

ORIGINAL ARTICLE

Knowledge, attitude and practice on nutrition and dietary habits among nursing students

 Prince Chikwere¹,  Isaac Gunu Asirifi²

¹MPH, All Nations University, Nursing Department, Koforidua, Ghana

² MSc, All Nations University, Nursing Department, Koforidua, Ghana

Received: 19.08.2024, Accepted: 27.01.2025

Abstract

Objective: This study aimed to assess the knowledge, attitudes, and practices regarding nutrition and dietary habits among nursing students.

Method: A quantitative cross-sectional survey was conducted between August 2023 and November 2023. The study included 180 nursing students from various academic levels. Data were collected using structured questionnaires and analyzed using descriptive and inferential statistics.

Results: The findings revealed that the overall knowledge level of the participants on nutrition was moderate, with a mean score of 3.152 ± 0.297 on a five-point Likert scale. Attitudes towards nutrition varied, with distinct dietary patterns identified among participants. Principal component analysis revealed four dietary patterns, each associated with different food consumption habits. While some dietary patterns were associated with healthier attitudes, others showed mixed correlations. Dietary practices among nursing students indicated varying levels of adherence to healthy behaviours. For example, approximately half of the participants reported regular exercise, while less than half consumed breakfast daily. Additionally, only 46.1% of participants reported daily vegetable consumption, while 28.3% reported daily fruit consumption.

Conclusion: This study highlights the importance of targeted interventions to improve nutrition knowledge and promote healthier dietary behaviours among nursing students.

Keywords: Nursing Students, Nutrition Education, Diet

Correspondence: Prince Chikwere, MPH, All Nations University, Nursing Department, Koforidua, Ghana **E-mail:** uc.princechik@gmail.com

Cite This Article: Chikwere P, Asirifi IG. Knowledge, attitude and practice on nutrition and dietary habits among nursing students. Turk J Public Health 2025;23(1): 54-68.

©Copyright 2025 by the Association of Public Health Specialist (<https://hasuder.org.tr>)
Turkish Journal of Public Health published by Cetus Publishing.



Turk J Public Health 2025 Open Access <http://dergipark.org.tr/tjph/>.

This article is distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License.

INTRODUCTION

Nutrition is a fundamental component of healthcare, influencing individuals' overall health and well-being. Adequate nutrition supports optimal growth and development, strengthens immune function, and reduces the risk of chronic diseases.¹ Conversely, poor dietary habits characterized by inadequate nutrient intake, excessive consumption of unhealthy foods, and erratic eating patterns contribute to the burden of malnutrition and diet-related NCDs globally. Ghana, like many sub-Saharan African countries, grapples with the double burden of malnutrition, with persisting issues of undernutrition coexisting with the rising prevalence of obesity and diet-related NCDs.² Nursing education plays a pivotal role in shaping the knowledge, attitudes, and practices of future nurses regarding nutrition, thereby influencing their ability to address nutritional needs effectively. Optimal nutrition can aid in the management and prevention of various health conditions, improve patient recovery and rehabilitation, and enhance quality of life.³ Moreover, nutrition interventions have been shown to reduce healthcare costs and alleviate the strain on healthcare systems by preventing and managing diet-related chronic diseases.⁴ Nurses are uniquely positioned to play a central role in promoting nutrition and healthy dietary habits among individuals, families, and communities.

In the context of nursing education, the knowledge, attitudes, and practices (KAP) regarding nutrition and dietary habits among nursing students play a pivotal role in shaping their competence as future healthcare professionals.⁵ Moreover, nurses serve as advocates for nutrition-related policies and

programs, working collaboratively with interdisciplinary teams to promote evidence-based nutrition practices and address systemic barriers to healthy eating.⁶ Nutrition education equips nursing students with the knowledge, skills, and attitudes necessary to address the nutritional needs of diverse populations effectively. It encompasses a wide range of topics, including basic nutrition principles, dietary assessment techniques, nutritional interventions for various health conditions, and strategies for promoting behaviour change.⁷ Within the curriculum of nursing programs, nutrition education plays a vital role in preparing students to integrate nutritional assessment, counselling, and intervention into their clinical practice.⁸ However, the effectiveness of nutrition education efforts hinges on nursing students' KAP regarding nutrition and dietary habits. A conceptual framework is shown in Figure 1.

Understanding the nutrition-related KAP of nursing students at All Nations University in Koforidua, Ghana, is particularly relevant due to the country's unique health challenges and cultural context. Despite the importance of nutrition education in nursing, little is known about the knowledge, attitudes, and practices (KAP) regarding nutrition and dietary habits among nursing students in Ghana and especially, Koforidua. The extent of nutrition knowledge among nursing students remains unclear, raising concerns about their preparedness to provide effective nutritional counselling. This study aimed to address these gaps by assessing KAP regarding nutrition and dietary habits among nursing students, informing targeted interventions to promote healthier lifestyles.

METHOD

Study design

The study was a descriptive cross-sectional survey.

Study population and sample

The study involved university nursing students enrolled at the Nursing Department, All Nations University, situated in Koforidua, Ghana as participants. At the time of the study, the Nursing Department had a student population of 328 individuals. This diverse cohort comprised students from various educational backgrounds, including holders of West African Senior School Certificate (WASSC), certificate holders with designations such as Registered Nurse Assistant Clinical (RNAC), Registered Health Assistant Clinical (RHAC), and Registered Nurse Assistant Preventive (RNAP), as well as diploma holders recognized as Registered General Nurses (RGN). Notably, a significant proportion of the student body consisted of weekend students who concurrently worked in healthcare roles, serving either as registered general nurses or enrolled nurses.

