study self-care behavior in caring for UI among elderly females in the Dang Yai sub-district, Muang district, Khon Kaen province.

Material and Method

Study Sample

The population comprised elderly females aged 60 years or older who were Thai nationals and registered in the Dang Yai sub-district of Muang district, Khon Kaen province. The sample consisted of 288 elderly females, who were selected by qualification participate in the study by Daniel (Daniel & Cross, 2017). The sample size was calculated to be 261 individuals, with 10% added to prevent missing or incomplete data. Therefore, the population size of this study was 288.

The sampling process involved multiple steps, beginning with dividing the population into three groups based on village size. A representative sample from each group was selected using random cluster sampling, with a ratio of 4:1. The selection process involved randomizing two villages and one town. As a result, Nong Loob Moo 4 with 86 samplings and Nong Loob Moo 10 with 78 samplings were chosen from the two villages, while Nong Loob Moo 7 was selected from the town, with a total of 124 samplings (288 samplings in total).

Inclusion criteria

Females aged 60 or above, holding Thai nationality, and residing in Dang Yai sub-district, Muang district, Khon Kaen province, were eligible for this study if they were capable of verbal communication and comprehension and provided their consent.

Exclusion criteria

Individuals who had been diagnosed with or had undergone treatment for neurological conditions such as stroke, Parkinson's disease, Alzheimer's disease, spinal cord injury, acute confusional state, depression, or had been assessed for any of these conditions, including those related to the brain or nervous system, and attended less than 80% of the research participants.

Conceptual framework

This cross-sectional descriptive research was conducted in a community context using semi-structured interviews as data collection methods. All data were included as demographic and socioeconomic factors by age, educational level, body mass index (BMI), number of normal deliveries, past career, urinate leakage, activities, environment barriers, caffeine and alcohol intake, constipation, daily water intake, urination frequency from day to night, underlying disease, pelvic muscle exercise, the amount of urine and the frequency in UI conditions and self-care behavior: Prediction, behavioral change and self-care performance by using the definition "UI" of WHO (World Health Organization, 2017) and ICS (Sultan, Monga, Lee, Emmanuel, Norton & Santoro, 2017) along with Orem self-care theory (Orem, 2001) as the concept of research tool.

Orem's self-care deficit theory (Orem, 2001) focuses on patients' abilities to care for themselves, a concept widely acknowledged in nursing. Orem elaborated on the idea of care, defining "self-care" as "the activity that a person initiates and performs in order to benefit themselves to maintain living, health and livelihood." This theoretical framework underscores the significance of individuals' ability to undertake actions that enhance their own well-being and maintain their health and quality of life.

Utilizing Orem's self-care deficit theory to explore the impact of self-care agency and self-care deficit, fundamental aspects of Orem's model, on UI management among elderly females. This approach encompasses examining how individuals' self-assessed abilities to perform self-care activities influence their UI management approaches and treatment compliance, while also developing

personalized interventions for elderly females affected by UI.

Research tools

For this research, a questionnaire with 65 questions was created and administered to the participants in an interview format. Prior to creating the questionnaire, Previous studies on UI were examined by the researchers across four databases - PubMed, SciELO, Web of Science, and Thaijo - with the keywords "UI," "underreported," "self-care behavior," and "elderly females." Utilizing the WHO (World Health Organization, 2017) and ICS (Sultan, Monga, Lee, Emmanuel, Norton & Santoro, 2017) definition of "UI" in conjunction with Orem's self-care theory (Orem, 2001) as the research concept tool. The survey was distributed across four domains as follows:

1. Demographic interview form is the initial domain involved gathering demographic information through a population-based survey to understand the general characteristics of elderly females with UI. The survey consisted of eight inquiries, including age, education, previous job, health condition, BMI, and total number of childbirths.

2. Screening UI form is the second domain that performs an initial screening for elderly females with UI, where she answered affirmatively to the initial screening queries, showing the existence of UI. Interviews were conducted in a specific order, beginning with demographic information, followed by factors-related questions, and concluding with self-care behavior inquiries. Three questions were used to adapt the definition of UI by WHO (World Health Organization, 2017) and ICS (Sultan, Monga, Lee, Emmanuel, Norton & Santoro, 2017): "Do you experience urine leakage?" "Do you have a high temperature, cloudy, or painful urine?" and "Have you encountered any urine leakage on the day of the interview?"

3. Factors associated with the UI form are the third category dealt with UI questions, focusing on factors associated with the occurrence and severity of UI in elderly females. For 27 questions from the literature review, different factors were linked with the origins of UI, such as activities, environmental barriers, caffeine and alcohol consumption, water intake, pelvic muscle exercises, diabetes, constipation, frequency of urination, and physical activity. Inquiries regarding the seriousness and regularity of UI have also been incorporated.

4. The self-care behavior form is a question of the fourth domain that specifically looks at self-care behaviors for UI among elderly females within the last 6 months or up to the present time. A modified version of Orem's self-care deficit theory (Orem, 2001) was used with 27 questions: six questions focused on prediction, four questions on changing behavior, and 17 questions on self-care performance. Participants were asked to rank their responses from "highest" to "lowest" using a 5-point Likert scale.

Data collection

The initial phase of data collection involved training three healthcare providers to conduct interviews with the elderly females. The training covered standard procedures, questionnaire content, and interview skills, until the providers were confident. The interviewers underwent an evaluation to determine their suitability for conducting the field interviews. The elderly females who were selected were interviewed in person at their residences by a researcher or experienced interviewers. All participants were selected using random cluster sampling and there was no invitation to join the sample group. If an individual is unable to read or write, their fingerprints will be imprinted on the consent form. While conducting the interviews, the interviewers discussed the study's goals and the questionnaire with elderly females. Furthermore, elderly females needed to comprehend the objectives of the research, as they were required to respond personally to the survey. Participants were only included in the study if they responded "Yes" to the initial screening question, "Do you experience urine leakage?" If the respondent did not respond affirmatively, the question was not considered.

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After saying "yes" to the question mentioned earlier, participants were required to fill out three forms relating to UI: demographic characteristics, factors related to UI, and self-care behavior questionnaires.

Reliability

To ensure consistency of content, interviews were conducted with five experts to verify content consistency, evaluate the consistency index, and choose questions with a consistency index of 0.6 or higher to be included in the questionnaire. This study determined the conviction rate by surveying 30 elderly females who matched the same criteria as the samples in the Sila Sub-district. The Kuder-Richardson20 (K-R20) showed a screen conviction rate of 0.89, with a Cronbach's alpha coefficient of 0.90 for UI-related questionnaire factors and 0.87 for elderly females' UI self-care behavior questionnaires.

Data analysis

This research utilized the IBM SPSS Software trial version 22 was used to analyze the data. It included distributing frequency, percentage, standard deviation, measures of association for categorical variables with chi-square (Z^2), measures of association for continuous variables with Pearson product-moment correlation coefficient, and prediction testing with stepwise multiple regression analysis at 0.05.

Ethics Statement

This study was certified by the National Ethics Committee Accreditation System of Thailand (NECAST) of Northeastern University on December 15, 2023, Number of COA 018/2566, Project No. 023/66. Moreover, this study worked according to Helsinki's ethical principles only when the samplings verbally volunteered and signed the study contract before participating in the research.

Results

The population-related data of the samplings in the community shows the data of 94 elderly females who had UI which found the average age at 72.48 years (standard deviation (S.D.) =7.71, Min.=62, Max.=89): 61.7% of elderly females aged between 60 and 69 years and 21.3% of elderly females aged 70–79 years. These elderly females mostly had the highest education at 95.7% of primary school and 97.9% who did a lot of heavy lifting, minority had underlying disease (31.9%) such as hypertension (18.1%), diabetes (13.8%), and mostly having between 25.0 kg/m2 and 29.9 kg/m2 of BMI (91.5%), 2.54 times in average of elderly females who experienced more than two times of normal delivery (S.D.=1.22, Min.=0, Max.=8), and almost half of the samples had experienced 2 times of normal delivery twice (46.8%) (Table 1).

Table 1 Demographic profile of the respondents (n=94) (Source: Original Research Data)

Demographic profile of the respondents	Number (Percentage)
Age (Mean=72.48, S.D.=7.71, Min.=62, Max.=89)	
60–69 Years	58 (61.7%)
70-79 Years	20 (21.3%)
80-89 Years	16 (17.0%)
Education level	
Primary school	90 (95.7%)
High school	4 (4.3%)
Past career	
Labor	92 (97.9%)
No	2 (2.1%)

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Demographic profile of the respondents	Number (Percentage)
Underlying disease	
Hypertension	17 (18.1%)
Diabetes Mellitus	13 (13.8%)
No	64 (68.1%)
Body mass index	
23–24.9 kg/m2 (overweight)	8 (8.5%)
25–29.9 kg/m2 (obesity class 1)	86 (91.5%)
Number of normal deliveries (Mean=2.54, S.D.=1.22, Min.=0, Max.=8)	
2 times	44 (46.8%)
3 times	26 (27.7%)

Factors related to UI in elderly females

Table 2 shows the factors related to UI in elderly females as follows: pelvic muscle exercise (r=0.676, p<0.001), exercise (r=0.587, p<0.001), constipation (r=0.566, p<0.001), environmental barriers (r=0.518, p<0.001), water intake (r=0.421, p<0.001), and activities (r=0.311, p=0.002) at a significance level of 0.05. The model explained that the overall prediction success rate was 56.1%.

Table 2 Factors related to UI in elderly females (n=94) (Source: Original Research Data)

Variables	Unstandardized Coefficients		Standardized Coefficients	t	p-value
	B	Std. Error	Beta		
Pelvic muscle exercise	0.123	0.052	0.564	9.464	<0.001*
Exercise	0.438	0.092	0.353	7.752	<0.001*
Constipation	0.231	0.066	0.357	6.492	<0.001*
Environmental barriers	0.176	0.042	0.096	1.906	<0.001*
Water intake	-0.147	0.039	0.348	7.577	<0.001*
Activities	0.137	0.034	0.157	3.088	0.002*

Constant=1.398, R=0.583, R^2=0.561, p-value<0.05

Self-care behavior for UI among elderly females

Table 3 shows self-care behaviors for UI among elderly females. Overall, it was moderate (mean=2.96, S.D.=0.14). Specifically, the overall prediction was moderate (mean=3.38, S.D.=0.32), and found that the top four self-care prediction behaviors were as follows: the highest was not in a place with cigarette smoke at 98.9% (mean=4.99, S.D.=0.10) followed by avoidance of constipation (89.4%; mean=3.90, S.D.=0.33), control body weight of 88.3% (mean=2.99, S.D.=0.34), and no water intake for 2 hours before sleep was 63.8% (mean=2.31, S.D.=0.61).

The overall behavioral change was moderate (mean=2.68, S.D.=0.37). The highest was checking the nearest route to the restroom, 75.5% (mean=2.83, S.D.=0.45), checking the location of the nearest restroom before going was 74.5% (mean=2.82, S.D.=0.51), trying to stay close to the restroom at 71.1% (mean=2.71, S.D.=0.45), and did not go out at 51.1% (mean=1.67, S.D.=0.87).

Furthermore, overall self-care performance was moderate (mean=3.02, S.D.=0.11). The highest is hurry to the restroom, at 98.9% (mean=4.42, S.D.=0.15), urinate in advance 97.9%

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(mean=4.30, S.D.=0.46), change to new clothes when wet with urine at 96.8% (mean=4.04, S.D.=0.15), and meditating at 68.1% (mean=4.01, S.D.=0.47).

