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Nutritional Status and Food Consumption of Nursing Students in Southern Nursing College Network†

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Abstract

Introduction: Food consumption is a critical indicator of nutrient intake and profoundly influences nutritional status and overall health. Maintaining optimal health is crucial for nursing students, who, as health exemplars, play a vital role in promoting healthy lifestyles. However, there remains a dearth of studies specifically examining the types of foods consumed, particularly in southern regions and college dormitory settings. Therefore, this study aimed to investigate nursing students' nutritional status and food consumption in the Southern Nursing College network to improve their health and well-being. Methods: A cross-sectional descriptive study was conducted to investigate the nutritional status and food consumption patterns of nursing students enrolled at the Southern Network Nursing College during the academic year 2023. Multi-stage sampling randomly selected 372 representatives. Then, data were collected using a general information questionnaire and a food frequency questionnaire. Descriptive statistics and chi-square analyses were employed for data analysis. Results: The majority of participants were female (92.74 %), with an average age of 20 years (SD = 1.38) and a cumulative Grade Point Average (GPAX) of 3.33 (SD = 0.31). Nutritional status varied, with 51.61 % classified as normal, 26.34 % as overweight, and 22.04 % as underweight. Factors associated with nutritional status included academic year, monthly income, alcohol consumption, and meal patterns. Food items commonly consumed included sticky rice with grilled chicken/pork, milk, bakery items for breakfast; noodles, rice and curry, and carte food for lunch; carte food, noodles, and salad for dinner; snacks, milk, and cold beverages between meals; and milk, snacks, and instant noodles for late-night consumption. These dietary choices reflected a high intake of carbohydrates and fats, potentially posing significant health risks to nursing students, a concern that needs immediate attention. Conclusion: Noteworthy sources of carbohydrates include sweetened milk, beverages, snacks, and bakery items. Food consumption significantly impacts nutritional status and overall health. The findings of this study have direct implications for the nursing profession, highlighting the need for nursing professional organizations and educational institutions to address nursing students' nutritional needs. The urgency of this issue is underscored by the need for continuous monitoring of dietary habits, coupled with the provision of healthy food alternatives, which is essential for promoting their well-being.

Keywords: Food consumption, Nursing student, Nursing college, Nutritional status

Introduction

Despite possessing a high level of knowledge and positive attitudes toward food consumption among college students (Sinthukot et al., 2019; Phaitrakoon et al., 2021), dietary habits often fall short of optimal standards. Studies have shown that many students frequently consume starchy foods and sweet beverages such as bread, coffee, cocoa, and milk for breakfast (Phaitrakoon et al., 2021). Between meals, preferences lean towards crispy snacks (Chabuakam, 2019), bakery items, ice cream, soft drinks, or desserts

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(Bashatah, 2020). Lunch and dinner typically consist of one-pot meals, such as a Thai omelet with rice, basil fried chicken topped with fried egg, French fries, and hamburgers (Dechjob et al., 2019). Moreover, late-night study sessions often accompany the consumption of instant noodles or snacks (Khunkaew et al., 2020), all of which are rich in energy content, contributing to potential fat accumulation and consequent obesity (Tasgin, 2017).

Protein, essential for bodily growth, is inadequately consumed by many students (Hadaye et al., 2019; Ningrum et al., 2019; Khunkaew et al., 2020). Similarly, micronutrients found in vegetables and fruits, crucial for optimal digestive function and fat metabolism, are also lacking in their diets (Ahmad et al., 2022). Consequently, malnutrition among nursing students manifests in both underweight (11.4 - 24.3 %) and overweight (8.9 - 19.3 %) percentages (Chabuakam, 2019; Sinthukot et al., 2019; Khunkaew et al., 2020).

Environmental factors within educational institutions, media influence, personal preferences, and the allure of Westernized dietary norms collectively shape nursing students' food consumption habits (Chansuksi & Kaewchankha, 2018; Chabuakam, 2019; Khunkaew et al., 2020). Furthermore, nursing students' demanding academic schedules, characterized by late-night study sessions and early morning classes, often lead to selecting convenient, nutrient-poor food options (Khunkaew et al., 2020).