The sample size (n) was determined to be 180, using Yamane's formula for calculating samples with a known population (328) as follows:

$$n = N / 1 + (N \times e^2) = 328 / 1 + (328 \times 0.05^2)$$

The calculation was based on a 95% confidence level and a 5% margin of error (e). To account for potential variations in knowledge, attitudes, and practices attributed to different stages of nursing education, the population was stratified based on academic year cohorts, including first year, second year, third year, and fourth year students. The final

sample consisted 55% of each year group. A summary of the sampling procedure is demonstrated in Figure 2.

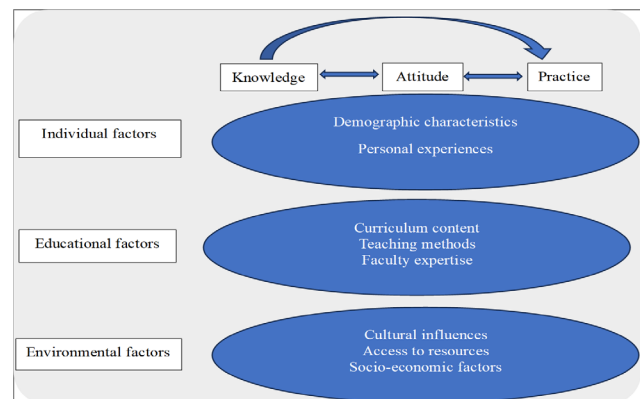


Figure 1. Conceptual framework on KAP on nutrition and dietary habits

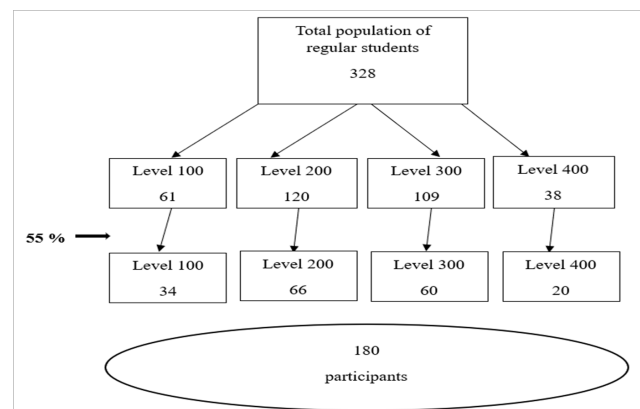


Figure 2. Sampling history and procedure

Data collection instrument

The data collection process involved a self-administered structured questionnaire. The first section collected biodata/socio-economic characteristics of the study participants such as age, gender, admission type, economic status, ailments from chronic diseases, and lifestyle (exercise, cigarette smoking and alcohol drinking). The second section was a food frequency questionnaire consisting of one closed question having fourteen sub questions with “Daily”, “3-5 times Per week”, “Weekly (1-2 times)”, “Monthly”, “Occasionally”, and “Never”, as alternative answers. The fourteen sub questions are

made of food groups and the section assessed frequency of intakes of the food groups. The third section of the questionnaire assessed the knowledge of respondents on twenty nutrition-related statements with a 5-point Likert scale – “Strongly disagree”, “Disagree”, “Neither or disagree”, “Agree”, and “Strongly agree”.

The questionnaire was pretested among fifteen (15) student nurses in All Nations University. The second section (food frequency questionnaire) was pretested in a focus group discussion that involved seven (7) persons: five student nurses, the researcher, and a recorder. The draft questionnaire was reviewed by a nutritionist and a nurse.

The participants were assisted to take their anthropometric (weight and height) measurements. The weight and height were used to calculate body mass index (BMI) in kilograms per squared meter. The BMI measurements were used as health outcome measures since they have implications for nutrition.

Data Processing and Analysis

Data was analysed by the Statistical Package for Social Sciences (SPSS) version 20.0 software. Descriptive statistics, such as means, frequencies, and percentages, were used to summarize demographic characteristics and key variables related to KAP on nutrition and dietary habits among nursing students. Means and standard deviations for continuous variables were computed and compared by one-way ANOVA. Nutritional knowledge was analysed using a Likert scale where a ratio scale numbered, 1 – 5, was formulated. For true nutrition statements, “1 = Strongly disagree”, “2 = Disagree”, “3 = Neither or disagree”, “4

= Agree”, and “5= Strongly agree”. For false nutrition statements, “1 = Strongly agree”, “2 = Agree”, “3 = Neither or disagree”, “4 = Disagree”, and “5= Strongly disagree”. These coding allowed for the computation of the overall mean response as well as mean responses for the individual statements. The means derived from the Likert scale calculations were used to evaluate the level of knowledge on nutrition of the participants. For the purposes of this research, means from the Likert scale less/equal to 3 (≤ 3) was interpreted as “bad” nutrition knowledge, means 3.1 to 3.6 were interpreted as “satisfactory”, means 3.6 to 4.0 were interpreted as “good”, means 4.1 to 4.5 were interpreted as “very good”, and means 4.6 to 5.0 were interpreted as “excellent”. Means of 3.05 were approximated to 3.1 and means of 3.55 were approximated to 3.6, for easy interpretation. Chi-square (X^2) was used to assess demographic data. Principal Component Analysis (PCA) was used to find the dietary patterns from the food frequency questionnaire by coded input variables, “1 = Daily”, “2 = 3-5 times per week”, “3 = Weekly (1-2 times)”, “4 = Monthly”, “5 = Occasionally”, “6 = Never”. Factor loadings were obtained for each of the foods in correlations with the components which were identified as dietary patterns. The foods within a pattern, with the highest factor loadings were used to characterize the dietary pattern. Pearson correlation (r) was used to determine the relationship between nutritional knowledge level and dietary patterns. The level of significance was at 0.05.