Table 3 Self-care behavior for UI among elderly females on prediction, behavioral change and self-care performance (n=94) (Source: Original Research Data)

Self-care behavior	Level Number (Percentage)					Mean	S.D.
	Lowest	Low	Moderate	High	Highest		
Prediction (Mean=3.38, S.D.=0.32)							
1. Not in a place with cigarette smoke	0	0	0	1 (1.1)	93 (98.9)	4.99	0.10
2. Avoiding constipation	0	0	10 (10.6)	84 (89.4)	0	3.90	0.33
3. Controlling body weight	0	6 (6.4)	83 (88.3)	5 (5.3)	0	2.99	0.34
4. No water consuming for 2 hours before sleep	4 (4.3)	60 (63.8)	27 (28.7)	3 (3.2)	0	2.31	0.61
Behavioral change (Mean=2.68, S.D.=0.37)							
1. Checking the nearest route to the restroom	0	23 (24.5)	71 (75.5)	0	0	2.83	0.45
2. Checking the location of the nearest restroom before going out Behavioral change	1 (1.1)	19 (20.2)	70 (74.5)	4 (4.3)	0	2.82	0.51
3. Trying to stay close to the restroom	0	27 (28.7)	67 (71.1)	0	0	2.71	0.45
4. Do not going out	48 (51.1)	37 (39.4)	1 (1.1)	8 (8.5)	0	1.67	0.87
Self-care performance (Mean = 3.02, SD = 0.11)							
1. Hurry to the restroom	0	0	0	93 (98.9)	1 (1.1)	4.42	0.15
2. Urinate in advance time	0	0	0	92 (97.9)	2 (2.1)	4.30	0.46
3. Change into new clothes when wet with urine	0	0	1 (1.1)	91 (1.1)	2 (2.1)	4.04	0.15
4. Meditating	0	0	0	64 (68.1)	30 (31.9)	4.01	0.47

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Discussion

A study on the predictive factors and self-care behavior for UI among elderly females in Khon Kean province, Thailand, discussed the results as follows:

1. The study found factors related to UI in elderly females as follows: Pelvic muscle exercise, exercise, constipation, environmental barriers, water intake, and activities, which is related to pelvic muscle exercise (Chaisri, Sarit-apirak, Udomsubpayakul & Monomai, 2017; Radziminska, Rajek, Straczynska, Podhorecka, Kozakiewlcz & Kormatowska, 2018; Torres-Lacoma, Navarro-Brazalez, Yuste-Sanchez, Sanchez-Sanchez, Prieto-Gomez & Vergara-Perez, 2022; Zhang, Wang, Gao, Jia, Sun & Wang, 2022), activities limitation (Chompoowisate, Laokhompruttajarn, Laokhompruttajarn, 2022; Shuo, Zhao, Shi, Wei, Xiao-long, Guan-qun et al, 2023; Zhang, Wang, Gao, Jia, Sun & Wang, 2022), water intake, environmental barriers (Padungkul & Mantangkul, 2017), constipation (Condon, Mannion, Molloy & O'Caoimh, 2019), and exercise (Padungkul & Mantangkul, 2017; Zhang, Wang, Gao, Jia, Sun & Wang, 2022), limitation of some activities that obstruct the elderly from walking to the restroom and urinating on their clothes unintentionally, and inappropriate environment (Chompoowisate, Laokhompruttajarn, Laokhompruttajarn, 2022; Padungkul & Mantangkul, 2017).

Factors predictor influence self-care behavior for UI among elderly females on prediction where avoidance of constipation was 89.4% and no water intake for 2 hours before sleep was 63.8%. Regarding behavioral change, checking the nearest route to the restroom was 75.5%, checking the location of the nearest restroom before going was 74.5%, and trying to stay close to the restroom was 71.1%. The self-care performance was hurry to the restroom 98.9% and urinate in advance 97.9%. Self-care behaviors for UI in elderly females were influenced by several factors including constipation, environmental barriers, water intake, and activities. But elderly female often neglects pelvic floor exercises and exercise as part of their self-care regimen.

These results may increase awareness and focus on the perineal area in elderly females. They should not feel embarrassed despite the fact that discussing genitalia is uncommon in Eastern cultures. Moreover, the outcomes of this study suggest improvements in self-care routines and interventions that incorporate exercises for the pelvic floor muscles. These exercises have proven effective in strengthening the muscles of the pelvic floor and in reducing UI.

2. Self-care behavior for UI among elderly females that overall prediction showed a moderate overall prediction. The top four self-care behaviors were as follows: not in a place with cigarette smoke, avoiding constipation, controlling body weight, and not consuming water for 2 hours before sleep. They found that the prevention of UI is related to avoiding smoking and constipation (Padungkul & Mantangkul, 2017).

For overall behavioral change at a moderate level, it was found that the top four highest averages of UI self-care behavior for UI among elderly females were as follows: checking the nearest route to the restroom, checking the location of the nearest restroom before going out, trying to stay close to the restroom, and not going out, who stated that the elderly should prepare the nearest route to the restroom (Chompoowisate, Laokhompruttajarn & Laokhompruttajarn, 2022; Padungkul & Mantangkul, 2017). A pelvic floor muscle exercise program tailored to elderly females and supervised by professionals can help improve UI symptoms (Torres-Lacoma, Navarro-Brazalez, Yuste-Sanchez, Sanchez-Sanchez, Prieto-Gomez & Vergara-Perez, 2022).

Moreover, overall self-care performance was at a moderate level, with the top four highest averages of UI self-care behavior for UI among elderly females being as follows: Hurry to the restroom, urinate in advance time, change into new clothes when wet with urine, and meditating, Research had discovered that the most frequent method used

to help people with UI involves quickly going to the restroom when they feel the urge to urinate, promptly cleaning their body if it gets wet with urine, and changing into fresh clothing (Chompoowisate, Laokhompruttajarn, Laokhompruttajarn, 2022; Padungkul & Mantangkul, 2017; Murukesu, Singh & Shahar, 2019).

Results present significant challenges for healthcare providers and policymakers of Khon Kaen Province for decrease prevalence of UI. They also have implications for policymakers responsible for developing early screening protocols for UI risk factors in elderly females and establishing self-care UI, aimed at facilitating early prevention. Healthcare providers in hospitals, medical centers, and community settings must implement UI screening for early detection and provide guidance on self-care behaviors for those experiencing UI.

Research exploitation and recommendation

To improve the quality of healthcare services and provide valuable insights for UI caring, it is important to investigate the UI user interface experience among the elderly females, particularly in the context of rapidly aging populations. Additionally, health policymakers should develop and implement strategic plans for UI in health setting services to establish a more effective and efficient model of care. Lastly, it is essential to examine UI in both men and women across all healthcare facilities, nursing home, and including community settings.

Limitation

The knowledge gained from this study revealed factors related to UI in elderly females and self-care behaviors for UI among elderly female. Factors related to UI in elderly females in six dimensions are pelvic muscle exercise, exercise, constipation, environmental barriers, water intake, and activities. Self-care behavior for UI among elderly females moderate overall in terms of prediction, behavioral change, and self-care performance. However, this study had certain limitations. It only focused on elderly females living in the Dang Yai Sub-district, Muang District, Khon Kaen Province. Therefore, the findings cannot be applied to all of Thailand or other countries. Additionally, the research was cross-sectional, with a majority (61.7%) of participants falling into the young-to-middle-aged category. Most of the elderly experienced vision impairment and hearing difficulties, and the majority (95.7%) attained primary education. This resulted in a bias in the information gathered during data gathering. Nevertheless, the elderly females who were chosen participated in face-to-face interviews and were provided with clear reading assistance by researchers before completing the questionnaire independently.

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The Development of a Construction of Life and Careers Skills Instrument Based on the 21st Century for Nursing Students at Praboromarajchanok Institute

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Abstract

Background: Regarding teaching and learning management, the purpose of creating the nursing program is to produce effective professional nursing students who meet the healthcare service and system. Professional nurses are required with proper knowledge, innovation, information, media, and technology, including life and careers skills for working through current society. The research objectives were 1) To examine and validate the confirmatory factors, and 2) to study the results of the construction of a life skill instrument that is based on the 21st Century in Life and careers skills. **Methods:** This study was a descriptive research design. Three hundred and sixty nursing students who are 2nd, 3rd, and 4th-year students enrolled at Praboromarajachanok Institute by random sampling from 27 Boromrajonani College of Nursing in Thailand. The research instruments were the construction of life skills questionnaires comprising 5 elements. The research data were analyzed using frequency, mean, standard deviation, and CFA. **Results:** The results represented that the Model is related to the evidence-based 5 elements of life and careers skills. Furthermore, careers represented the standard estimated of an observed variable total of 40 variables between 0.75 – 0.91. Chi-square 781, df 617, relative Chi-square 1.26, $p < .001$, RMSEA 0.02, SRMR 0.020, TLI 0.98. **Conclusion:** Nursing educational institutions should play an important role in producing new registered nurses with soft skills as a qualification, especially focusing on Life and careers skills that can show that the nurse can confront any problem properly. The development of this instrument can guide nursing educators to assess nursing students to identify their strengths and weaknesses. Allowing them to improve their competency before graduation, especially can help nursing educators to prepare the nursing students for entering the nursing profession on the right track. It enables concrete monitoring of nursing students' progress and can be used to regulate the curriculum and teaching methods. This also helps nursing educators to create a plan appropriately that supports supplementary curriculum activities for further educational development.

Key Words: Life and careers skills, 21st Century, Nursing students

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Introduction

Presently, Thailand has undergone rapid changes in the 21st century that affect the way of life for Thai people, as well as the ways of consumer culture, morality, and ethics. It leads to modifications in the health conditions of the Thai people as a whole picture. A professional nurse is a vital worker to a healthcare team in providing nursing care to people. Accordingly, nurses should stay concerned and keep up with health industry changes in the health industry. The main objective of each nursing educational institution is to produce effective professional nurses, it implies that the development of teaching and learning management is needed.

According to Boromrajonani College of Nursing, covered by Praboromarajachanok Institute, each place offers a Bachelor of Nursing Science program that focuses on integrating knowledge to practice in a realistic environment as if at the hospital, health service organization, or community. A nursing career is to work effectively based on compassionate care, morality, and professional ethics by creating teaching and learning arrangements according to the curriculum. Adding extracurricular activities that focus on the student-centered and based on Sufficiency Economy Philosophy (SEP). Producing effective nurses who characterize professions and provide humanized health care services according to the standards of the Thailand Nursing and Midwifery Council (Thailand Nursing and Midwifery Council, 2023).

Moreover, continuously developing the quality of students and building the recipients' confidence through an educational service. There are 3 desirable graduate characteristics specified that consist of 1) a nursing career aspect that emphasizes nursing knowledge and holistic nursing care based on various integrated sciences, expertise, and competency in health promotion and knowing how to use research processes. 2) International competency, promoting nursing students' English language skills, critical thinking, communication, and public relations. Additionally, nursing students should keep up with social changes and be aware of leadership principles, perform appropriate personalities, and be good role models. 3) Life skills aspect, nursing students should be aware of the value of oneself, including other people and the environment, especially emphasizing morality and ethics in living life.

Various aspects and approaches can help educational institutions generate professional nurses with desirable graduated characteristics that are consistent with learning skills in the 21st century, such as critical thinking, problem-solving, collaboration, and teamwork skills (Armpat et al., 2018).

There will be teaching and learning styles that focus on promoting students to enhance their analytical thinking and ability to solve problems effectively by establishing learning experiences for nursing students, so that nursing students can gain their nursing knowledge, improve their nursing skills, and progress the capability for making decisions correctly, according to the principles and can solve the problems carefully together with a multidisciplinary team to retain health service effectively and safely.

According to Learning Skills Model from the partnership for 21st century network (P21), focuses on providing adolescents with knowledge and skills for living in the 21st century, which is globalization. It involves 3 main concepts as follows: 1) Learning and innovation skills, 2) Information, media, and technology skills, and 3) Life and careers skills (Tuntirojanawong, 2017). The main conceptions of aspects 1 and 2 are hard skills, which are knowledge and skills used at work. The third main conception is soft skills. This is significant to work, particularly in the nursing profession, which works with clients as a "human" who have a variety of ages, maturity levels, emotions, and environments. Acquiring soft skills requires experience in practice, action, and learning that will support students to graduate with crucial nursing skills in various fields and be ready to accomplish their professions efficiently. Regarding life

and careers skills, focusing on giving people the ability to be flexible and adaptable. Knowing life goals and determination, understanding society, and accepting cultural differences. Furthermore, having production potential and accepted required inspection if needed, as well as having leadership and responsibility (Sangprateeptong, 2018)

Life and careers skills according to 21st century concepts comprise 1) flexibility and adaptability, 2) initiative and self-direction, 3) social and cross-cultural, 4) productivity and accountability, and 5) leadership and responsibility (Nokkaew & Mankong, 2021). Skills in this area will make nursing students more knowledgeable, indicating, practicing, and knowing how to restrain themselves. Additionally, a person with life skills will be reasonable and know how to indicate the right way of life—assisting yourself to be happy and being able to handle any problems on your own. Being able to thankfully adjust and survive in changing social conditions, also preparing for living in the future (Janjaroen & Nakaramontree, 2016). Evaluating and promoting students with proper life skills by allowing nursing students to know themselves physically, emotionally, and mentally will result in students adapting and living a happy life while studying; they can experience success through a studying path. Regarding the research study, it was found that the happiness factors in studying, learning style, and the environment that affect students' learning were significantly related to the desired graduated characteristics, based on the National Framework for Higher Education at the 0.01 level (Chantra et al., 2016). Driving the mission of producing graduates of the College of Nursing under the Praboromarajchanok Institute focuses on nursing students' life skills so that students can adapt and perform appropriate behavior within the nursing profession. Additionally, dealing with any problem effectively and studying with happiness. The researcher realizes that the life skills assessment of nursing students in the present uses the assessment based on behavioral expectations. In addition, the questionnaire is not specific to Life and careers skills based on the context of the 21st century. Therefore, the researcher developed a measurement and studied the results of Life and careers skills based on the 21st century through the concept of Life and careers skills for nursing students. Regarding the expectations, there will be an instrument to assess nursing students' life skills that can provide more relevant outcomes. Particularly, using the information obtained from the research for planning the development of nursing students that suit the context. More importantly, it is to obtain desirable graduate characteristics as professional nurses for society and the community.