Given nursing students' pivotal role as health leaders and role models within their communities (Hadaye et al., 2019), their dietary habits assume heightened importance. However, existing literature reveals a predominance of snack and sweet beverage consumption among nursing students, contributing to insulin dysregulation and increased fat deposition (Chomchuen et al., 2023). Conversely, protein intake remains insufficient for satiety regulation and body growth (Hadaye et al., 2019; Ningrum et al., 2019; Khunkaew et al., 2020).

While extensive research exists on the knowledge, attitudes, and general dietary behaviors of nursing students (Chabuakam, 2019; Khunkaew et al., 2020), there remains a dearth of studies specifically examining the types of foods consumed, particularly within the context of southern regions and college dormitory settings. Consequently, this study seeks to address this gap by investigating the dietary habits of nursing students at the Southern Network College, aiming to provide foundational insights for promoting healthier consumption behaviors. Such endeavors are crucial for fostering optimal health conditions among nursing students, who play vital roles as health advocates and educators within their communities.

Methodology

Research design and setting

This study adopts a cross-sectional descriptive design to examine the nutritional status and dietary patterns of nursing students enrolled at Southern Network Nursing College across the academic years from 2023.

Population

The study population comprised nursing students at Southern Network Nursing College enrolled in the 1st to 4th academic years of 2023. Inclusion criteria were the absence of weight control measures and the absence of underlying diseases necessitating specific dietary control. Exclusion criteria were not willing to participate in research. A sample size of 372 was determined using Krejcie & Morgan's formula (1970) with a $\chi 2$ of 3.814 and a *p*-value of 0.5. Sampling was conducted through the spatial division of the Southern Nursing College Network into upper and lower southern regions. Boromarajonani College of Nursing Nakhon Si Thammarat represented the upper southern region, while Boromarajonani College of Nursing Songkhla represented the lower southern region. Stratified random sampling was employed to ensure proportional representation across academic years.

Data collection

Data collection used a demographics questionnaire and a Food Frequency Questionnaire (FFQ). The demographics questionnaire encompassed general, health, behavioral, and meal consumption information, with body mass index (BMI) categorized into underweight (BMI < 18.5 Kg/m^2), normal

weight (BMI = 18.5 - 22.9 Kg/m^2), and overweight (BMI ≥ 23.0 Kg/m^2). The FFQ utilized was adapted from Aekplakorn (2011) and captured information on types of food consumed regularly at each meal, frequency of consumption over the past week, and categorized into infrequent and frequent consumption. The questionnaire's content was validated by 5 experts, resulting in a validity score of 1.00. Reliability testing was conducted with 30 nursing students from other colleges, yielding a Cronbach's alpha coefficient of 0.80. Data collection was conducted through individual interviews lasting 30 - 45 min.

Ethical consideration

The study received approval from Walailak University's Ethics Review Committee (WUEC-21-317-01). Before obtaining informed consent, eligible participants were provided with comprehensive information regarding the research objectives, procedures, potential risks, benefits, confidentiality measures, and their right to withdraw from the study. Participants were also asked to consent to access their medical records.

Data analysis

Descriptive statistics, including frequency, percentage, mean, and standard deviation, were employed to analyze personal information and food consumption frequency data. Chi-square statistics were utilized to explore relationships within the dataset

Results and discussion

Demographic data

The study predominantly comprised female participants (92.74 %), with a mean age of 20 years (SD = 1.38) and a cumulative Grade Point Average (GPA) of 3.33 (SD = 0.31). The majority identified as Buddhists (76.88 %) and exhibited normal weight (51.61 %), with an average monthly income of 4,300 baht (SD = 1,543.58), as shown in **Table 1**.

A substantial proportion of reported behaviors include tea/coffee consumption (72.31 %) and sweet beverages (94.09 %), while a minority engaged in alcohol consumption (5.38 %). Approximately half of the participants reported regular exercise (52.42 %), with sedentary behavior observed 4 - 7 days per week in the majority (78.23 %). The average sleep duration was 6 h (SD = 1.00), with the majority reporting sleep durations of less than 7 h (64.52 %).