RESULTS

Demographic and other characteristics of participants by gender

The study involved a total of 180 participants, comprising 156 (86.9 %) females and 24 (13.1 %) males. The mean age of the participants was 29.78 ± 5.51 , mean BMI 27.35 ± 5.30 , mean

SBP 113.69 ± 8.63 , and mean DBP 72.32 ± 8.82 .

Table 1 presents the demographic data of participants.

More than half (111; 61.7 %) of the participants were certificate nurses (enrolled nurses). Most of the respondents (129; 71.7 %) got their nutrition information from either a health practitioner or nutrition lecturer.

Table 1. Demographic and other characteristics of participants by gender

Variable	Participants N=180	Female (n=156)	Male (n=24)	p-value	
		n	%	n	%
Educational level					0.756
Diploma Nursing	22	19	12.2	3	12.5
Diploma/Degree other than Nursing	3	2	1.3	1	4.2
HAC/NAC/NAP	111	99	63.5	12	50.0
WASSCE	44	36	23.1	8	33.3
Academic level					0.011*
Level 100	34	26	16.7	8	33.3
Level 200	66	59	37.8	7	29.2
Level 300	60	54	34.6	6	25.0
Level 400	20	17	10.9	3	12.1
Economic status (self-reported)					0.139
Bad	8	7	4.5	1	4.2
Good	38	37	23.7	1	4.2
Moderate	134	112	71.8	22	91.7
Chronic disease in self					0.335
No	170	148	94.9	22	91.7
Yes	10	8	5.1	2	8.3
Regular exercise					0.349
No	90	81	51.9	9	37.5
Yes	90	75	48.1	15	62.5
Smoking					
No	180	156	100	24	100
Yes	0	0	0.0	0	0.0
Alcohol drinking					0.171
Ex-drinker	2	2	1.3	0	0.0
No	172	150	96.2	22	91.7
Yes	6	4	2.6	2	8.3

Table 1. (continued). Demographic and other characteristics of participants by gender

Variable	Participants N=180	Female (n=156) n(%)	Male (n=24) n(%)	p-value	
		n	%	n	%
Nutrition knowledge source					0.024*
Blogs, internet forum, discussion	11	11	7.1	0	0.0
Family and friends	23	20	12.8	3	12.5
Nutritionist/nutrition tutor/ physician/nurse	129	111	71.2	18	75.0
Press and news website	2	2	1.3	0	0.0
Radio and television	6	3	1.9	3	12.5
Social media e.g. Facebook	9	9	5.8	0	0.0
Breakfast					0.578
Always	70	61	39.1	9	37.5
Never	3	2	1.3	1	4.2
Sometimes	107	93	59.6	14	58.3
Meals usually taken per day					0.658
Four or more	9	8	5.1	1	4.2
One	2	2	1.3	0	0.0
Three	96	85	54.5	11	45.8
Two	73	61	39.1	12	50.0
Ever received professional diet advice due to health					0.637
No	111	98	62.8	13	54.2
Yes	69	58	37.2	11	45.8
What informs food choice					0.025*
Advertisement	7	5	3.2	2	8.3
Excitement to eat	28	28	17.9	0	0.0
Financial status	38	34	21.8	4	16.7
Friends and family	9	5	3.2	4	16.7
Nutrient content/Nutrition label	98	84	53.8	14	58.3

N is total number of participants; n is the number of males or females in a category; percentages are in parentheses; *significant difference between variables at $p < 0.05$

Knowledge on nutrition and dietary habits among nursing students

The overall knowledge of the participants on nutrition as estimated by the mean of the responses on the nutrition knowledge was 3.152 ± 0.297 . Sixty-eight participants (37.5 %) had score ≤ 3.0 , ninety-two participants

(51.3 %) had scores 3.1 to 3.5, nineteen participants (10.6 %) had scores 3.6 to 4.0, and only one participant (0.6 %) had scores between 4.1 to 4.5. None of the participants had scores between 4.6 to 5.0. The levels of nutrition knowledge on the various test items are presented in Table 2.

Table 2. Knowledge level of nutrition and dietary habits among participants

S/No	Nutrition knowledge test items	Mean response
	Fat is always bad for your health; you should therefore avoid it as much as possible	3.14
	If you have eaten high-fat foods, you can reverse the effects by eating apples	3.31
	A balanced diet implies eating all foods in the same amounts	3.33
	For a healthy nutrition, dairy products should be consumed in the same amounts as fruit and vegetables	3.19
	Brown sugar is much healthier than white sugar	2.69
	To eat healthily, you should eat less fat. Whether you also eat more fruit and vegetables does not matter	3.38
	Oily fish (salmon, mackerel) contain healthier fats than red meat	3.55
	Meat sausage contains more salt than cream cheese	2.99
	Skimmed milk (low fat) contains fewer minerals than full-fat milk	3.00
	The health benefit of fruit and vegetables lies alone in the supply of vitamins and minerals	2.86
	Dairy products contain more saturated fats (fatty acids) than vegetable oils	3.32
	If cream is whipped (to solid) it contains less calories than in its liquid form	3.13
	Fat contains fewer calories than the same amount of fiber	3.26
	The same amount of sugar and fat contains equally many calories	3.11
	Malnutrition can be reversed at any point with appropriate diets	2.26
	When a pregnant woman is undernourished, she is at risk of having a low-birth-weight baby	3.84
	When taken during meals, Vitamin-C-rich foods such as fresh citrus fruits, help the body absorb and use iron.	3.74
	Palm oil does not contain unsaturated fats	3.01
	Whole-grain bread has a higher vitamin and mineral content	3.30
	Plantain is a major source of iron	2.63