Research objectives

1. To examine and validate the confirmatory factors of the Life and careers skills assessment based on the 21st century in Life and careers skills aspects for nursing students.
2. To study the results of Life and careers skills based on the 21st century according to the assessment established by the researcher.

Research hypothesis

The confirmatory factor analysis model of the Life and careers skills assessment that is based on the 21st century for nursing students developed, is consistent with evidence-based.

Conceptual framework

The confirmatory factor model and model of 21st Century Outcomes and Support System) (Rotherham & Willingham, 2009). According to the literature review, it was found that Life and careers skills have 5 components: 1) Flexibility and adaptability, 2) Initiative and self-direction, 3) Social and cross-cultural skills, 4) Productivity and accountability, and 5) Leadership and responsibility as follows:

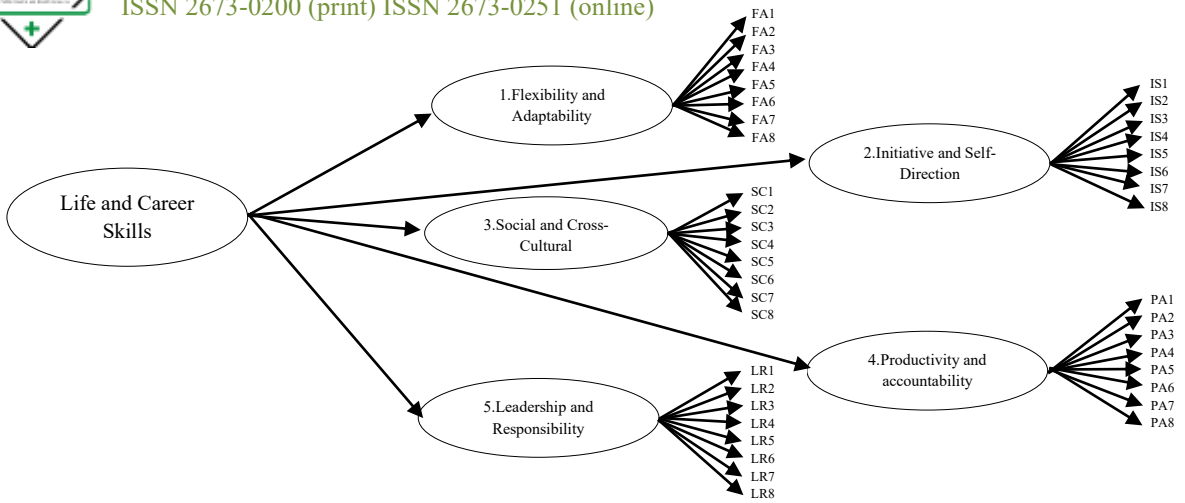

Figure I: Conceptual framework of Life and careers skills based on 21st-century concepts for nursing students

Methodology

Study Design

This study was descriptive research with a cross-sectional design for examining the confirmatory factor analysis of Life and careers skills of nursing students based on 21st century concepts. The study was conducted among 2nd - 4th year nursing students who enrolled in the Bachelor of Science Nursing program at Boromrajonani College of Nursing, Praboromarajachanok Institute; the total number of participants was 360 nursing students that met the inclusion criteria. This study used a convenience sampling method, which is a nonprobability sample from ten colleges of nursing based on the proportion of the total population. This is because participants are selected based on availability, accessibility, or proximity to the researcher. Moreover, time, resources, and access are limited for this study.

Results of Sample Size Calculation

According to Comrey and Lee (1992), the sample group using EFA/CFA should not be below 50 participants. Thus, this study used the Yamane formula for calculating the sample size for this study, the formula is:

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

Results Interpretation

Population Size (N): 3,604
Margin of Error (e): 5%
Sample Size (n): 360.04

This means that for a population of 3,604, a sample of 360 respondents is sufficient to achieve results with a 95% confidence level and a margin of error of 5%.

Research instrument

The research instrument and demographic survey were used for data collection through this study and developed by the researcher based on the conceptual framework. Using the variable definitions obtained for creating the criteria of study to determine the number of questions and proceed with generating a draft questionnaire. It involves two significant questions. The first part is about general student information. The second part is a question that examines life skills based on the 21st century concept. The main concept of Life and careers skills provides 5 elements. There are 1-5 levels of characteristics that are based on the Likert rating scale with 12 items per component, totaling 60 items. The content and language validity were proved by three experts with an IOC value was 0.60-1.00. The questionnaires were revised based on experts' recommendations and tried on 40 nursing students who met the inclusion criteria similar to a sample group. Cronbach's Alpha presented values on 1) Flexibility and adaptability (0.94), 2) Initiative and self-direction (0.96), 3) Social and cross-cultural (0.96), 4) Productivity and accountability (0.96), and 5) Leadership and responsibility (0.95), respectively.

Data analysis

The demographic data was analyzed using descriptive statistics to

describe the sample characteristics. Regarding the confirmatory factor, confirmatory factor analysis was used to validate the constructor of components. Furthermore, the mean and Standard deviation were used to analyze nursing students' Life and careers skills with the program JAMOVI version 2.4.8.

Data collection

Formulating the questionnaire in an online format by creating a QR code, preparing a letter requesting permission to collect data, and coordinating with 30 nursing colleges. Moreover, collecting, analyzing, summarizing, reporting, and publishing data were based on planning.

Research considerations

This research was considered by the research committee of Boromarajonani College of Nursing, Changwat Nonthaburi Certificate No. COE 63/014 on 6 July 2023

Research results

The study revealed that there were 138 second-year nursing students (38.33%), 117 third-year nursing students (32.51%), and 105 fourth-year nursing students (29.16%). As represented in Table 1, there were 40 empirical variables, all of which passed the conditions of the first order as a confirmatory factor analysis as follows:

Table 1: Summary of confirmatory factors analysis (first order) for observed variables of Life and careers skills indicators in each component (n 360)

Factor	indicators	b	SE	*p*	R^2
1: Flexibility and Adaptability	Indicators 1st – 8th	0.71-0.86	0.038-0.044	< .001 *	0.77-0.89
2: Initiative and Self-Direction	Indicators 9th – 16th	0.73-0.85	0.037-0.042	< .001 *	0.80-0.86
3: Social and Cross-Cultural	Indicators 17st – 24th	0.81-0.94	0.038-0.042	< .001 *	0.85-0.91
4: Productivity and Accountability	Indicators 25st – 32th	0.71-0.87	0.036-0.042	< .001 *	0.75-0.90
5: Leadership and Responsibility	Indicators 33st – 40th	0.75-0.84	0.035-0.042	< .001 *	0.83-0.87

* Mean to every indicator was significant

According to Table 1, the results showed that the empirical indicators for every component of Life and careers skills that were analyzed with the JAMOVI version 2.4.8 program received the index values for checking the consistency of the model as follows: Chi-square 1854, df 730, relative Chi-square 2.53, p <.001, RMSEA 0.06, SRMR 0.029, TLI 0.93, CFI 0.93. The index of consistency met the specified criteria were RMSEA and RMR less than 0.05, relative Chi-square more than 2, and index TLI and CFI more than 0.95 (p> .05) (Schumacker & Whittaker, 2022; Kumar, 2012). Therefore, the researcher modified the model based on the index values to check the consistency of the new model as follows: Chi-square 781, df 617, relative Chi-square 1.26, p <.001, RMSEA 0.02, SRMR 0.020, TLI 0.98, CFI 0.99. Although the calculated p-value remains <.001. Hair et al. (2019) suggested that if n > 200 and the number of observed variables > 30, significant p-values expected are acceptable values, there is no need to adjust the model until p > 0.5.

Table 2: mean and standard deviation of each component of Life and careers skills of nursing students, PBRI (n 360)

Component of life skills and career	Mean and SD of each class and total nursing students							
	Total Students		2nd year		3rd year		4th year	
	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD
1: Flexibility and Adaptability	3.57	0.95	3.55	0.85	3.56	1.05	3.61	1.05
2: Initiative and Self-Direction	3.56	0.93	3.56	0.84	3.50	1.05	3.61	1.01
3: Social and Cross-Cultural	3.76	0.99	3.76	0.87	3.73	1.11	3.79	1.11

Component of life skills and career	Mean and SD of each class and total nursing students							
	Total Students		2nd year		3rd year		4th year	
	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD
4: Productivity and Accountability	3.55	0.93	3.56	0.83	3.46	1.09	3.57	1.01
5: Leadership and Responsibility	3.63	0.94	3.64	0.84	3.54	1.09	3.66	1.01

According to Table 2, the results revealed that overall nursing students evaluated themselves in Social and Cross-Cultural aspects with the highest score ($\bar{x}$ 3.76, SD 0.99), Leadership and Responsibility ($\bar{x}$ 3.63, SD 0.94), Productivity and Accountability ($\bar{x}$ 3.55, SD 0.93), respectively. When considering the year separately, it signifies that nursing students evaluate themselves at an excellent level each year. Nevertheless, the 3rd-year nursing student had a mean average decrease. On the other hand, flexibility and adaptability aspects in 4th-year nursing students were increased. Initiative and self-direction, social and cross-cultural, productivity and accountability, and leadership and responsibility aspects were decreased in years 3 and 4.

Discussion

According to confirmatory factor analysis of the observed variable of Life and careers skills, it presented that the model was consistent with empirical data and evidence-based for all 5 components, signifying that the empirical indicators can examine Life and careers skills based on the 21st century concept. When evaluating a sample of nursing students, the average was at a good to very good level. It displayed that the curriculum design and extra-curricular activities of nursing colleges that affiliate with the Praboromarajchanok Institute covered 5 components of Life and careers skills. To respond to rapid changes in medical technology, health systems, and the increasingly complex care needs of patients are required more than before (World Health Organization, 2020, April 6). Consequently, educational institutions must produce professional nurses who have knowledge and nursing skills, especially soft skills that can provide effective nursing care to patients, including working with the healthcare team as a collaborative teamwork that can confront globalization at present (Benner et al., 2010).

Life and careers skills help professional nurses provide proper nursing care to patients and families. According to Preechakoon et al. (2021), soft skills play a significant role in teamwork, communication, and conflict management, which is especially important for guild professional nurses to work effectively with a multidisciplinary team. Also, they can reduce medical errors and improve nursing care.

Meanwhile, professional nurses who have high Life and careers skills can handle and cope with stress, especially stress management and adaptation (Thailand Nursing and Midwifery Council, 2021). Particularly, in crises such as the COVID-19 outbreak, nurses should have resilience and a lower rate of burnout. Regarding the Thai nursing rules, it must always be taken into account that good life skills have a positive effect on successful working.

Regarding five domains showed that 2nd-year nursing students had a high score on Flexibility and Adaptability skills: Year 2 average scores are at a very good level and enhanced in Year 3 and Year 4 respectively (Table 2). The decrease in the average score in Year 3 can be explained as a result of stress from adjusting to studying the subject through the curriculum: both theoretical and practical subjects that emphasize remembering, understanding, applying, analyzing, and synthesizing skills. After 1 year of study, nursing students could adjust to their studies. Particularly, less stress in 4th-year nursing students is because the style or process can help nursing students understand. Nursing students become more skilled, in analytical and critical thinking.

Currently, the context of patient care is more complex in terms of treatment, technology, and patients' expectations of service. Therefore, Life and careers skills are

important for professional nurses. For example, the COVID-19 outbreak has shown the importance of nurses' flexibility, adaptability, and capability to work under extreme pressure and stress. Nurses with good Life and careers skills can handle any situation, such as crisis care (Smith & Johnson, 2022). Moreover, it is also a feature that will continuously lead to learning other new skills. Nurses can easily adapt to new roles and have more responsibility, particularly improve their leadership skills. Therefore, educational institutions should be aware that this aspect is vital for the development of nursing students nowadays.

Regarding the Initiative and Self-Direction skills, this had an average score for Year 2 at a very good level. It decreased slightly in Year 3 and Year 4 (table 2). This skill is extremely significant. This is because professional nursing requires personnel with high responsibility and be able to work independently and ready to learn throughout life. Nursing students with good initiative and self-regulation skills can acclimatize to challenges and have a greater chance of success in studying and working. Nursing students must manage their study time properly. Improving self-discipline in preparing for the examination, also nursing students can learn by them. Moreover, they can enhance analytical thinking and problem-solving, being responsible for nursing practice at the hospital. Participating in professional development activities, academic conferences, and having a work-life balance throughout the student's life in 4 years of study. Research by Lee & Park (2021) supported that nursing students with high self-regulation skills, provide better academic performance by applying knowledge for practice. Likewise, Martinez & Chen (2021) suggested that setting learning goals will help nursing students develop nursing skills better. According to Social and Cross-Cultural comparisons, the average score for 2nd-year nursing students is at a very good level. It decreased slightly in Year 3 and Year 4. In addition, this aspect had the highest average score among the 5 components (table 2).