Significant associations were observed between nutritional status and factors, including academic year, income, alcohol consumption, and exercise habits ($p < 0.05$), as shown in **Table 2**. In addition, the study found that significant associations were observed between nutritional status and food consumption at each meal, including Breakfast, Lunch, between meals, and late-night ($p < 0.05$), as shown in **Table 3**.

Food consumption patterns

The top 3 types of food consumed by nursing students at each meal were identified as follows:

1) Breakfast: Predominantly consisted of sticky rice with grilled/fried chicken/pork (47.31 %), milk (sweetened or plain milk and soy milk) (47.04 %), and bakery items (bread, cupcakes, brownies) (40.86 %).

2) Lunch: Notable selections included noodles (66.94 %), rice and curry (60.75 %), and carte food options (rice topped with stir-fried chicken/pork and basil, fried egg or omelet, fried rice) (55.38 %).

3) Dinner: Common choices comprised of carte food (55.11 %), noodles (44.89 %), and spicy salad (35.22 %).

4) Between meals: Snacks (55.65 %), milk (54.57 %), and cold beverages (iced tea, green tea, cocoa) (41.40 %) were frequently consumed.

5) Late-night consumption: Milk (44.09 %), snacks (23.92 %), and instant noodles (21.77 %) were the predominant options chosen during late-night hours, as shown in **Table 4**.

Table 1 General information (n = 372).

General information	Total n (%)	Underweight n = 82 (22.04 %)	Normal weight n = 192 (51.61 %)	Overweight n = 98 (26.34 %)	$\chi 2$	*p*-value
Gender					0.276	0.871
Men	27 (7.26 %)	6 (22.22 %)	15 (55.56 %)	6 (22.22 %)		
Women	345 (92.74 %)	76 (22.03 %)	177 (51.30 %)	92 (26.67 %)		
Age, Min-Max = 18 - 24 years, Mean = 20 years (SD = 1.38)					2.583	0.275
18 - 20 years	240 (64.52 %)	53 (22.08 %)	130 (54.17 %)	57 (23.75 %)		
> 20 years	132 (35.48 %)	29 (21.97 %)	62 (46.97 %)	41 (31.06 %)		
Religion					1.414	0.493
Buddhism	286 (76.88 %)	60 (20.98 %)	147 (51.40 %)	79 (27.62 %)		
Islam	86 (23.12 %)	22 (25.58 %)	45 (52.33 %)	19 (22.09 %)		
Academic year					16.128	0.013*
1	99 (26.61 %)	28 (28.28 %)	54 (54.55 %)	17 (17.17 %)		
2	99 (26.61 %)	18 (18.18 %)	47 (47.48 %)	34 (34.34 %)		
3	75 (20.17 %)	15 (20.00 %)	47 (62.67 %)	13 (17.33 %)		
4	99 (26.61 %)	21 (21.21 %)	44 (44.45 %)	34 (34.34 %)		
Cumulative grade point average (GPAX), Min - Max = 2.53 - 4.00, Mean = 3.33 (SD = 0.31)					8.704	0.069
2.50 - 2.99	53 (14.25 %)	6 (11.32 %)	27 (50.94 %)	20 (37.74 %)		
3.00 - 3.49	185 (49.73 %)	44 (23.78 %)	90 (48.65 %)	51 (27.57 %)		
3.50 - 4.00	134 (36.02 %)	32 (23.88 %)	75 (55.97 %)	27 (20.15 %)		
Monthly income, Min-Max 2,000 - 10,000 baht, Mean = 4,367.47 baht (SD = 1,543.58)					9.847	0.007*
2,000 - 5,000 baht	301 (80.91 %)	76 (25.25 %)	151 (50.17 %)	74 (24.58 %)		
> 5,000 baht	71 (19.09 %)	6 (8.45 %)	41 (57.75 %)	24 (33.80 %)		

* *p*-value < 0.05

Table 2 Behavioral data (n = 372).