For the statements, “When a pregnant woman is undernourished, she is at risk of having a low-birth-weight baby” and “When taken during meals, Vitamin-C-rich foods such as fresh citrus fruits, help the body absorb and use iron”, participants had good knowledge level with scores of 3.84 and 3.74 respectively. Bad level of knowledge was recorded for the statements, “The health benefit of fruit and vegetables lies alone in the supply of vitamins and minerals” (2.86), “Brown sugar is much healthier than white sugar” (2.69), “Plantain is a major source of iron” (2.63), and “Malnutrition can be reversed at

any point with appropriate diets” (2.26). Table 3 illustrates the prevalence of participants’ knowledge according to their academic level.

Attitudes on nutrition and dietary habits among Nursing students

Four components were derived from the principal component analysis with Eigenvalues of 4.285, 1.910, 1.302, and 1.084 for Pattern I, Pattern II, Pattern III, and Pattern IV respectively (Table 3). The percentage of variance for the identified patterns were respectively 30.608 %, 13.645 %, 9.300 %, and 7.743 %.

Table 3. Factor loadings of extracted components

Foods	Dietary patterns			
	I	II	III	IV
Cereals & Grains and their products	0.374	0.166	0.481	0.072
Starchy Roots and Tubers and their products	0.389	0.304	-0.305	0.587
Legumes and Legume Products	0.508	0.421	-0.381	0.168
Nuts & Seeds and their products	0.642	0.369	-0.352	-0.066
Meat, Eggs & Game and their products	0.587	-0.025	0.404	0.141
Sea Foods/Freshwater fishes and their products	0.482	0.309	0.258	0.139
Milk and Milk Products	0.694	-0.240	0.196	-0.120
Fats and Oils (e.g. cooking oils, fried foods)	0.526	-0.382	0.384	0.335
Processed Foods and fast foods	0.625	-0.416	-0.128	0.174
Salty Foods (e.g. momoni, koobi)	0.619	-0.295	-0.315	0.076
Fruits (e.g. orange, pawpaw. Mango)	0.591	0.527	-0.045	-0.301
Vegetables (e.g. garden eggs, leafy vegetables)	0.538	0.420	0.315	-0.347
Beverages and Non-Sugar Alcohols (e.g. tea, coffee, cocoa beverages)	0.510	-0.288	-0.206	-0.525
Sugary drinks	0.562	-0.615	-0.184	-0.115

Values are factor loadings or correlations of each food with components identified. A positive factor loading indicates the food sample is positively associated with the dietary pattern, while a negative factor loading indicates an inverse association with the dietary pattern.

Pattern I is characterized by more frequent intakes of nuts & seeds, milk and milk products, processed foods and fast foods, and salty foods. Pattern II was characterized by more frequent intakes of legumes and legume products, fruits and vegetables

and less frequent intakes of sugary drinks, processed foods and fast foods. Pattern III is characterized by more frequent intakes of cereals & Grains and meat, eggs & game. Pattern IV is characterized by more frequent intakes of starchy roots and tubers and less frequent intakes of beverages and non-sugar alcohols.

The overall level of nutrition of participants was negatively correlated with Dietary pattern II ($p<0.05$) and Dietary pattern III ($p<0.01$) (Table 4).

Table 4. Relation of the dietary pattern to the overall knowledge of the participants

Variable	Dietary patterns			
	PATTERN I	PATTERN II	PATTERN III	PATTERN IV
Overall nutrition knowledge	0.040	-0.148*	-0.196**	-0.028

*Correlation is significant at the 0.05 level (1-tailed). **Correlation is significant at the 0.01 level (1-tailed).

Practices on nutrition and dietary habits among Nursing students

About half (46.1 %) of the participants took vegetables daily and another 27.2 % consumed vegetables 3-5 times per week (Table 5). Only 28.3 % took fruits daily and another 28.9

%, 3-5 times per week. Occasionally, 8.3 % had intakes of fruits. About one-third of the participants (32.8 %) took processed foods 1-2 times per week. Only 7 % and 8.9 % of the participants claimed never to have consumed beverages (such as coffee) and sugary drinks respectively (Table 5).