When considering the decline in scores during the third year, it is found that the curriculum design for the third year, which includes a greater number of professional courses compared to other years, may lead to stress in students as they adjust to the changes. However, as time passes and students adapt, the average scores tend to rise again. Additionally, the highest average scores observed may be attributed to several factors: 1) The nature of the nursing profession requires constant interaction with others. Students have been practicing communication skills from the beginning of their studies and continuously through clinical practice in real-world situations, particularly in hospital wards (Chen & Wilson, 2021). 2) Teamwork training with interdisciplinary professionals, developed through theoretical, experimental, and practical teaching activities. 3) The curriculum's emphasis on social skills and cross-cultural learning, as nurses must provide care for everyone regardless of nationality or differences, adhering to the principles of equity and the professional code of ethics (Nursing Council of Thailand, 2023). 4) Creating learning environments through real-world scenarios and simulations, which encourage group work and foster continuous development of social skills. 5) The current healthcare system demands nurses with good social skills who can provide nursing care for diverse and cross-cultural patient populations (Taylor & Brown, 2022).

According to productivity and accountability domains, the average scores in the second year were found to be at an excellent level, decreased in the third year, and increased again in the fourth year (Table 2). The reasons behind the excellent average scores may include the strict academic assessment standards, given that nursing involves working directly with humans. Nursing students are trained to protect rights and prevent harm to ensure maximum safety for service recipients.

The curriculum is structured to progress from theoretical learning to experimental practice and then real-world application. For skills that pose a higher risk

of harm, students are first developed through simulations (SIM) or laboratory experiments. This equips them with practical skills and trains them in critical thinking, decision-making, and problem-solving in nursing contexts. Additionally, the unique nature of the nursing profession emphasizes real-world responsibility and instills a sense of accountability and prioritization of patient safety (Thompson & Brown, 2020). Training in management before graduation and practice in evaluating their performance helps students identify their strengths and weaknesses. This self-awareness and assessment enable them to improve their work, increasing the efficiency and clarity of patient care.

Furthermore, the average scores in leadership and responsibility domains were found to be excellent in the second year, decreased in the third year, and rose again in the fourth year (Table 2). Leadership and responsibility ranked as the second-highest scoring component out of all five. In the second year, students begin learning about their profession and practicing in laboratory settings, which provide a clearer understanding of their professional roles. At this stage, students are also at an age where they start developing maturity and gain confidence as they adjust from their first-year experiences. This leads to enthusiasm for learning, motivation to try new things, and active participation in group activities. Frequent small group assignments allow students to practice leadership skills within their teams.

However, during the third year, students face the most rigorous nursing coursework, which involves integrating complex knowledge from multiple disciplines. This, coupled with the stress and pressure of caring for patients in real-life scenarios where no harm must occur, can undermine their confidence in decision-making and their assigned responsibilities.

Despite these challenges, third-year students practice in small groups of eight members, where each student has the opportunity to act as a group leader. This involves coordinating with faculty or nurse mentors, overseeing group tasks, and delegating responsibilities among team members. These activities foster leadership skills in incremental ways. By repeating these experiences and learning from peers, students gradually develop their leadership competencies. Over time, those who identify and address their weaknesses can enhance their abilities in Leadership and Responsibility, leading to continuous improvement.

Conclusion

Life and careers skills are essential soft skills for the nursing profession. They enable nurses to handle pressure-filled situations and make effective nursing decisions to ensure client safety. At the same time, these skills help nurses maintain a happy and balanced life in society. Particularly, promoting critical thinking, problem-solving, nursing students must analyze complex patient conditions and make sound clinical decisions. Also, communication skills, nursing student can provide clear communication with patients, families, and healthcare teams is crucial for effective care delivery. Nursing career works in multidisciplinary teams, requiring strong interpersonal skills to ensure coordinated care. Regarding career, practical skills and theoretical knowledge are essential to excel in nursing roles. Especially, lifelong learning, nursing career evolves rapidly, so continuing education and specialization are key for career growth. Thus, nursing education should emphasize both life and careers skills readiness by starting at the nursing schools, it should integrate these skills into both curricula and extracurricular activities, providing students with practical training every academic year to prepare them for real-world practice.

Recommendations for Future Research

1) Conduct longitudinal studies to track the development of Life and careers skills among students across cohorts. This will provide insights into trends and serve as a guide for planning Life and careers skills promotion in subsequent academic years.

2) Expand the development of evidence-based assessment tools for 21st century life skills, particularly in the areas of information, media, and technology literacy.

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Discharge Planning for Neonates in Neonatal Intensive Care Units: A Scoping Review

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Abstract

The effective discharge planning for neonates in Neonatal Intensive Care Units (NICUs) is essential to ensuring a smooth home-care transition. The discharge preparation process plays a crucial role in facilitating this readiness. By identifying and implementing key components of a comprehensive discharge plan, healthcare providers can optimize outcomes for infants and their families. This scoping review aligns with the Joanna Briggs Institute (JBI) scoping review methodology. The systematic scoping reviews were sourced following the PCC framework published on CINAHL, ScienceDirect, PubMed, Google Scholar, and Directory of Open Access Journals from 2014 to September 2024.

A total of 382 articles were identified; following the screening, 57 reviews underwent full-text screening, and 21 articles met the inclusion criteria and were included in this review. The key components of a comprehensive discharge planning process for neonates in Neonatal Intensive Care Units were identified and grouped into five points of preparedness as follows: 1) Medical preparedness 15/21 (71.42%), 2) Parental preparedness 17/21 (80.95%), 3) Home Care preparedness 11/21 (52.38%), 4) Support system preparedness 13/21 (61.90%), and 5) Follow-Up Care preparedness 15/21 (71.21%). This review has identified the five key components of a comprehensive discharge planning process for neonates in the Neonatal Intensive Care Unit that have a positive impact on neonatal outcomes. However, further applied research is needed to transfer this empirical knowledge into clinical practice.

Keywords: Discharge planning, Neonates, Neonatal Intensive Care Units, Scoping Review

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Introduction

Neonates admitted to Neonatal Intensive Care Units (NICUs) are often seen with several challenging problems, including respiratory distress syndrome, meconium aspiration syndrome, birth asphyxia, prematurity, infections, congenital anomalies, hyperbilirubinemia, hypoglycemia, and intraventricular hemorrhage (Costa & Costa, 2022; Karnati, Kollikonda, & Abu-Shaweesh, 2020). These conditions can affect the baby's breathing, feeding, and overall development, requiring specialized care in the NICU to ensure their survival and well-being. The medical complexity of NICU graduates demands an intricate approach that prepares both the neonates and the family for the challenges of home-based care. Healthcare professionals can dramatically reduce the risks associated with this critical transition by providing targeted education, skill training, and parental support. Research indicates that well-structured discharge planning can reduce hospital readmission rates by up to 40%, highlighting its essential role in preventing potential medical complications (Padratzik & Love, 2022). The transition from the highly controlled NICU setting to home care is a complex and delicate process that significantly impacts the long-term health outcomes of these vulnerable infants (Green et al., 2020; Mazur et al., 2021).

Discharge planning is a multifaceted process that extends beyond mere medical clearance. It encompasses a comprehensive approach to preparing neonates and their families for a safe, supported transition from hospital to home care. This process is crucial because it directly influences medically fragile neonates' continued health, development, and overall well-being. It represents a critical juncture in the care of neonates who have received intensive medical intervention all medical teams need to consider the process of discharge planning for the neonates admitted to NICUs (Mazur et al., 2021; Padratzik & Love, 2022). The significance of this process extends far beyond a simple medical clearance, encompassing a holistic approach that addresses medical, psychological, developmental, and familial dimensions of care. The discharge planning is a comprehensive strategy designed to ensure the continued health and well-being of medically fragile newborns. The psychological and emotional aspects of discharge planning are equally crucial. Parents of NICU graduates often experience significant anxiety and stress, feeling overwhelmed by the prospect of managing their infant's complex medical needs (Pillai et al., 2021).

According to past studies, a comprehensive discharge plan serves to empower families, building their confidence through detailed education on medical device management, medication administration, and recognition of potential health risks. This support extends beyond mere technical training, addressing the emotional well-being of parents and creating a supportive framework for the family's adaptation (Osorio & Salazar, 2023). These early interventions can significantly impact neurological development, cognitive progression, and social adaptation (Malwade et al., 2024). By identifying potential developmental challenges early and establishing clear follow-up mechanisms, healthcare providers can create a proactive approach to the child's growth and development. This approach recognizes that the care of a NICU graduate is a continuous process that extends well beyond the initial hospital stay. The economic implications of effective discharge planning are substantial. By minimizing unnecessary hospital readmissions and providing comprehensive home-care strategies, healthcare systems can optimize resource allocation and reduce long-term healthcare expenditures (Smith, Love, & Goyer, 2022).

Moreover, the approach recognizes the unique circumstances of each family, incorporating cultural sensitivity, socioeconomic considerations, and individual learning capabilities into the discharge plan. An interdisciplinary approach is fundamental to successful discharge planning. This collaborative model involves a diverse team of

healthcare professionals, including neonatologists, nurses, social workers, developmental specialists, and family support counselors. By bringing together multiple perspectives, the discharge plan becomes a comprehensive, nuanced strategy that addresses the multifaceted needs of both the infant and the family (Smith, Love, & Goyer, 2022). Ultimately, discharge planning for neonates in the NICU is a critical intervention that bridges intensive medical care with home-based management (Yeary & Smith, 2022). However, the current literature addresses basic components of discharge planning, parent education, and interdisciplinary approaches, there remains a notable lack of standardized, evidence-based discharge protocols and clear metrics for measuring discharge readiness. These gaps highlight the need for more comprehensive research to enhance the effectiveness and inclusivity of NICU discharge planning protocols.

Review question

What are the key components of a comprehensive discharge planning process for neonates in Neonatal Intensive Care Units?

Objectives

To identify, synthesize, and map systematic reviews of the key components of a comprehensive discharge planning process for neonates in Neonatal Intensive Care Units

Methodology

This scoping review was guided by the Joanna Briggs Institute (JBI) methodology and employed by the PCC framework to help define the review's focus (Peters, M, D, J., et al., 2021; Peters, M. D., et al., 2022). After identifying the review question, the researchers followed the key steps as follows:

1. Identifying Relevant Studies

This step involves identifying relevant studies through a systematic approach. The relevant studies were sought by using the PCC (Population, Concept, Context) framework to guide the selection of relevant studies. The population of the reviews included neonates (ages from birth to 28 days of life) who have been admitted to Neonatal Intensive Care Units (NICUs), regardless of gestational age, sex, underlying conditions, or other factors. Besides, the populations included parents or caregivers of NICU infants, irrespective of age, gender identity, or other demographic variables who involved in the discharge planning process. The Concept encompasses all aspects of discharge planning, including, parent education programs, interdisciplinary team approaches, follow-up care protocols, and transition support strategies from hospital to home care. The Context focus on Neonatal Intensive Care Units in both developed and developing countries, including various healthcare settings such as tertiary hospitals, specialized children's hospitals, and regional medical centers that provide intensive care for newborns. The review considered all types of primary research studies (quantitative, qualitative, and mixed methods), systematic reviews and practice guidelines in English published on CINAHL, ScienceDirect, PubMed, Google Scholar, and Directory of Open Access Journals from 2014 to September 2024.

2. Study Selection

This step involves selecting relevant studies based on predefined inclusion and exclusion criteria based on the PCC framework mentioned. The review involves independent screening of titles and abstracts by two reviewers, followed by full-text assessment of potentially relevant studies against the inclusion criteria. The clear criteria are established to determine which studies will be included in the review. It is a rigorous process ensuring that only the most relevant studies are included in the review.

3. Data Extraction

This step involves extracting relevant information from the included studies. A standardized data extraction form is developed to ensure consistency in data collection. The extraction form guides the extraction of key

information, including design, population characteristics, interventions, comparisons, outcome measures, and results. By using a standardized approach, researchers can reliably collect and analyze data from diverse relevant studies.

4. Data Analysis

This step involves analyzing the extracted data to identify patterns, themes, and gaps in the literature. Data synthesis involves organizing and interpreting the information to draw meaningful conclusions. To visually represent the breadth and depth of the evidence, mapping techniques can be employed. Additionally, collecting similar studies together facilitates comparison and analysis, enhancing the understanding of the research field.

Data Sources

This systematic scoping review employed the PCC framework with the mentioned criteria. Data was sourced from CINAHL, ScienceDirect, PubMed, Google Scholar, and Directory of Open Access Journals (gray literature) published in English from 2014 to September 2024.