Behavioral	Total n (%)	Underweight n = 82 (22.04 %)	Normal weight n = 192 (51.61 %)	Overweight n = 98 (26.34 %)	$\chi 2$	*p*-value
Tea/coffee					1.287	0.526
No	103 (27.69 %)	20 (19.42 %)	58 (56.31 %)	25 (24.27 %)		
Yes	269 (72.31 %)	62 (23.05 %)	134 (49.81 %)	73 (27.14 %)		
Sweet beverages					4.499	0.105
No	22 (5.91 %)	1 (4.55 %)	15 (68.18 %)	6 (27.27 %)		
Yes	350 (94.09 %)	81 (23.14 %)	177 (50.57 %)	92 (26.29 %)		
Sweetness level					4.540	0.604
Little	103 (38.29 %)	27 (26.21 %)	51 (49.52 %)	25 (24.27 %)		
Moderate	89 (33.09 %)	21 (23.60 %)	40 (44.94 %)	28 (31.46 %)		
Normal	77 (28.62 %)	14 (18.18 %)	43 (55.84 %)	20 (25.98 %)		
Alcohol					6.30	0.043*
No	352 (94.62 %)	76 (21.59 %)	187 (53.13 %)	89 (25.28 %)		
Yes	20 (5.38 %)	6 (30.00 %)	5 (25.00 %)	9 (45.00 %)		
Energy drinks					0.399	0.819
No	357 (95.97 %)	78 (21.85 %)	184 (51.54 %)	95 (26.61 %)		
Yes	15 (4.03 %)	4 (26.67 %)	8 (53.33 %)	3 (20.00 %)		
Exercise, Min - Max 30 - 120 h, Mean = 44.33 h (SD = 21.52)					6.574	0.037*
No	207 (55.65 %)	51 (24.64 %)	112 (54.10 %)	44 (21.26 %)		
Yes	165 (44.35 %)	31 (18.79 %)	80 (48.48 %)	54 (32.73 %)		
Sedentary behavior					1.624	0.804
No	47 (12.63 %)	12 (25.53 %)	22 (46.81 %)	13 (27.66 %)		
1 - 3 days/week	34 (9.14 %)	5 (14.71 %)	19 (55.88 %)	10 (29.41 %)		
4 - 7 days/week	291 (78.23 %)	65 (22.34 %)	151 (51.89 %)	75 (25.77 %)		
Sleep					6.292	0.178
Average sleep time (hours/day), Min - Max 4 - 9.5 h, Mean = 6.45 h (SD = 1.00)						
< 7 h	240 (64.52 %)	52 (21.67 %)	132 (55.00 %)	56 (23.33 %)		
7 - 9 h	131 (35.22 %)	30 (22.90 %)	60 (45.80 %)	41 (31.30 %)		
> 9 h	1 (0.26 %)	-	-	1 (100 %)		

* *p*-value < 0.05

Table 3 Meals consumed by nursing students in Southern Nursing College network (n = 372).

Meals consumed	Total n (%)	Underweight n = 82 (22.04 %)	Normal weight n = 192 (51.61 %)	Overweight n = 98 (26.34 %)	$\chi 2$	*p*-value
Breakfast					10.080	0.006*
Infrequently	204 (54.84 %)	41 (20.10 %)	120 (58.82 %)	43 (21.08 %)		
Frequently	168 (45.16 %)	41 (24.40 %)	72 (42.86 %)	55 (32.74 %)		
Lunch					6.602	0.037*
Infrequently	35 (9.41 %)	12 (34.29 %)	11 (31.42 %)	12 (34.29 %)		
Frequently	337 (90.59 %)	70 (20.77 %)	181 (53.71 %)	86 (25.52 %)		
Dinner					2.208	0.332
Infrequently	32 (8.60 %)	10 (31.25 %)	13 (40.63 %)	9 (28.12 %)		
Frequently	340 (91.40 %)	72 (21.18 %)	179 (52.65 %)	89 (26.17 %)		
Between meals					8.054	0.018*
Infrequently	240 (64.52 %)	46 (19.17 %)	120 (50.00 %)	74 (30.83 %)		
Frequently	132 (35.48 %)	36 (27.27 %)	72 (54.55 %)	24 (18.18 %)		
Late-night					6.089	0.048*
Infrequently	334 (89.78 %)	70 (20.96 %)	170 (50.90 %)	94 (28.14 %)		
Frequently	38 (10.22 %)	12 (31.58 %)	22 (57.89 %)	4 (10.53 %)		

* *p*-value < 0.05

Table 4 Food consumption at each meal (n = 372).

