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Research paper

Dietary diversity and supplement use among nursing students

Sedigheh Pakseresht[1] iD **, Arezoo Monfared[2]** iD **, Azadeh Zebhi[3], Nasrin Mokhtari Lake[4],**
Marjan Mahdavi-Roshan[5] iD

[1] Depatment of Midwifery, Social Determinants of Health Research Center, School of Nursing and Midwifery,
Guilan University of Medical Science, Rasht, Iran
[2] Depatment of Nursing, School of Nursing and Midwifery, Islamic Azad University, Rasht Branch,
Guilan University of Medical Science, Rasht, Iran
[3] Depatment of Nursing, School of Nursing and Midwifery, Guilan University of Medical Science, Rasht, Iran
[4] Candidate in Educational Administration, Social Determinants of Health Research Center (SDHRC), Department of Nursing,
School of Nursing and Midwifery, Guilan University of Medical Sciences, Rasht, Iran
[5] Department of Community Medicine, School of Medicine, Guilan University of Medical Science, Rasht, Iran

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ABSTRACT

Introduction: Poor nutrition causes many chronic diseases in developed and developing countries. Dietary diversity is one indicator that reflects the state of the whole diet.

Aim: The study aimed to determine the diet diversity and supplement usage of nursing students of Guilan University of Medical Sciences, Iran.

Material and methods: In this cross-sectional study, 185 nursing students of Guilan University of Medical Sciences, Iran, participated, and the classification (relative) method was used. Information was collected through questionnaires completed in interviews. The questionnaires had three parts: demographic data, dietary diversity score (DDS; food frequency questionnaire), and supplement usage. Data was analyzed using descriptive statistics and inferential statistics.

Results and discussion: The results indicated that the average consumption rates of items from the five main food groups were 0.91 ± 0.24 scores (bread and cereals), 1.3 ± 0.49 (meat), 0.84 ± 0.59 (dairy), 0.53 ± 0.35 (cereals and vegetables), and 1.01 ± 0.58 (fruits). The findings showed that the average consumption rates of the different food categories were not similar. According to an evaluation by Kant (maximum score of 10), the average overall DDS of students was 4.60 ± 1.37 scores, which is undesirable. The highest percentage of deficiency was related to vegetables (73.67), while the lowest percentage of deficiency was related to meats (34.73).

Conclusions: Using DDSs is a good way to determine the diet of various communities in terms of nutritional value, and it can help predict diet adequacy. In cases of insufficient dietary diversity and supplement usage, educating people on how to follow a healthy diet is critically important for disease prevention.

Corresponding author: Arezoo Monfared, Shahid Beheshti School of Nursing and Midwifery, Guilan University of Medical Sciences, shahid beheshti Highway, Student Street, 41469-39841, Rasht, Iran. Tel: +989113315015.
E-mail address: Paksersht@yahoo.com.

1. INTRODUCTION

The human body requires energy to maintain its basal metabolism. This energy may be provided from other sources than food. The body also needs a varied diet to provide the necessary micro-nutrients provided by a balanced diet. Accordingly, one scientific instrument for assessing diet quality is dietary diversity. Dietary diversity means a daily diet containing food from each of the five main groups on the food pyramid. To assess dietary diversity, all food consumed during the measurement period must be considered.[1,2]

The dietary diversity score (DDS) is an indicator of the various foods in a diet. Based on dietary guidelines, dietary diversity is one of the components of a healthy diet. Studies conducted in Iran and other parts of the world demonstrate that dietary diversity is directly related to quantity and quality of a nutritional diet.[3–5] One benefit of a varied diet is that a variety of healthy nutrients and foods is received.[6] Dairy foods supplies calcium, vitamin D and carbohydrates and it have an important role to play in human diet.[7,8] Nutritional problems are the causes of many chronic diseases (atherosclerosis, obesity and certain types of cancer) in developed and developing countries. Having a diverse diet creates the highest protection against chronic diseases.[6,9–11] The use this type of diet is associated with a longer lifespan and improved levels of health.[10,12]

Despite this fact, study of Mohajeri et al. have reported low DDSs among Iranians. In the study of elementary students of Ardabil, Iran, showed that dietary diversity among school-age children had a low rating, and the prevalence of severe malnutrition was high.[1] Moreover, Mirzaeean studied students of Isfahan University of Medical Sciences and determined that most students had problems in obtaining micronutrients from consuming foods from the dairy and fruit and vegetable groups.[13] Given that the adequate consumption of micronutrients plays an important role in growth, disease prevention, and healthy living both directly and indirectly, a varied diet is essential. Although there are different dietary patterns and cultural diversity in the diet and food diversity in geography and different nations in different cultural and geographical communities is important.[14]

The academic education period is a dynamic transition period; the feeding of students is different because of their busy lives, separation from the family, skipping meals, and choosing ready-to-eat meals, and following weight-loss diets (especially girls). Nursing students are young people who should play important functional roles in the country's health system; assessing the health and nutrition supplementation of nursing students leads to obtaining knowledge for providing basic care for this group.

2. AIM

This study aimed to determine the dietary diversity and supplement usage of nursing students at Guilan University of Medical Sciences, Iran. The results of this study can be used to program healthy eating among students, improve community health, and prevent diseases in the future.

3. MATERIAL AND METHODS

1.3. Study design
This research is a cross-sectional, descriptive-analytic study. The study population consisted of male and female nursing students enrolled in the second semester of scholastic year 2015/2016. Stratified random sampling (relative) was used based on the semester with an equal percentage of males and females of two schools.