Research Considerations

This research was considered by the research committee of Boromarajonani College of Nursing, Changwat Nonthaburi.

Results

A total of 382 articles were identified; following the screening, 57 reviews underwent full-text screening, and 21 articles met the inclusion criteria and were included in this review. The key components of a comprehensive discharge planning process for neonates in NICU were identified and grouped into five points of readiness. seven categories, mastering technical care skills, gaining emotional comfort, and building confidence in infant care. Medical preparedness 15/21 (71.42%), Parental preparedness 17/21 (80.95%), Home care preparedness 11/21 (52.38%), Support system preparedness 13/21 (61.90%), and Follow-Up care preparedness 15/21 (71.21%). The details are as follows:

Medical preparedness

Medical preparedness for neonates discharged from the NICU is crucial for ensuring a safe transition home. Key factors influencing this preparedness include physiological stability, weight gain, and feeding competence (Anderson & Narvey, 2022). Assessing these criteria is essential for determining when a preterm infant can be safely discharged, as it directly impacts their health outcomes and family preparedness. The reviews found that several factors of medical readiness should be measured before discharging the neonates from the NICU. For example, physiological stability must be ensured that preterm infants obtain stable vital signs, including heart rate and respiratory function (Costa, H. P. F., & Costa, E. P. F., 2022). The ability to maintain physiological stability is linked to the infant's post-menstrual age, indicating that older infants are generally more stable (Kristiawati et al., 2020). Consistently, weight gain is a critical indicator of a preterm infant's readiness for discharge, reflecting their overall health and nutritional status. Infants should reach a specific weight threshold, often around 1,800 grams, to ensure they can thrive outside the NICU environment. Successful oral feeding is vital that help evaluate an infant's readiness for oral feeding. Infants must show competence in sucking, swallowing, and breathing coordination to minimize risks of apnea and choking (Kristiawati et al., 2020; Mccord, Fieldhouse, & El-Naggar, 2024).

Parental preparedness

Parents' preparation is essential for the successful discharge planning of infants from healthcare facilities, particularly for preterm babies. Comprehensive education and training for parents on infant care significantly enhance their confidence and competence, facilitating a smoother transition home (Smith, 2021). This preparedness encompasses various factors, including parental knowledge, emotional

support, and the hospital's role in providing guidance. Parents should receive training on recognizing symptoms of illness, administering medications, and feeding practices. Studies indicated that high parental preparedness correlates with improved infant growth metrics, such as weight and length, within weeks of discharge (Padratzik & Love, 2022). Some studies identified assessments of parental readiness that can effectively assess parental preparedness levels. Personalized guidance based on preparedness assessments can enhance parental confidence and ensure optimal care for infants. Addressing emotional needs is crucial, healthcare providers should offer support to alleviate parental anxiety and promote well-being. The social environment also plays a significant role in parental preparedness, influencing their abilities to care for their infants (Padratzik & Love, 2022; Smith, 2021; Smith, Love, & Goyer, 2022).

Home care preparedness

A safe and supportive home environment is essential for the successful discharge planning of patients, particularly in improving infants' health and outcomes. Healthcare professionals can enhance home care preparedness through comprehensive assessments and tailored support strategies. This preparedness involves evaluating the home environment for potential hazards and ensuring the availability of necessary medical supplies and safety equipment. Home visits by healthcare professionals can identify risks such as inadequate space, unsafe furniture, or lack of medical supplies. Environmental factors, including the physical and social aspects of the home, significantly influence discharge readiness (Qian et al., 2021). In addition, assessing parental preparedness for discharge planning, including knowledge of follow-up care and infant management, to ensure successful transitions from NICU to home. This assessment can assist in identifying at-risk families and improve post-discharge outcomes for neonates (Salmani et al., 2020). Research by Cheng et al. (2016) supported that home care preparedness for discharge planning through early involvement, formal assessments of caregiving capabilities, and personalized education is the main successful discharge implementation.

Support system preparedness

Discharge planning in NICU incorporates a multidisciplinary approach including healthcare providers, parents, and caregivers to establish a comprehensive plan that supports the neonate's health and development (Aliane et al., 2024). The preparedness of the family or support system plays an essential part in influencing the accomplishment of this transition (Anderson & Narvey, 2022). Particularly, factors that relate to this transition such as parental knowledge, emotional readiness, financial resources, access to follow-up care, and the availability of community support significantly influence the outcomes for both the neonate and their family (Osorio & Salazar, 2023). Therefore, the importance of integrating support system preparedness into discharge planning processes, addressing the challenges of family aspect, and emphasizing the need for personalized interventions are needed. By focusing on equipping families with the required skills, resources, and confidence, NICU can improve the long-term health and well-being of neonates while empowering parents or caregivers to direct the complexities of home care (Kristiawati et al., 2020).

Follow-up care preparedness

Establishing a clear follow-up care plan is essential for successful discharge planning, particularly for infants. This preparedness involves scheduled post-discharge appointments, effective communication among stakeholders, and access to community resources. A structured discharge process enhances the transition from hospital to home, minimizing complications. Scheduled appointments facilitate ongoing health monitoring, crucial for infants' development (Handiyani et al., 2024). Multidisciplinary follow-up care has shown higher satisfaction among parents compared to regular care,

indicating its effectiveness in addressing complex needs (Bouwmeester et al., 2023). Research by Carter and Carter (2024) emphasized the importance of comprehensive follow-up care for high-risk NICU graduates, focusing on clinical assessments, developmental milestones, and necessary therapies while addressing ethical issues based on care coordination, resource capacity, and social determinants of health in discharge planning. Likewise, follow-up care preparedness in NICU discharge planning involves ensuring families have the necessary

skills and education for home care, completing arrangements for outpatient care, and assessing discharge readiness to reduce readmission risks and enhance infant care post-discharge (Smith, Love, & Goyer, 2022; Yeary & Smith, 2022). According to Osorio & Salazar (2023), discharge planning in the NICU highlights that families' discharge preparedness should be assessed. Especially, families at higher risk, for example; single mothers or those with limited resources, may require additional education and training for effective follow-up care. In addition, educating parents on care skills, fostering security and trust, and considering individual family characteristics, ensuring they are ready for follow-up care and the transition to home life are vital discharge preparations for preterm children (Osorio & Salazar, 2023; Padratzik & Love, 2022).

Discussion

According to the results, they emerged a group of the comprehensive discharge planning process for neonates in NICU demonstrated as a below table.

Table 1: A group of the key components of a comprehensive discharge planning process for neonates in the NICU

Medical preparedness	Parental preparedness	Home care preparedness	Support system preparedness	Follow-up care preparedness
Physiological stability	Education and infant care training	Environment assessment	Multidisciplinary team	Scheduled appointment
Feeding competence	Emotional support	Safety equipment	Family resources	Care coordination
Age and weight-appropriate stability	Preparedness assessment	Medical supplies	Community support	Risk assessment

In the delicate world of neonatal intensive care, discharge planning emerges as a complicated process that represents far more than a simple medical transition. It is a deep journey of transformation, where delicate newborns who often battle with multipart medical challenges prepare to leave the carefully monitored environment of the hospital and enter the unpredictable home care. The moment of discharge is both a celebration of medical achievement and a threshold of anticipation, fraught with hope, anxiety, and remarkable potential. Every infant's path is unique, interlaced from involved medical, developmental, and familial threads that must be precisely examined and carefully accomplished. Medical stability represents the critical first consideration in discharge preparedness. This is not merely a specification of clinical limitations, but a holistic assessment of the infant's physiological flexibility and adaptive competencies.

Physicians and nurses engage in a delicate dance of observation, tracking multiple interconnected systems. They scrutinize respiratory patterns, examining the infant's ability to breathe independently and maintain consistent oxygen saturation. Each breath becomes a narrative of progress, each stable respiratory cycle a testament to the infant's growing strength. Effective communication among healthcare providers, parents, and community resources is vital for continuity of care (Qian et al., 2021). Nurses play a critical

role in documentation and coordination, ensuring seamless transitions. A structured discharge process includes stages like inpatient assessment and final documentation, which streamline transitions (Griffith et al., 2022; Karnati, Kollikonda, & Abu-Shaweesh, 2020).

Beyond clinical measurements, discharge planning explores deeply into the human experience. Families are not passive recipients of medical instructions but active, crucial participants in the discharge journey. Caregivers undergo comprehensive training that transcends traditional medical education. They learn not just technical skills, how to manage specialized equipment, and recognize potential complications, but also develop emotional resilience. Each lesson represents a bridge between clinical expertise and compassionate care.

Healthcare providers as support teams play influential roles, in helping families navigate the complex emotional landscape of caring for a medically fragile infant. They provide resources, emotional support, and strategic guidance, recognizing that successful discharge depends as much on psychological awareness as medical preparedness. Discharge planning represents a sophisticated collaboration among diverse healthcare professionals. Neonatologists, nurses, respiratory therapists, nutritionists, and social workers function not as isolated experts but as an integrated team, each contributing specialized knowledge to create a comprehensive care strategy. Neonatal discharge planning exemplifies an extraordinary intersection of medical science, technological expertise, and profound human compassion. It represents a holistic approach that honors both the clinical complexity of infant care and the deeply personal nature of each family's medical journey. As medical knowledge advances and technologies evolve, discharge planning will continue to transform, always guided by the fundamental principle of supporting the most vulnerable patients through their first critical transition into life. Thus, there are 5 key components of discharge planning as follows:

Medical preparedness

The transition from a neonatal intensive care unit (NICU) to home is a critical period for families of neonates, demanding careful discharge planning to ensure the continuity of care and the well-being of the infant. Neonates in the NICU often confront multifaceted health challenges, including prematurity, congenital conditions, or critical illnesses, which require highly specialized medical care. A prerequisite for discharge helps ensure a successful transition home, infants must meet specific medical criteria. Physiological stability is essential, requiring stable vital signs, maintained body temperature, and adequate weight gain. Additionally, feeding competence, including the ability to feed orally without complications, is crucial for independent feeding after discharge (Anderson & Narvey, 2022; Mccord, Fieldhouse, & El-Naggar, 2024; Smith, 2021).

Parental preparedness

The actual discharge preparedness in NICU needs to engage parents initially in education and care, highlighting the need for parent-centered tools like "My Flight Plan for Home" to improve support system readiness for neonates' discharge planning. "My Flight Plan for Home tool" was focused on 5 major themes: 1) Family dynamics, 2) Parenting in the NICU, 3) Discharge preparedness, 4) Engaging parents in infant care, and 5) Implementation recommendations, additionally minor themes supported each of the major themes (Franck et al., 2023). In addition, various factors affect how the discharge planning is successful. Parental perceptions of family-centered care, anxiety, and parenting self-efficacy significantly influence discharge preparedness for preterm infants are significant influences that can be addressed through nursing-led interventions to progress the support system readiness during discharge planning in NICU (Franck et al., 2023; Griffith et al., 2022; Salmani et al., 2020).

Home care preparedness

A safe and supportive home environment is essential for the successful discharge of patients, particularly infants. Healthcare professionals can enhance home care preparedness through comprehensive assessments and tailored support strategies. This involves evaluating the home environment for potential hazards and ensuring the availability of necessary medical supplies and safety equipment (Qian et al., 2021). Regarding home care preparedness, it emphasizes family and community resources, can help mitigate risks, and enhance the infant's well-being. Various studies identified home environment assessment is important in a period of transitional care. Home visits by healthcare professionals can identify risks such as inadequate space, unsafe equipment, or lack of medical supplies. Environmental factors, including the physical and social aspects of the home, significantly influence discharge preparedness. Thus, parents or caregivers can improve their confidence and preparedness for managing infant care at home (Çelik & Altay, 2023; Carter & Carter, 2024; Qian et al., 2021).

Support system preparedness

The importance of supportive preparedness that includes family and community resources can help mitigate risks and enhance the infant's well-being. A multidisciplinary approach involving neonatologists, nurses, social workers, and other healthcare professionals is essential to ensure comprehensive care and support during the discharge process. Effective communication among all stakeholders, including parents, is crucial to facilitate a smooth transition. Clear and accessible documentation of discharge plans and preparedness criteria helps streamline the process. Additionally, providing access to community resources, support groups, and ongoing education empowers families to navigate potential challenges after discharge. Implementing a structured discharge process with distinct stages, such as inpatient assessment, anticipated discharge planning, imminent discharge actions, and final discharge documentation, helps optimize the transition from NICU to home (Çelik & Altay, 2023; Carter & Carter, 2024; Qian et al., 2021).