Table 5. Frequency of consumption of various food groups and types

Food group/type	Frequency of consumption											
	Daily		3-5 times per week		1-2 times per week		Monthly		Occasionally		Never	
	n	%	n	%	n	%	n	%	n	%	n	%
Cereals & Grains	66	36.7	84	46.7	24	13.3	1	0.6	5	2.7	0	0.0
Starchy Roots and Tubers	39	21.7	63	35.0	66	36.7	2	1.1	8	4.4	2	1.1
Legumes	25	13.9	68	37.7	53	29.4	18	10.0	16	8.9	0	0.0
Nuts & Seeds	23	12.8	41	22.8	62	34.4	21	11.7	31	17.2	2	1.1
Meat, Eggs & Game	73	40.6	56	31.1	34	18.9	11	6.1	5	2.7	1	0.6
Sea Foods/Freshwater fishes	64	35.6	51	28.3	42	23.3	9	5.0	13	7.2	1	0.6
Milk	47	26.1	59	32.8	48	26.7	9	5.0	16	8.9	1	0.6
Fats and Oils (e.g. cooking oils, fried foods)	71	39.4	59	32.8	34	18.8	8	4.4	8	4.4	0	0.0
Processed Foods and fast foods	16	8.8	47	26.1	59	32.8	19	10.6	36	20.0	3	1.7
Salty Foods	15	8.3	29	16.1	75	41.7	21	11.7	30	16.7	8	4.4
Fruits	51	28.3	52	28.9	45	25.0	17	9.4	15	8.3	0	0.0
Vegetables	83	46.1	49	27.2	37	20.5	7	3.9	4	2.2	0	0.0
Beverages and Non-Sugar Alcohols	34	18.9	44	24.4	62	34.4	9	5.0	24	13.3	7	3.9
Sugary drinks	19	10.5	33	18.3	53	29.4	16	8.9	43	23.9	16	8.9

DISCUSSION

The study sought to assess knowledge, attitude, and practice on nutrition and dietary habits among nursing students of All Nations University, Koforidua. In recent times, the significant rise in non-communicable diseases (NCDs) related to diet has been associated with environments that encourage the overconsumption of unhealthy foods and restrict opportunities for physical activity.^{9,10} For this purpose, it is crucially essential to educate the public about nutrition and to execute intervention tactics aimed at elevating the degree of nutritional literacy.¹¹ It is crucial

Turk J Public Health 2025;23(1)

to provide training to nurses, who play a significant role in executing public health enhancement strategies and decision-making, to enhance their understanding of nutrition and nutrition literacy. A previous study proposed that this training should commence during their undergraduate education.⁸ Consequently, nursing students with a robust grasp of nutrition and nutrition literacy will be equipped to effectively advise society as future nurses before completing their studies.

The level of knowledge of the participants was low (with the score of 3.15) but 'satisfactory'

based on the rating used in the study. In a similar study by Chepulis & Mearns,⁵ the level nutritional knowledge scores of nursing students were low. Unfortunately, about 38 % had bad knowledge of nutrition (≤ 3). And another 51.3 % of the participants only had satisfactory scores (3.1 to 3.5). Interestingly, only 10.6 % of the participants had 'good' (scores 3.6 to 4.0) level of knowledge on nutrition. A study in Turkey, however, found about half of the students had good level of nutrition knowledge.⁷ The highest scores, 3.84 and 3.74, were respectively recorded for the knowledge on the statements, "When a pregnant woman is undernourished, she is at risk of having a low-birth-weight baby" and "When taken during meals, Vitamin-C-rich foods such as fresh citrus fruits, help the body absorb and use iron". These scores represent 'good' level of knowledge. Participants displayed good level of knowledge (scores between 3.6 to 4.0) for the test items, "When a pregnant woman is undernourished, she is at risk of having a low-birth-weight baby" and "When taken during meals, Vitamin-C-rich foods such as fresh citrus fruits, help the body absorb and use iron". Apparently, the highest score was elicited by the former followed by the latter test item. Most of the participants were females and may be conscious of the outcomes of their present and future pregnancies. Vitamin C is one of the commonest vitamins and it is not surprising that the participants had a good score on the test item concerning the vitamin.

'Bad' levels of knowledge were demonstrated for the statements, "The health benefit of fruit and vegetables lies alone in the supply of vitamins and minerals" (2.86), "Brown sugar is much healthier than white sugar" (2.69), "Plantain is a major source of iron" (2.63), and

Turk J Public Health 2025;23(1)

"Malnutrition can be reversed at any point with appropriate diets" (2.26). Participants asserted that the only health benefits that can be obtained from fruits and vegetables is the provision of vitamins and minerals. Fruits and vegetables contain fibres for prevention of constipation and colon cancer; they also contain considerable amount of water. Brown sugar was seen as being healthier than white sugar. These two sugars same; the difference only lies in the colouration. Participants also agreed that malnutrition can be reversed at any point with appropriate diets. This statement certainly is false. When malnutrition reaches chronic levels, it becomes almost impossible to reverse it. Plantain is still seen as a major source of iron. Plantain is a source of iron but not a major source; it mainly supplies carbohydrate. Nurses, as the primary cohort of healthcare professionals, are strategically positioned to oversee and assist in fulfilling patients' fundamental nutritional needs within diverse work settings and cultures. In hospital settings, this responsibility may encompass addressing issues such as eating problems, dehydration, and/or malnutrition,¹² contributing to prolonged hospital stays and an elevated risk of mortality if untreated. Thus, enhancing patients' health outcomes stands as a crucial duty for nurses. Nevertheless, as indicated by Chao et al., student nurses exhibit limited knowledge in this domain.¹³ Insufficient nutrition literacy emerges as a significant obstacle to delivering comprehensive, high-quality nutritional care to patients. It becomes imperative to plan post-undergraduate education training sessions to enhance the confidence and motivation of nursing students in providing effective nutritional care.¹³ Consequently, augmenting nutrition literacy among nursing students

becomes pivotal for enhancing public health outcomes and the quality of life for patients. Though the mean SBP and DBP are low and in normal range, the mean BMI was within the overweight range. Half of the participants did not engage in regular exercise (Table 1).¹⁴ Yamamoto et al. suggests that skipping meals results in additional eating throughout the day, which can lead to weight gain.¹⁵ Though most of the participants reported a healthy nutrition behaviour, more than half took regular meals and less than half took breakfast daily (Table 1).