Food consumption	Total n (%)	Eating infrequently (≤ 3 days/week)	Eating frequently (> 3 days/week)
Breakfast			
Sticky rice with chicken/pork	176 (47.31 %)	117 (66.48 %)	59 (33.52%)
Milk	175 (47.04 %)	96 (54.86 %)	79 (45.14%)
Bakery	152 (40.86 %)	94 (61.84 %)	58 (38.16%)
Carte food	107 (28.76 %)	49 (45.79 %)	58 (54.21%)
Fast food	102 (27.42 %)	76 (74.51 %)	26 (25.49%)
Lunch			
Noodles	249 (66.94 %)	154 (61.85 %)	95 (38.15%)
Rice and curry	226 (60.75 %)	98 (43.36 %)	128 (56.64%)
Carte food	206 (55.38 %)	89 (43.20 %)	117 (56.80%)
Cold beverages	52 (13.98 %)	33 (63.46 %)	19 (36.54%)
Salad	38 (10.22 %)	30 (78.95 %)	8 (21.05%)

Food consumption	Total n (%)	Eating infrequently (≤ 3 days/week)	Eating frequently (> 3 days/week)
Dinner			
Carte food	205 (55.11 %)	109 (53.17 %)	96 (46.83 %)
Noodles	167 (44.89 %)	97 (58.08 %)	70 (41.92 %)
Salad	131 (35.22 %)	93 (70.99 %)	38 (29.01 %)
Rice and curry	81 (21.77 %)	43 (53.09 %)	38 (46.91 %)
Instant noodles	60 (16.13 %)	49 (81.67 %)	11 (18.33 %)
Between meals			
Snacks	207 (55.65 %)	126 (60.87 %)	81 (39.13 %)
Milk	203 (54.57 %)	149 (73.40 %)	54 (26.60 %)
Cold beverages	154 (41.40 %)	100 (64.94 %)	54 (35.06 %)
Bakery	143 (38.44 %)	95 (66.43 %)	48 (33.57 %)
Sweet drinks	99 (26.61 %)	68 (68.69 %)	31 (31.31 %)
Late-night			
Milk	164 (44.09 %)	110 (67.07 %)	54 (32.93 %)
Snacks	89 (23.92 %)	69 (77.53 %)	20 (22.47 %)
Instant noodles	81 (21.77 %)	66 (81.48 %)	15 (18.52 %)
Bakery	77 (20.70 %)	57 (74.03 %)	20 (25.97 %)
Yogurt	55 (14.78 %)	49 (89.09 %)	6 (10.91 %)

Discussion

This study found that only half of the nursing students in the southern nursing college network were normal weight (51.61 %); this is lower than the criteria set by the Ministry of Public Health (> 59 %) (Department of Health, Bureau of Nutrition, 2023). However, this result was similar to nursing students in the northern (Uttaradit province) (56.04 %) (Khunkaew et al., 2020), which is a nursing college under the same affiliation; therefore, it has a policy for students that is the same. All students must live in the dormitories and purchase food from stores within the college; these make food choices less likely. In addition, studying hard causes students to sleep late, wake up late, and consume easy, convenient, fast food. However, this study found that they had a lower normal weight than nursing students in the central (Royal Thai Navy College of Nursing) (64.56 %) and the northeastern (BCN, Sunpasitthiprasong) (66.80 %) (Chabuakam, 2019; Sinthukot et al., 2019). The Royal Thai Navy College of Nursing has arranged 3 meals a day to facilitate students' lives, along with things to support students' exercise. As a result, it promotes good nutritional status and health (Sinthukot et al., 2019). In the northeastern region, it was found that 27.36 % of students control their weight to maintain their appearance, causing the majority of students to have a normal weight (Chabuakam, 2019). In addition, studies abroad found that nursing students in India have a normal weight (28.20 - 36.67 %) (Hadaye et al., 2019; Kaur & Sharma, 2019) less frequently than in the present study because in India, it is famous for eating carbohydrates (rice, flour) and it was found that nursing students there have a habit of consuming fast food, instant food, snacks, and sweet drinks, etc. (Hadaye et al., 2019). It causes fat accumulation in the body (Ludwig et al., 2021).