Follow-up care preparedness

A crucial aspect of successful discharge planning is establishing a clear follow-up care plan. Scheduled post-discharge appointments allow for ongoing monitoring of the infant's health and development. Effective communication among healthcare providers, parents, and other stakeholders is essential to ensure continuity of care. Providing access to community resources, support groups, and ongoing education empowers families to address potential challenges after discharge. A structured discharge process, including stages such as inpatient assessment, anticipated discharge planning, imminent discharge actions, and final discharge documentation, helps streamline the transition and minimize potential complications. On the other hand, while structured discharge processes are beneficial, challenges such as resource limitations and varying levels of parental support can hinder effective follow-up care, highlighting the need for ongoing improvements in care coordination and resource allocation (Çelik & Altay, 2023; Carter & Carter, 2024). As research by Padratzik and Love (2022), claimed that NICU discharge planning should begin on the first day of admission, focusing on both caregiving education and addressing parents' social-emotional needs. This comprehensive approach empowers families, ensuring caregivers and parents can prepare for the challenges of caring for medically fragile infants at home. Additionally, Brachio et al. (2020) recommended that the discharge planning as part of a multilevel education bundle, which includes NICU provider education and parent education, enhance follow-up care preparedness for neonates and improve attendance at neonatal follow-up clinics.

Conclusion

The scoping review should conclude that a comprehensive discharge planning process for neonates in NICU encompasses a holistic approach addressing medical preparedness, parental education and confidence, home safety assessments, multidisciplinary collaboration, follow-up care arrangements, effective communication, support systems, and a structured discharge process (Yeary & Smith, 2022). These components are essential for ensuring successful transitions from hospital to home for vulnerable infants and their families. Discharge planning in the NICU represents a key point in the care variety for neonates and their families. It is more than a logistical process; it is a personalized, family-centered effort that certifies a safe and continuous transition from the highly monitored NICU environment to the home setting. Particularly, effective discharge planning addresses the medical, emotional, and practical needs of both the neonate and the caregivers, fostering confidence and competence in parents while safeguarding the infant's long-term health and well-being (Smith, Love, & Goyer, 2022; Yeary & Smith, 2022). To conclude, discharge planning in the NICU is a critical and dynamic process that bridges the gap between hospital and home care. It requires thoughtful preparation, vigorous communication, and a commitment to supporting families holistically. By prioritizing these essentials, NICU can contribute to the healthy development of neonates and foster a sense of enablement and resilience in caregivers, eventually improving results for both the infant and the family.

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Factors Influencing High-Sodium Food Consumption Behavior among Nursing Students

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Abstract

The consumption of high-sodium foods is a major cause of various chronic diseases. Controlling or reducing the factors contributing to high sodium intake can help alleviate health problems. This descriptive study aimed to examine the high-sodium food consumption behaviors among nursing students and identify the factors influencing their consumption of high-sodium foods. The samples consisted of 130 nursing students enrolled in the Bachelor of Nursing Science program at Boromarajonani College of Nursing Changwat Nonthaburi in 2024. They were selected by stratified random sampling. The data collection tools comprised a questionnaire covering high-sodium consumption behavior, information perceptions on high-sodium food consumption, accessibility to high-sodium food sources, attitudes toward high-sodium food consumption, and knowledge about high-sodium food consumption. The data were analyzed using percentage, mean, standard deviation, and multiple regressions.

The results showed that the nursing students had a moderate level of high-sodium food consumption (Mean = 3.14, S.D. = 0.70). Their knowledge and risk perception about high-sodium food consumption were both high (Mean = 8.92, S.D. = 1.23; Mean = 3.40, S.D. = 0.50, respectively). Accessibility to high-sodium food sources was also high (Mean = 4.02, S.D. = 0.73), while their attitudes toward high-sodium food consumption were moderate (Mean = 3.20, S.D. = 0.53). There are two factors significantly influenced high-sodium food consumption behaviors: accessibility to high-sodium food sources and attitudes towards high-sodium food consumption. Together, they significantly predicted behavior at the 0.05 significance level. The multiple correlation coefficient (R) was 0.506, the coefficient of determination (R^2) was 0.256, and the standard error of estimate (S.E.est) was 0.607. Therefore, these two variables explained 25.6% of the variance in high-sodium food consumption behavior among nursing students. In conclusion, educational institutions should foster an environment that encourages the consumption of low-sodium foods and increases awareness about the significance of minimizing sodium intake. These measures aim to reduce sodium consumption among students, thereby helping to prevent health risks associated with high sodium levels.

Keywords: High-Sodium Food Consumption Behavior, Chronic diseases, Nursing Students

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Introduction

Sodium is an essential mineral required by the body to maintain the osmolality of extracellular fluids and ensure normal fluid circulation. Sodium is obtained through the consumption of foods, often in the form of sodium chloride (table salt), found in meats, processed foods, semi-prepared or ready-to-eat meals, pickled foods, and seasoning sauces. According to the Bureau of Non-Communicable Diseases, Department of Disease Control (2023), the recommended daily sodium intake should not exceed than 2,000 mg (equivalent to 1 teaspoon of salt). Excessive sodium intake can lead to salt retention and increased extracellular fluid, which subsequently raises blood pressure. Hypertension, as a result, increases the risk of cardiovascular diseases, stroke, and acute myocardial infarction. Additionally, high sodium intake directly affects kidney function, as the kidneys are responsible for sodium excretion. This results in overworking the kidneys, leading to faster deterioration, protein leakage in the urine, and the accumulation of waste in the body (Borrelli et al., 2020; Graudal et al., 2020). Kidney damage, once it develops, remains permanent even if sodium levels in the body are later reduced (Tussanapong, 2020).

Despite the recommended sodium intake limit of 2,000 mg per day, a survey conducted in 2019 revealed that the average sodium consumption among the Thai population was as high as 3,636 mg per person per day, equivalent to 1.8 teaspoons of salt (Bureau of Non-Communicable Diseases, Department of Disease Control, 2023). A health survey of the Thai population conducted during 2019–2020 found that most sodium intake originates from processed foods and eating out, including sodium added during cooking (71%) and adding seasoning to food while eating (11%) (Aekplakorn, 2021). Among individuals aged 15–29 years, the majority consumed high-sodium foods such as freshly prepared meals, followed by ready-to-eat foods (Yungiam & Kittirawutthiwong, 2022). This has resulted in a trend where Thais are likely to consume sodium in amounts higher than normal.

A review of relevant literature reveals various factors influencing sodium consumption. For instance, a study by Boonsiri et al. (2017) found that knowledge about sodium consumption helped students become more aware and reduce their sodium intake, as evidenced by a decrease in sodium levels in their urine after gaining knowledge. Similarly, research by Chaiket (2016) on sodium-related dietary factors among students of Srinakharinwirot University found that access to information about sodium correlated with sodium levels in their diet. Another study by Khunkaew, Khunkaew & Ngadkratok (2020) reported that nursing students in Uttaradit frequently consumed ready-made meals due to the convenience of purchasing such foods and living in dormitories preventing them from cooking their meals. This aligns with the findings of Somchit & Phanomai (2015), who discovered that food accessibility, convenience in food selection, and information about ready-to-eat foods, including type, price, and promotional deals, influenced the purchasing behavior of high school students. Furthermore, Ounkaew (2022) identified that attitudes toward food consumption significantly impacted the eating behaviors of high school students, consistent with Rattanasakornchai's (2019) findings, which revealed a correlation between attitudes and eating behaviors in secondary school students. The literature suggests that factors influencing sodium consumption include knowledge about sodium, access to sodium-related information, food accessibility, and attitudes toward sodium consumption.

Currently, excessive sodium consumption is observed across all age groups, particularly among individuals aged 19–30 years, whose average daily sodium intake is 3,633.8 mg (Bureau of Non-Communicable Diseases, Department of Disease Control, 2023). This trend likely applies to nursing students in colleges, as most are aged between 18 and 25 years. Nursing students are considered part of the healthcare system and

play a vital role in delivering healthcare services. Adopting appropriate sodium consumption behaviors during their college years not only helps prevent chronic illnesses in the future but also enables them to serve as sources of knowledge and exemplary health role models to healthcare recipients. However, previous studies on high-sodium food consumption behaviors or the factors influencing such behaviors among nursing students have been very limited in number. A survey involving 40 students from a nursing college, conducted through a Google Form questionnaire, revealed that the students consumed high-sodium foods daily. The most frequently consumed foods included made-to-order meals with added seasonings (76.2%), semi-prepared foods such as instant noodles (71.4%), and fast food (69%). The primary factors contributing to this behavior were identified as convenience (78.6%), affordability (59.5%), and easy access to food sources (52.4%).

These factors may lead to nursing students consuming sodium in amounts exceeding the recommended levels. Given these circumstances, the researchers are interested in studying the factors influencing the consumption of high-sodium foods among nursing students at College of Nursing. This study aimed to examine the consumption behaviors of high-sodium foods among nursing students and identify the factors influencing high-sodium food consumption among these students. The findings of this study will contribute to the development of solutions and interventions aimed at promoting appropriate sodium consumption behaviors, ultimately reducing the risk of diseases associated with excessive sodium intake.

Research Methodology

Study design

The study was structured as a descriptive research.

Study Population and Sample

Population: Nursing students enrolled in the Bachelor of Nursing Science program at Boromarajonani College of Nursing Changwat Nonthaburi, from years 1 to 4 in the first semester of the 2024 academic year, totaling 705 individuals.

Samples: The sample consisted of 130 nursing students enrolled in the Bachelor of Nursing Science program at Boromarajonani College of Nursing Changwat Nonthaburi, from years 1 to 4 in the 2024 academic year. The sample size was determined using the G*Power Version 3.1.9.7 (Faul, Erdfelder, Lang & Buchner, 2009) with settings as follows 1) Test family: F Test 2) Statistical test: Linear multiple regression: Fixed model, R= deviation from zero and 3) Input parameter: Effect size =0.15 (medium), Alpha = 0.05, Power = 0.95, number of predictors = 4. The sample was selected using stratified random sampling, resulting in 33 participants each from years 1, 2, and 3, and 31 participants from year 4.

Research Instruments

The research utilized a questionnaire, designed through an analysis of relevant literature and related research, consisting of six sections:

Section 1: Personal Information

This section included open-ended questions requiring respondents to select one option or provide answers in the blank spaces. The questions addressed details such as gender, age, year of study, weight, height, favorite food flavors, type of residence during study, monthly financial support from parents, and the average cost of meals per meal.

Section 2: High Sodium Food Consumption Behavior Questionnaire

This section utilized a 5-point Likert rating scale consisting of 15 items to measure high-sodium food consumption behaviors. The interpretation of the mean scores was based on the criteria as follows:

4.20 – 5.00: the highest level of high-sodium food consumption.

3.40 – 4.19: a high level of high-sodium food consumption.

2.60 – 3.39: a moderate level of high-sodium food consumption.

1.80 – 2.59: a low level of high-sodium food consumption.

1.00 – 1.79: the lowest level of high-sodium food consumption.

Section 3: Knowledge about High-Sodium Food Consumption

This section consisted of 10 closed-ended questions designed to evaluate knowledge about high-sodium food consumption. Respondents were required to answer "Yes" or "No." A "Yes" response was scored as 1 point, while a "No" response was scored as 0 points. Criteria for interpreting score are as follows:

8.00–10.00: A high level of knowledge about high-sodium food consumption.

6.00–7.99: A moderate level of knowledge about high-sodium food consumption.

Less than 6.00: A low level of knowledge about high-sodium food consumption.

Section 4: Information Perception on High-Sodium Food Consumption

This section employed a 5-point rating scale comprising 6 items to assess participants' perception of information related to high-sodium food consumption. The interpretation of the mean scores was based on the criteria as follows:

4.20 – 5.00: The highest level of information perception on high-sodium food consumption.

3.40 – 4.19: A high level of information perception on high-sodium food consumption.

2.60 – 3.39: A moderate level of information perception on high-sodium food consumption.

1.80 – 2.59: A low level of information perception on high-sodium food consumption.

1.00 – 1.79: The lowest level of information perception on high-sodium food consumption.

Section 5: Accessibility to High-Sodium Food Sources

This section used a 5-point rating scale consisting of 6 items to evaluate participants' access to high-sodium food sources. The interpretation of the mean scores was based on the criteria as follows:

4.20 – 5.00: The highest level of accessibility to high-sodium food sources.

3.40 – 4.19: A high level of accessibility to high-sodium food sources.

2.60 – 3.39: A moderate level of accessibility to high-sodium food sources.

1.80 – 2.59: A low level of accessibility to high-sodium food sources.

1.00 – 1.79: The lowest level of accessibility to high-sodium food sources.

Section 6: Attitudes toward High-Sodium Food Consumption

This section utilized a 5-point Likert scale with 7 items to measure participants' attitudes toward the consumption of high-sodium foods. The interpretation of the mean scores was based on the criteria as follows:

4.20 – 5.00: The highest level of attitude toward high-sodium food consumption.