University students commonly exhibit a low consumption of daily fruits and vegetables, coupled with a heightened intake of fried foods.¹⁴ Despite some reported unhealthy eating habits, most students possess a sound understanding of the food pyramid and balanced nutrition. The challenges may arise from factors such as stress, a heavy workload, and time constraints, leading university students to make suboptimal food choices. Consequently, adhering to healthy eating patterns becomes challenging for these university students.¹⁴

Most of the participants in the present study were already working, giving them a good socio-economic status (Table 1). This may account for the types of varied and complex dietary patterns in the study. A study in Australia identified three dietary patterns the healthy pattern composed of fruit, vegetables, and legumes, the Western pattern composed of high fat, sugar, and salt, and the unbalanced pattern.¹⁹ Though Williams et al. associated the dietary patterns with socio-demographic factors, it was apparent that most nursing students adopt unhealthy dietary patterns similar to those of their counterparts in other

university academic programmes.¹⁹

The overall level of nutrition of participants was negatively associated with Dietary pattern II ($p < 0.05$) and Dietary pattern III ($p < 0.01$) (Table 4). Participants with high score and high nutrition knowledge are less likely to adhere with Dietary pattern II and dietary pattern III. Assessing nutritional knowledge solely with a general score may not fully capture its influence on dietary preferences. Considering factors such as socioeconomic status, lifestyle, and cultural habits could reveal variations in the relationship between dietary patterns and knowledge levels. The observed negative correlations suggest that a tendency toward healthy eating does not always align with conscious nutritional knowledge. This highlights the need for health education initiatives to bridge these gaps. The knowledge may not have direct correlation with blood pressure and anthropometric measurements. An earlier study indicated a positive correlation between the dietary attitudes of nursing students and their nutrition knowledge.²⁰ The earlier study suggested that to enhance the dietary perspectives of nursing students, educators in nursing should create educational intervention initiatives focused on nutrition. These programs aim to boost understanding of nutrition and pinpoint issues related to food habits. Liao et al. reported that nutrition literacy accounted for 17.2% of the overall variance in healthy-eating behaviours among college students.²¹ The results of Liao et al. indicated suboptimal levels of nutrition literacy among college students and a positive correlation was observed between elevated levels of nutrition literacy and the adoption of healthier dietary behaviours.²¹ Consequently,

it is thus imperative to devise strategies for enhancing nutrition literacy in college students as a means to encourage healthier eating habits.²¹ In a study that involved students in nursing, law, and Islamic sciences, Uysal et al. reported a correlation between health literacy and nutrition knowledge.²² Consistent with existing literature, it can be argued that elevating nursing students' nutrition knowledge by nurse educators would lead to an increase in students' nutrition literacy. The current nutrition education provided to undergraduate nursing students is insufficient to meet the demands placed on future nurses as healthcare professionals, especially in delivering nutritional care aligned with patient needs. Adequate preparation for training is essential to support the long-term health of nurses themselves while enhancing their professional competence to address contemporary nutritional challenges.²² Consequently, there is a critical need to enhance nursing students' capacity to acquire, process, and comprehend nutrition information, along with the skills necessary for making informed nutritional decisions. A study reiterates that improvement should start from the undergraduate level, and nutrition lessons should be incorporated into the nursing curriculum.⁷ Interestingly, participants in the current study have benefitted from a nursing curriculum that includes a nutrition course. It is obvious the two to three-hour course is not enough to elicit a high level of nutrition knowledge and behaviour. Interventions should be created to enhance the dietary behaviours of nursing students through health-promoting activities⁴ and the accessibility of online health resources.¹⁹

The findings (Table 1) suggest a high level
Turk J Public Health 2025;23(1)

of awareness among participants regarding the detrimental health effects associated with alcohol and tobacco use, aligning with global efforts to promote healthy lifestyle behaviours.²³ Regarding dietary habits, less than half of the participants reported consuming breakfast regularly (38.9%), while the majority reported consuming three meals daily (53.3%). Interestingly, a higher proportion of males than females reported consuming three meals daily, suggesting potential differences in meal patterns between genders. Moreover, a significant proportion of participants (40.6%) reported consuming only two meals daily, with a higher percentage of males (50.0%) than females (35.6%) adopting this dietary pattern. This finding raises concerns about the adequacy of nutrition intake among participants, particularly those consuming fewer meals per day, as it may impact their overall nutrient intake and energy levels.²⁴ Additionally, a small percentage of participants reported regularly purchasing already cooked food, with a higher proportion of males (16.7%) than females (less than 5%) engaging in this behaviour. This highlights potential differences in dietary preferences and convenience-seeking behaviours between genders. Overall, the findings underscore the importance of promoting regular exercise and healthy dietary behaviours among participants, with targeted interventions needed to address gender disparities and encourage healthier lifestyle choices.