Factors associated with nutritional status include academic year and monthly income, with second and fourth-year students exhibiting higher rates of being overweight. Increased stress levels, particularly

during clinical rotations, may drive emotional eating behaviors (Yucharoensuk, 2018) and sedentary lifestyles (Urbanetto et al., 2019)., contributing to weight gain. Similarly, higher income levels correspond to increased food consumption and weight gain, consistent with findings from Narathiwat Rajanagarindra nursing students (Rongpan et al., 2021). Alcohol consumption and exercise habits are also significant predictors of nutritional status, mirroring patterns observed in the Eastern region (Booranasuksakul et al., 2019). While alcohol consumption contributes to excess energy intake and fat storage (Steiner & Lang, 2017), regular exercise protects against obesity (Yamsri et al., 2017; Chomchuen et al., 2023).

In this study, it was observed that nursing students exhibited a preference for consuming stir-fried, fried, and fatty meats, exemplified by grilled food and one-pot meals such as Thai omelets with rice, rice topped with basil fried chicken and fried egg, as well as fast-food options like French fries and hamburgers. These food choices align with the hectic schedules of nursing students, particularly during the morning rush to attend classes, a trend consistent with findings among nursing students in the central region (Srinakarinwirot University) (Phaitrakoon et al., 2021). Additionally, the demands of rigorous academic coursework and heavy workloads often lead students to adopt irregular sleep patterns, resulting in late nights and subsequent late wake-up times (Khunkaew et al., 2020). Consequently, a considerable portion of students (45.2 %) skip breakfast, a behavior linked to hormonal imbalances affecting hunger and fatigue levels and influencing subsequent meal consumption patterns (Gupta et al., 2020).

Students commonly opt for carte food, noodles, and salad for lunch and dinner, primarily consisting of carbohydrates and fats derived from animal sources. However, excessive consumption of such foods can lead to the accumulation of fatty acids and subsequent weight gain (Tasgin, 2017). Between meals, consuming crispy snacks, bakery items, ice cream, soft drinks, and desserts is prevalent, contributing to high energy intake but limited nutritional value (Chabuakam, 2019; Bashatah, 2020). Moreover, late-night snacking habits, including the consumption of milk, snacks, and instant noodles during late-night study sessions (Khunkaew et al., 2020), further exacerbate the intake of high-carbohydrate, low-nutrient foods, increasing the risk of overweight and obesity (Tasgin, 2017; Ludwig et al., 2021; Kinansi et al., 2023). The accessibility of food options on college campuses, facilitated by convenience stores, vending machines, robotic baristas, and food delivery services, enables nursing students to quickly access snacks and beverages between meals. This convenience-oriented food environment contributes to the frequent consumption of carbohydrate-rich snacks and drinks, including iced tea, green tea, and cocoa. Overall, these dietary habits reflect a reliance on convenient, energy-dense food options, which, if not moderated, can have detrimental effects on long-term health outcomes such as obesity and metabolic disorders.

Conclusions

This study highlights trends in the nutritional status and dietary habits of nursing students within the Southern Nursing College network. The prevalence of underweight and overweight surpasses recommended thresholds, indicating an urgent need for targeted interventions. Addressing these challenges requires collaborative efforts from nursing professional organizations and educational institutions to prioritize students' nutritional well-being. Initiatives such as establishing healthy food alternatives on campus and promoting balanced meal options can mitigate adverse dietary behaviors. Given nursing students' pivotal role as health role models, addressing nutritional problems is paramount to ensuring the reliability of healthcare services and fostering public health awareness. Continued attention to students' dietary habits and nutritional status is essential for cultivating a healthier generation of healthcare professionals.

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