3.40 – 4.19: A high level of attitude toward high-sodium food consumption.

2.60 – 3.39: A moderate level of attitude toward high-sodium food consumption.

1.80 – 2.59: A low level of attitude toward high-sodium food consumption.

1.00 – 1.79: The lowest level of attitude toward high-sodium food consumption.

Validation of Research Instruments

The researcher submitted the questionnaire to three experts for evaluation. The content validity indices (CVI) for Sections 2 through 6 of the questionnaire, calculated based on Polit & Beck(2021), were 1.00, 0.97, 1.00, 0.94, and 0.95, respectively. The reliability of the questionnaire was 0.82, 0.79, 0.76, 0.72, and 0.81 for Sections 2 through 6, respectively.

Data Collection

This research was conducted between June - July 2024. The data collection was done as follows:

1. The researcher submitted a formal request to the Director of Boromarajonani College of Nursing Changwat Nonthaburi, seeking permission to collect data from the sample group.

2. Coordination was conducted with class leaders to inform potential participants about the study and arrange appointments for completing the questionnaire.

3. The researchers met with participants who voluntarily agreed to join the study, introduced themselves, explained the research objectives, and emphasized the protection of participants' rights.

4. Participants signed the informed consent forms and completed the questionnaire, which required approximately 15–20 minutes.

5. The researchers reviewed the questionnaires for completeness and accuracy before proceeding with data analysis.

Data Analysis

1. Personal information from the respondents was analyzed using basic statistics, including frequency, percentage, mean and standard deviation.

2. Data on high-sodium food consumption, information perception about high-sodium foods, accessibility to high-sodium food sources, and attitudes toward high-sodium foods were analyzed by calculating the mean and standard deviation.

3. Data on knowledge about high-sodium foods were analyzed using frequency and percentage.

4. Factors influencing high-sodium food consumption among nursing students were predicted using Pearson's correlation coefficient and multiple regression analysis (MRA).

Ethical Approval

This study was approved by the Research Ethics Committee of Boromarajonani College of Nursing Changwat Nonthaburi (BCNNON No. 014/66) on April 9, 2024. Participants were informed about the study through an introduction, an explanation of the research objectives, and a description of the procedures for participation. Informed consent forms were signed by all participants before the research process commenced.

Results

General characteristics of the sample

The majority of the sample group was female, totaling 121 individuals (93.10%). Most participants were aged 19–21 years, with 95 individuals (73.10%) in this age group. The average age was 19.89 years (S.D. = 1.289). Thirty-three persons (25.40%) were in their first to third academic year, and thirty-one individuals (23.80%) were in their fourth year. A total of 119 individuals (91.50%) resided in the college dormitories. Their preferred taste was salty (43.08%). (Table 1)

Table 1. General characteristics of nursing students (n=130)

General characteristics	N	%
Gender		
male	9	6.90
female	121	93.10
Age		
≥ 22 years	13	10.00
19-21 years	95	73.10
≤18 years	22	16.90
Mean =19.89 S.D. = 1.289		
Academic year		
first-year	33	25.40
second-year	33	25.40
third-year	33	25.40
fourth-year	31	23.80
Accommodation		
college dormitory	119	91.50
private apartment	11	8.50
Preferred taste		
salty	56	43.08
sweet	36	27.69
sour	34	23.15
bland	4	3.08

Level of High-sodium food consumption behaviors, Knowledge about high-sodium food consumption, Information perception on high-sodium food consumption, Accessibility to high-sodium food sources, and Attitudes toward high-sodium food consumption of nursing students

The sample group's behavior regarding the consumption of high-sodium foods was at a moderate level on average (Mean = 3.14, S.D. = 0.70). Their knowledge about high-sodium food consumption was at a high level on average (Mean = 8.92, S.D. = 1.23). Information perception on high-sodium food consumption was also at a high level on average (Mean = 3.40, S.D. = 0.50). In addition, accessibility to high-sodium food sources was rated high on average (Mean = 4.02, S.D. = 0.73). Their attitudes toward high-sodium food consumption were at a moderate level on average (Mean = 3.20, S.D. = 0.53). (Table 2)

Table 2. Levels of High-sodium food consumption behaviors, Knowledge about high-sodium food consumption, Information perception on high-sodium food consumption, Accessibility to high-sodium food sources, and Attitudes toward high-sodium food consumption of nursing students (n=130)

Variables	Mean	S.D.	Level
High-sodium food consumption behaviors	3.14	.70	Moderate
Knowledge about high-sodium food consumption	8.92	1.23	High
Information perception on high-sodium food consumption	3.40	.50	High
Accessibility to high-sodium food sources	4.02	.73	High
Attitudes toward high-sodium food consumption	3.20	.53	Moderate

Correlation among the variables and High-sodium food consumption behaviors of the nursing students

The correlation analysis shows that the factor most significantly related to high-sodium food consumption behavior was accessibility to high-sodium food sources, with a positive correlation coefficient of .477 ($r_{x3}y$ = .477) at the 0.01 significance level. The correlation coefficients for the factors are as follows:

1) Accessibility to high-sodium food sources (X_3) and high-sodium food consumption behavior showed a moderate positive correlation, with a coefficient of .477 ($r_{x3}y$ = .477, p≤ 0.01).

2) Attitudes toward high-sodium food consumption (X_4) and high-sodium food consumption behavior showed a low negative correlation, with a coefficient of -.275 ($r_{x4}y$ = -.275, p≤ 0.01).

3) Information perception on high-sodium food consumption (X_2) and high-sodium food consumption behavior showed a low positive correlation, with a coefficient of .229 ($r_{x2}y$ = .229 p≤ 0.01). (Table 3)

Table 3. Correlation analysis of the variables and High-sodium food consumption behaviors of the nursing students (n=130)

Variables	X1	X2	X3	X4
Knowledge about high-sodium food consumption (X1)	1.00			
Information perception on high-sodium food consumption (X2)	.000	1.00		
Accessibility to high-sodium food sources (X3)	-.021	.244**	1.00	
Attitudes toward high-sodium food consumption (X4)	.083	.023	-.236**	1.00
High-sodium food consumption behaviors (Y)	-.125	.229**	.477**	-.275**

** *p* value ≤ .01

Factor influencing High-sodium food consumption behaviors of the nursing students

The regression analysis revealed that there are two factors significantly influencing high-sodium food consumption behavior: accessibility to high-sodium food sources (X3) and attitudes toward high-sodium food consumption (X4). Together, these variables significantly predicted high-sodium food consumption behavior at the 0.05 significance level. The multiple correlation coefficient (R) was .506, the coefficient of determination (R^2) was .256, and the standard error of estimate (S.E.est) was .608. These two variables explained 25.6% of the variance in high-sodium food consumption behavior among nursing students. (Table 4)

The predictive equation for high-sodium food consumption behavior in raw score form is as follows:

$$Y = 2.182 + 0.418(X_3) - 0.226(X_4)$$

The predictive equation in standardized score form is as follows:

$$Zy = 0.436(ZX_3) - 0.173(ZX_4)$$

Table 4. Regression analysis of the variables and High-sodium food consumption behaviors of the nursing students (n=130)

Variables	b	*S.E.*$_b$	β	t	p- value
Constant	2.182	.501		4.353	.000***
Accessibility to high-sodium food sources (X_3)	.418	.076	.436	5.536	.000***
Attitudes toward high-sodium food consumption (X_4)	-.226	.103	-.173	-2.192	.030*
$R = .506$, $R^2 = .256$, $S.E._{est} = .60769$, F-Change = 4.804, p = .030					

* p value ≤ .05
*** p value ≤ .001

Discussion

The findings of this study revealed that nursing students exhibited moderate levels of high-sodium food consumption behavior. It was also found that accessibility to high-sodium food sources and attitudes toward high-sodium food consumption significantly predicted high-sodium food consumption behavior among nursing students. These two factors accounted for 25.6% of the variance in consumption behavior, indicating their critical role in influencing dietary choices.

High-sodium food consumption behavior

Nursing students demonstrated a moderate level of high-sodium food consumption behavior, as indicated by the findings (Mean = 3.14, S.D. = 0.70). A significant reason for this result may stem from their eating habits, with a preference for salty flavors over others. This preference fosters a habitual inclination to choose high-sodium foods, even though the students possess substantial knowledge about the risks of sodium-rich foods. Furthermore, most students reside in dormitories, where breakfast and lunch are typically sourced from meals sold within the college premises. For dinner, they often rely on made-to-order meals, online food orders, or ready-to-eat options, particularly instant noodles. Additionally, during clinical practice periods, students often prioritize convenience and speed when selecting their meals, frequently choosing food from nearby canteens or convenience stores. The meals in these settings frequently involve high-sodium seasonings or are processed foods that use sodium as an essential ingredient. Such behaviors likely contribute to the observed moderate level of high-sodium food consumption. This result aligns with previous studies that identified moderate sodium intake behaviors among nursing students (Piaseu et al., 2020; Khamdo et al., 2023). However, this finding is inconsistent with the study by Biswas et al. (2020), which found that only 29.99% of students engaged in behaviors to avoid processed foods in order to reduce salt consumption, and that the median salt intake from adding salt during meals was 3 grams per day. In addition, Wu et.al (2023) studied association between eating habits and sodium intake among Chinese University Students. The result showed that excluding cooking salt and high-sodium seasonings, the daily dietary sodium intake among college students in Changsha, Hunan Province, was 1183.74 mg/day which defined as “high sodium intake”.

Accessibility to high-sodium food sources

Accessibility to high-sodium food sources was the strongest predictor, with a moderate positive correlation to consumption behavior ($r_{x3}y = 0.477$, $p < 0.01$). This means the more the nursing students easily access to high-sodium food sources, the more they have high-sodium food. This finding aligns with previous studies showing that the availability of certain foods strongly influences dietary patterns. For instance, Story et al. (2008) emphasized that environments abundant in high-sodium foods, such as fast food outlets

and convenience stores, contribute to unhealthy eating practices. Additionally, Laska et al. (2010) found that proximity to high-sodium food sources increased the frequency of their consumption, particularly among college students who may rely on convenience due to time and budget constraints. Recent evidence suggests that environmental accessibility to high-sodium foods strongly influences dietary patterns. For example, interventions that increase the availability of low-sodium alternatives in community and workplace settings have shown to reduce sodium intake among patrons, demonstrating the impact of food environments on behavior (CDC, 2023). Similarly, access to sodium-rich foods often correlates with increased consumption, highlighting the role of food availability in dietary choices.

Attitudes toward high-sodium consumption

Recent research highlights a negative correlation between attitudes toward high-sodium consumption and high-sodium consumption behavior ($r_{x4}y = -0.275$, $p < 0.01$). This suggests that individuals with more negative attitudes toward high-sodium foods are less likely to consume them. This can be attributed to the fact that nursing students acquire knowledge and awareness about nutrition during their education, including the topic of sodium intake. As a result, nursing students generally exhibit moderate attitudes toward sodium consumption. They believe that choosing bland or unseasoned foods, though less flavorful, is better for their health due to their lower sodium content. Moreover, students believe that understanding the health impacts of high sodium intake leads individuals to adopt better dietary behaviors. These findings align with the research by Satsawatchawanwong (2023), which found a slightly negative correlation between attitudes toward sodium-rich foods and sodium consumption behaviors among the people e in Tha Tako District, Nakhon Sawan Province. ($r = -0.058$, $p = 0.025$). However, the results differ from the study by Khamdo et al. (2023), which found no relationship between attitudes toward sodium consumption and sodium consumption behaviors among nursing students. Similarly, the study by Kanharura and Chupanit (2023) reported no correlation between attitudes toward sodium consumption and high-sodium dietary habits among adults in Mueang District, Udon Thani Province.

Knowledge about high-sodium food consumption

Knowledge about high-sodium food consumption had no significantly correlation to high-sodium food consumption behavior ($r_{x1}y = -.125$, $p < 0.01$). This could be explained by the fact that nursing students are predominantly in their adolescent or young adult years, a period when overall health is generally strong. This may lead to a lack of full awareness of the negative health consequences associated with excessive sodium intake. Moreover, their preference for flavorful foods, especially those with a salty taste, might explain why a high level of knowledge about high-sodium foods consumption does not significantly influence their sodium consumption behaviors. The assertion that knowledge does not correlate with high sodium consumption among nursing students is supported by recent studies. A study conducted among nursing students revealed that although their knowledge about sodium was significantly improved after participating in a sodium reduction program, their actual sodium consumption behaviors remained at a moderate level, indicating a lack of correlation between knowledge and behavior change (Piaseu et al., 2020). Furthermore, the study by Biswas et al. (2020) which demonstrated that majority of the health science undergraduate students (93.20%) had knowledge regarding the adverse effect of excess salt on health, but only some of them avoided process food to restrict their salt intake. Additionally, a comprehensive analysis reported no direct correlation between salt intake and either knowledge or behavior scores among different cohorts of university students, reinforcing the idea that increased knowledge alone is

insufficient to reduce high sodium consumption (Marakis et.al, 2023).