Research conducted by Alzaben et al. affirmed that a nutrition awareness program heightened pupils' nutritional knowledge but did not significantly impact their dietary habits.²⁵ Riley et al. highlighted gaps in nursing and healthcare curricula, emphasizing the

need for training in healthy dietary habits and food insecurity screening.²⁶ Nonetheless, Zaghamir & Ibrahim suggested that the young age of the student nurses and the above-average percentage of parents without college degrees may contribute to their lack of knowledge regarding nutrition and eating habits.⁴ Factors such as neglecting ward duties, disinterest in attending seminars or lectures, and an unwillingness to educate themselves on nutrition and eating habits may contribute to their inadequacy in nutrition knowledge.

The study established a positive correlation between higher knowledge scores and higher education levels, underscoring the potential importance of education in fostering understanding and awareness of nutrition and dietary practices. These findings resonate with previous research indicating that a higher level of education predicts a greater understanding of healthy nutrition and dietary habits.²⁷ Patients are anticipated to receive nutritional advice from nurses and other healthcare professionals. Nurses are frontliners in patient care and it is important to assess their level of knowledge in nutrition. Nursing students had a high prevalence of overweight and obesity, poor eating habits, and insufficient knowledge on key nutrition issues.²⁸ Young adult nursing students and nurses are the future of the nursing fraternity; knowledge of nutrition will be essential to their personal health and the health of their patients. According to studies, doctors and nurses who have a normal BMI are more likely to discuss weight, diet, and lifestyle issues with their patients and use strategies to prevent obesity in patients.²⁹ Nutrition transition has caused a drastic change in diet as processed foods and animal-based foods predominate meals. The young adults are caught up in this

transition as they wean from parental control. Furthermore, students, especially those in nursing schools, often face busy schedules and the need to balance various activities. Many succumb to unhealthy eating habits during this period, engaging in practices such as skipping meals, dieting, consuming fast food, and reducing physical activities. Their increased independence, marked by leaving their parents' home, intensive study sessions, occasional part-time jobs, and limited attention to the quality and quantity of their meals, further contribute to these unhealthy behaviours.³⁰ Moreover, students frequently resort to high-energy, low-nutrient foods like candy bars, cookies, and fast foods, opting for convenience over nutritional value. Academic pressures also impact their dietary choices, resulting in inadequate consumption of vegetables, fruits, and fiber, while increasing intake of fats, sodium, and sugars. Consequently, these habits lead to unhealthy dietary patterns and undesirable behaviours.

CONCLUSION

Overall, the findings highlight moderate levels of knowledge, varying attitudes, and mixed dietary practices among nursing students regarding nutrition and dietary habits. These results underscore the importance of targeted interventions to improve nutrition knowledge and promote healthier dietary behaviours among nursing students.

The study is not without limitations typical of descriptive cross-sectional studies. It relied on memories of participants. There was absence of data on potential confounders (educational and environmental factors as stipulated in Figure 1) and bias sources, and an inability to capture the full complexity of data. As a quantitative study, it did not capture

the context and subjective experiences of individuals.

ACKNOWLEDGEMENT

The authors are grateful to the Nursing Department, All Nations University, Ghana, and to all nursing students who participated in the study.

Financial Support : The study was exclusively funded by the authors.

Conflict of Interest : The authors declare no conflict of interest.

Ethical Declaration: Prior to commencing the study, permission was sought from the Nursing Department, All Nations University and the study was approved by the All Nations Ethics Review Committee. Furthermore, the principle of informed consent was meticulously upheld, as all potential participants were provided with comprehensive information regarding the purpose, procedures, and potential risks and benefits of the study. Written consent was obtained from each participant, reaffirming their voluntary participation and understanding of their rights as research subjects. Stringent measures were implemented to safeguard confidentiality and anonymity of participants.

Author Contrubition: Concept: PC; Design: PC, IGA; Supervising: PC; Data collection and entry: PC, IGA; Analysis and interpretation: PC; Literature search: PC, IGA; Writing: PC, IGA; Critical review: PC.

REFERENCES

1. World Health Organisation. Nutrition. 2021. Available at: <https://www.who.int/health-topics/nutrition>. Accessed December 5, 2023.
2. World Health Organisation. Key facts on non-communicable diseases. 2023. Available at: <https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases>. Accessed January 6, 2024.
3. Vari R, d'Amore A, Silenzi A, Chiarotti F, Del Papa S, Giovannini C, Scazzocchio B, Masella R. Improving Nutrition Knowledge and Skills by the Innovative Education Program MaestraNatura in Middle School Students of Italy. *Nutrients*. 2022; 14(10): 2037.
4. Zaghamir DEF, Ibrahim AM. Efficiency of an intervention study on nursing students' knowledge and practices regarding nutrition and dietary habits. *The Libyan Journal of Medicine*. 2023; 18(1): 2281121.
5. Chepulis LM, Mearns GJ. Evaluation of the Nutritional Knowledge of Undergraduate Nursing Students. *The Journal of Nursing Education*. 2015; 54(9), S103-S106.
6. Hwang Y, Oh J. Factors Affecting Health-Promoting Behaviors among Nursing Students. *International Journal of Environmental Research and Public health*. 2020; 17(17): 6291.
7. Mengi Çelik Ö, & Semerci R. Evaluation of nutrition literacy and nutrition knowledge level in nursing students: a study from Turkey. *BMC Nursing*. 2022; 21(1): 359.
8. Buxton C, Davies A. Nutritional knowledge levels of nursing students in a tertiary institution: lessons for curriculum planning. *Nurse education in practice*. 2013;13(5): 355-360.
9. Allen LN, Wigley S, Holmer H. Implementation of non-communicable disease policies from 2015 to 2020: a geopolitical analysis of 194 countries. *The Lancet. Global health*. 2021; 9(11): e1528-e1538.
10. Cammock R, Tonumaip'e'a D, Conn C, Sa'uLilo L, Tautolo ES, Nayar S. From individual behaviour strategies to sustainable food systems: Countering the obesity and non-communicable diseases epidemic in New Zealand. *Health policy*. 2021; 125(2): 229-238.
11. Zeldman J, Andrade JM. Identifying Physicians' and Nurses' Nutrition Knowledge Using Validated Instruments: A Systematic Narrative Review. *International Journal of Nutrition and Food Sciences*. 2020; 9(2): 43-53.
12. Volkert D, Beck AM, Cederholm T, Cruz-Jentoft A, Goisser S, Hooper L, Kiesswetter E, Maggio M,