Information perception on high-sodium food consumption

Information perception on high-sodium food consumption was not significantly predicted on consumption behavior (r_x2y = .229, $p > 0.01$). This results may be attributed to the fact that the nursing students receives information about high-sodium foods through various channels, including academic courses they learn, and digital media platform that provide abundant information. Consequently, their information perception of high-sodium food consumption is relatively high. However, nursing students may prioritize taste and flavor when selecting foods, with a strong preference for salty flavors (Kourouniotis et al., 2016). Additionally, the availability of food sources such as shopping malls and convenience stores, which frequently stock high-sodium products near colleges and dormitories, facilitates easy access to these foods.

As a result, despite being informed about high-sodium foods, nursing students continue to consume high-sodium food. This indicates that access to information on high-sodium foods does not significantly influence students' dietary behaviors regarding sodium consumption. This result is in agreement with the qualitative research conducted by Ruaisungnoen et al. (2018), which found that despite chronic disease patients possessing awareness of high-sodium food information, they continued to consume such foods. This behavior was attributed to factors such as a preference for salty flavors—perceiving unsalted foods as bland—and the influence of community eating practices. Nevertheless, the findings of this study diverge from those of Kanharura & Chupanit (2023), which reported that information perception significantly affects high-sodium food consumption. Similarly, they are inconsistent with the research by Youngiam et al. (2024), which identified perception as a significant determinant of sodium-rich dietary behaviors.

Conclusion

Nursing students exhibited moderate levels of high-sodium food consumption (Mean = 3.14, S.D. = 0.699). Two key factors influencing high-sodium food consumption were identified: accessibility to high-sodium food sources and attitudes toward high-sodium consumption. Based on the findings, educational institutions should manage the environment to promote the consumption of low-sodium foods and enhance awareness of the importance of reducing sodium intake. These efforts aim to decrease the sodium content in students' diets, thereby helping to mitigate potential health issues associated with high sodium consumption.

Research Implication

1. Nursing college administrators should promote behavioral interventions to encourage nursing students to make healthier choices regarding sodium consumption.
2. Nursing college administrators should guide the planning and implementation of initiatives aimed at fostering healthier food choices within the nursing college.

Suggestions for the further study

1. Research to develop a model or program for sodium consumption among nursing students is recommended to be conducted promptly.
2. A qualitative study to gain in-depth insights into high-sodium food consumption behaviors among nursing students is advised to be undertaken as a priority.

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Author Guideline and Instruction

International Journal of Public Health and Health Sciences (IJPHS)

Instruction for Authors & Guidelines (Revised March 18, 2022)

1. About the Journal

1.1. The International Journal of Public Health and Health Sciences (IJPHS) is published by Praboromajchanok Institute (PBRI), a higher educational institute of Ministry of Public Health, Thailand. PBRI is consisting of 3 Faculties, including Faculty of Medicine, Faculty of Nursing, and Faculty of Public Health and Allied Health Sciences. Under three faculties, there are in total of 42 Colleges, including 3 Colleges of Medicine, 30 Boromarajonani College of Nursing and Nursing Colleges, and 7 Sirindhorn Colleges of Public Health, one Kanchanabhishek Institute of Medical and Public Health Technology and one Abhaibhubejhr College of Thai Traditional Medicine Prachinburi located in all regions of Thailand.

1.2 The aim of publishing original articles and contributions is relevant to public health and medical sciences. The scope of the IJPHS covers the following areas: community health, nursing and nursing sciences, health policy and advocacy for health care, global health and sustainable development goals (SDGs), health care services, health promotion, health education and behavioral health, environmental health and climate changes, occupational health and safety, health technology and data management and health sciences.

2. Policies

2.1. The Editorial Board decides whether a contribution will be sent for peer review, and if so, it will consider the peer reviewers' reports and make the final decision to accept or reject the manuscript for publication. The Editorial Board reserves the final right to decide the section (manuscript type) in which the paper will be published if it is found to be acceptable for publication.

2.2. Submission of a manuscript to the IJPHS implies that it has not been published elsewhere, that it does not duplicate material already published in any language elsewhere, and that it is not in submission elsewhere.

3. Ethical issues

3.1. Human studies are expected to conducted in accordance with the recommendations outlined in the Declaration of Helsinki (1964, revised 1975, 1983, 1989, 1996, 2000, 2002, 2004, 2008 and 2013).

3.2. Authors should state in their Subjects (Materials) and Methods section that their institution's review board (ethics review committee) has approved the study proposal, as well as the manner in which informed consent was obtained from the subjects (if applicable).

4. Manuscript categories

The following types of contributions will be considered for publication.

4.1. Reviews: Review, evaluation or commentary of a number of research reports on a specific theme.

4.2. Originals: Articles with new findings and original research results, research methodologies, research materials and interpretations of the authors own or of other research results and articles of a similar nature.

4.3. Brief Reports: Articles with limited but original data and having the same format as originals.

4.4. Case Studies: Reports on cases of interest in the field of public health and related fields.

4.5. Field Studies: Reports on investigation into the status of public health with relevant data.

4.6. Opinions: Short articles conveying authors' own opinions or comments on various aspects of public health.

4.7. Letters to the Editor: Letters to the Editor on material published in the IJPHS are

welcome. Authors can submit Letters to the Editor by e-mail to the editorial office (ijph-editor@scphtrang.ac.th). The length must not exceed 500 words, only one table or figure is permitted, and there should be no more than five references. When appropriate, the journal may invite replies.

5. Copyright

If the manuscript is accepted for publication, copyright of the article shall be assigned to the IJPHS. After acceptance of a manuscript, the authors will be requested to complete a copyright transfer agreement form.

6. Manuscript format and style

Manuscripts should be prepared in the following manner. Submissions that do not conform to the instructions will be returned unread. The Editorial Office holds the right not to publish an article at any stage of the submission, review, and copyediting if the manuscript does not follow the required format and style.

6.1. Manuscripts should be written in English. Non-native English authors are encouraged to seek the assistance of an English-proficient colleague or commercial English editing services before submission of manuscripts to the journal.

6.2. Manuscripts should be typed in MS Word 97/03 for Windows or higher version, size 12-point type with margins of 2.5 centimeters on A4 (ca.22 × 28 cm) paper. Double spacing should be used throughout, and the right margin should be unjustified.

6.3. All papers should be organized to include the following: a title page, abstract, text, acknowledgments, references, figure legends, tables and figures. Each of the elements should begin on a separate page.

6.4. Pages should be numbered consecutively, beginning with the abstract. Line numbers should be put in the left margin of each page of the text.

6.5. Title page. The title page should include the following: a concise and descriptive title, name of each author, departmental and institutional affiliation of each author, the telephone and fax numbers as well as the e-mail address of the corresponding author, type of contribution, running title (not more than 60 letters including spaces), the number of words in the abstract and the text and the number of tables and figures.

6.6. Abstract. For all submissions except Letters to the Editor, structured abstracts should not exceed 250 words and should normally be organized under the following headings: Objectives, Methods, Results, and Conclusions. Abstracts are necessary for Opinions; however, abstracts for Opinions can be unstructured if appropriate.

6.7. Word count. Originals and Field Studies should be limited to 4,000 words, and Reviews should be limited to 6,000 words, excluding the abstract, acknowledgments, references, tables and figure legends. Brief Reports should not exceed 3,000 words and should contain no more than a total of 2 short tables or figures.

6.8. Format. Originals should generally use the following format: Introduction, Subjects (or Materials) and Methods, Results, and Discussion. Subheadings are paragraph titles should be used whenever possible. Brief Reports and Case Studies should be limited to four printed pages (normally, 800–1,000 words (text base) per page) including references, tables and figures.

6.9. Key words. For all submissions, give a list of 3-5 key words in alphabetical order. The authors are recommended to refer to Medical Subject Headings (MeSH) selected from main headings listed in Medical Subject Headings in Index Medicus, published by the National Library of Medicine (http://www.nlm.nih.gov/mesh/MBrowser.html). Key words will be placed after the abstract for Reviews, Originals, Case Studies and Field Studies.

6.10. Tables and figures. Tables and figures should be of adequate quality to withstand reduction in size. Each table and figure should be submitted on a separate A4 sheet. Their locations in the text should be indicated in the right margin of the text. Only

6 or fewer tables and figures are permitted in total. Each table and figure should constitute a single unit of communications; that is, it should be completely informative in itself without reading the body of the text.

6.11. References. The style of references should follow the Uniform Requirements for Manuscripts Submitted to APA Formatted References, 7th Edition (https://apastyle.apa.org/) Please refer to the examples of references listed below. List all authors when there are six or fewer; when there are seven or more authors, list the first three authors, followed by "et al." References should be numbered according to the order in which they appear in the text and should be listed at the end of the text. References should be limited to 30 original papers. Please ensure that the references include the most current articles and information.

Originals

Electronic Article with DOI

Author, A., Author, B., & Author, C. C. (year). Title of article. *Title of the Journal in Italics, Volume* (Issue), page numbers. https://doi.org/xxx.xxx

Sim, I. (2016). Two ways of knowing: Big data and evidence-based medicine. *Annals of Internal Medicine, 164*(8), 562-563. https://doi.org/10.7326/M152-2970

Electronic Article found on a news website that has a daily or weekly associated newspaper

Author, A. (year, month day). Title of the article. Title of Publication, URL

Schwarz, A. (2016, June 9). Research links PTSD to blasts in combat. The New York Times. https://www.nytimes.com/2016/06/10/us/ptsd-blst-waves-research.html

Book by two or more authors

Author, A., Author, B., & Author, C. (Year). Title of work. Publisher.

Sawyer Sommers, M., & Fannin, E. F. (2015). Diseases and disorders: A nursing therapeutics manual. F.A. Davis

Book Chapter Edited Book, print version

Author, A. A., & Author, B. B. (year). Title of chapter or entry. In A. Editor, B. Editor, C. Editor (Eds.), *Title of book* (pp. xxx-xxx). Publisher.

Toneatto, T., & Ongley, J. (2012). Buddhists. In E. Johnston Taylor (Ed.), *Religion: A clinical guide for nurses* (pp. 129-143). Springer Publishing.

Entire website

When you are not citing a specific page, but the entire website, it is sufficient to just give the address of the site in the text (no reference list entry is needed), as follows:

The American Medical Association is a an excellent resource for both medical professionals, as well as, the general public (https://www.ama-assn.org/).

Thesis/dissertation

Hom, K. E. (2018). *Association of Air Pollution with Longitudinal Changes in Arterial Stiffness and Correlated of Longitudinal Changes in Arterial Stiffness in the Multi-Ethnic Study of Atherosclerosis (MESA).* A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of Doctoral of Philosophy, University of Washington.

7. Charges

7.1. Page charges. No charge will be imposed on the authors of papers comprising up to ten printed pages with exemption for 200 $ in 2022-2025. However, charges for papers comprising more than ten pages will be levied on the authors at a rate of $50 per page.

7.2. Color figure charges. Color figures will incur a charge of $50 per each page.

8. Submitting a manuscript

Manuscripts should be submitted online through the web site at https://www.tci-thaijo.org/index.php/ijphs Authors can suggest preferred / non-preferred reviewers for their manuscript, but the editors are not obliged to use/not to use author suggested reviewers. In the IJPHS editorial process, six filed editors and their associate editors will handle submitted

papers according to their relevant areas of expertise. Please choose 2 appropriate fields in the order you prefer, as this will help ensure a prompt and efficient editorial process. The editorial board may allocate papers to fields other than those chosen by the authors when appropriate, but authors should endeavor to select the appropriate fields. Selection of inappropriate fields will delay the editorial process.

9. Accepted manuscripts

9.1. Research articles accepted for publication in the IJPHS will appear initially as author-supplied unedited files online in the IJPHS -in-Press section on the website (https://www.tci-thaijo.org/index.php/ijphs) shortly after acceptance. The date the articles was included on the website will be considered the publication date. Any substantive changes at this stage will require an erratum to be published. Articles will be published in the print version in order of acceptance as journal space permits.

9.2. Copyediting

Accepted manuscripts will undergo copyediting. The authors of the accepted manuscript are asked to make appropriate changes requested by the Editorial Office. The authors will be asked to submit the corrected manuscript to the Editorial Office as a Microsoft Word file(s).

9.3. Page proofs will be made available once to the submitting author.

9.4. Accepted manuscripts can also be accessed from the journal's page on the website free of charge. Authors can download the PDFs of their accepted articles and send then to colleagues for noncommercial use.

10. Editorial Office contact information

Questions regarding the instructions for authors should be addressed to the journal office via e-mail (ijphs@scphtrang.ac.th) or Tel. 66-88-7531547.

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