- Raynaud-Simon A, Sieber CC, Sobotka L, van Asselt D, Wirth R, Bischoff SC. ESPEN guideline on clinical nutrition and hydration in geriatrics. *Clinical Nutrition*. 2019; 38(1): 10–47.
13. Chao AM, Luong V, Dowd M, Compher C. A National Survey of Faculty Perceptions of Nutrition in Nursing Education. *The Journal of Nursing Education*. 2020; 59(10): 566–569.
14. Tok CY, Ahmad SR, Koh DSQ. Dietary habits and lifestyle practices among university students in Universiti Brunei Darussalam. *Malaysian Journal of Medical Sciences*. 2018; 25(3):56–66.
15. Yamamoto R, Tomi R, Shinzawa M, Yoshimura R, Ozaki S, Nakanishi K, Ide S, Nagatomo I, Nishida M, Yamauchi-Takahara K, Kudo T, Moriyama T. Associations of Skipping Breakfast, Lunch, and Dinner with Weight Gain and Overweight/Obesity in University Students: A Retrospective Cohort Study. *Nutrients*. 2021; 13(1): 271.
16. Rivera Medina C, Briones Urbano M, de Jesús Espinosa A, Toledo López Á. Eating Habits Associated with Nutrition-Related Knowledge among University Students Enrolled in Academic Programs Related to Nutrition and Culinary Arts in Puerto Rico. *Nutrients*. 2020; 12(5): 1408.
17. Mlambo M, Silén C, McGrath C. Lifelong learning and nurses' continuing professional development, a metasynthesis of the literature. *BMC Nursing*. 2021; 20: 62.
18. Mancin S, Soekeland F, Morengi E, Andreoli D, Mazzoleni B. Enhancing the teaching of nutrition for nursing students: Engagement in class through a digital learning environment. *Teaching and Learning in Nursing*. 2024; 19(1): e229-e234.
19. Williams SL, Vandelanotte C, Irwin C, Bellissimo N, Heidke P, Saluja S, Saito A, Khalesi S. Association between dietary patterns and sociodemographics: A cross-sectional study of Australian nursing students. *Nursing & Health sciences*. 2020; 22(1): 38–48.
20. Kim SO, Kim SM. Nutrition Knowledge, Food Habit Problems and Dietary Attitudes of Nursing Students. *Journal of Korean Academic Society of Nursing Education*. 2015; 21(4): 466–476.
21. Liao L-L, Lai I-J, Chang L-C. Nutrition literacy is associated with healthy eating behaviour among college students in Taiwan. *Health Education Journal*. 2019; 78(7):756–69.
22. Uysal N, Ceylan E, Koç A. Health literacy level and influencing factors in university students. *Health & Social care in the Community*. 2020; 28(2): 505–511.
23. World Health Organisation. Noncommunicable diseases country profiles 2018 Geneva World Health Organization. Available at: <https://www.who.int/publications/i/item/9789241514620>. Accessed January 6, 2024.
24. Brandhorst S, Longo VD. Dietary Restrictions and Nutrition in the Prevention and Treatment of Cardiovascular Disease. *Circulation Research*. 2019; 124(6): 952–965.
25. Alzaben AS, Alnashwan NI, Alatr AA, Alneghamshi NA, Alhashem AM. Effectiveness of a nutrition education and intervention programme on nutrition knowledge and dietary practice among Princess Nourah Bint Abdulrahman University's population. *Public Health Nutrition*. 2021; 24(7): 1854–1860.
26. Riley E, Haggard-Duff L, Long CR. Using an online learning module to teach nursing students about food insecurity as a social determinant of health. *Teaching and Learning in Nursing*. 2020; 15(4): 241–244.
27. Egg S, Wakolbinger M, Reisser A, Schätzer M, Wild B, Rust P. Relationship between nutrition knowledge, education and other determinants of food intake and lifestyle habits among adolescents from urban and rural secondary schools in Tyrol, Western Austria. *Public Health Nutrition*. 2020; 23(17): 3136–3147.
28. Van den Berg VL, Okeyo AP, Dannhauser A, Nel M. Body weight, eating practices and nutritional knowledge amongst university nursing students, Eastern Cape, South Africa. *African Journal Primary Health Care and Family Medicine*. 2012; 4(1): 323–331.
29. Zhu DQ, Norman IJ, While AE. The relationship between doctors' and nurses' own weight status and their weight management practices: a systematic review. *Obesity Reviews*. 2011; 12(6): 459–469.
30. Sogari G, Velez-Argumedeo C, Gómez MI, Mora C. College Students and Eating Habits: A Study Using An Ecological Model for Healthy Behaviour. *Nutrients*. 2018; 10(12): 1823.