This study is part of a thesis approved by the Guilan University of Medical Sciences with the code number 93122613. After obtaining the approval of the Ethics Committee (Ethical code: IR.GUMS.REC.1393.13) and the necessary permissions, the data collection was started at colleges. First, the study objectives were explained to the subjects and they were assured that their information would be kept confidential. After obtaining their consent, the questionnaires were filled.

2.2. Participants
Participants were selected by considering the type of school. According to the same study sample size with 95% confidence and considering an absolute deviation of 5%, 185 students were determined.[11] It is followed by:

$$n = \frac{(z_{1-\frac{\alpha}{2}})^2\, p(1-p)}{d^2} \geq \frac{(1.96)^2\, 0.14(1-0.14)}{(0.5 \times 0.5)^2} \geq$$

$$\geq 185 \rightarrow \frac{185}{484} \rightarrow 38\%$$

In total, 38% of students were selected from every school of nursing and midwifery separately. The number of desired samples in each school was estimated based on the proportion of each school's population to the total study population. Total students studying nursing were 484 people, of which 314 were in the School of Nursing and Midwifery of Shahid Beheshti in Rasht, and 170 were in the School of Nursing and Midwifery-paramedical of Langerud. The subjects were selected in classes based on the population-based formula:

$$n_i = \frac{N_i}{N} \times n.$$

A total of 120 subjects from the School of Nursing and Midwifery in Rasht, and 65 from the School of Langerud were enrolled. Inclusion criteria comprised diagnosis of chronic or incurable diseases including disabilities, arthritis, lack of thyroid disorders, parathyroid, willingness to participate in research, and student satisfaction.

3.3. Questionnaires
Data was collected using questionnaires that consisted of three parts. The first part questioned demographic charac-

teristics including age, gender, height, weight, body mass index, place of residence, birth, years of education, marital status, economic status, and education of parents. The second part was related to nutritional status in terms of dietary diversity. The third part was related to the state of supplementation (calcium, vitamin D, and fish oil supplements).

To evaluate nutritional status, the food frequency questionnaire was used. Its validity and reliability have been reported as between 0.60 and 0.79 in Iran by previous studies.[15–17] For scoring dietary diversity, the method of Kant et al. was used.[18] The questionnaire contained 23 questions regarding the five main categories of the food pyramid designed by the U.S. Department of Agriculture and included: (1) bread and cereals, (2) vegetables, (3) fruits, (4) meat, and (5) dairy. Then, the main groups were divided into 23 sub-groups that represented a variety of foods within each food group on the pyramid.[3,12]

The dietary diversity of the breads and cereals group was divided into the 7 subgroups of refined bread, biscuits, pasta, grains, bakery products, rice, and flour. The fruits group was also divided into the two subtypes of fruit and fruit juices. The vegetables group was divided into 7 subgroups: vegetables, potatoes, tomatoes, other starchy vegetables, beans, green vegetables, yellow vegetables. The meats group was divided into 4 subgroups: red meat, poultry, fish, and eggs. Three subgroups were considered for dairy products: milk, yogurt, and cheese. If a person consumes at least half the share of food in a day, then she/he is considered as a consumer of a subgroup. The maximum score of DDS awarded to each of the five groups is 2. Finally, from these numbers, a final score of 10 is calculated. Therefore, minimum and maximum dietary diversity scores are 0 and 10 points, respectively. The closer the dietary diversity score is to 10 indicates the proportionality of the dietary diversity in the studied subjects.

For example, if the individual consumes poultry and egg of meat group then her/his DDS in the meats group is $(2 \div 4) \times 2 = 1$. Here, the number 2 shows the number of daily consumed subgroups in the meat group, and the number 4 represents the subgroups contained in the meat group; 2 shows the maximum points given to each group which is a fixed number.[3,12,16] The third part of the questionnaire was related to the consumption of supplements (calcium, vitamin D, fish oil). Responses to questions in third part were measured as described. It should be noted that the data was collected through interviews and written on the questionnaire. To evaluate the validity of the questionnaire content validity was used. The questionnaire was given to 10 members of the School of Nursing and midwifery, Health, and Nutrition, Guilan University

of Medical Sciences, Rasht, Iran. After their comments were analyzed, the final edition was created. To determine reliability, the test-retest method was used. The tools were given to 20 students within a week, and the correlation coefficient was calculated as 78%.

3.4. Data analysis

Data was analyzed by SPSS software, v. 21 using descriptive statistics (frequency estimation, mean, standard deviation, and median), Kruskal-Wallis, ANOVA, and repeated measure ANOVA with a significance level of $P < 0.05$.

4. RESULTS

The mean age of subjects was 22.1 ± 3.1 years, weight was 66.2 ± 13.4 kg, height was 170.8 ± 8.5 cm, and BMI was 22.57 ± 3.61. Of the participants, 92.4% were single, 40.5% had a household income of up to 1 million USD, 37.3% stated their father's education diplomas and 41.6% stated the education of the mother.

Overall, the mean DDS of students was 4.60 ± 1.37 (Table 1). The DDS of the girls was 4.57 ± 1.37 and of the boys was 4.63 ± 1.37. The highest percentage of deficiency for vegetables was 73.67% and for dairy was 59.30%; the lowest percentage (34.73%) was related to the meat group (Figure 1). There was a significant correlation between DDS and place of residence ($P = 0.005$). Among the participants, 5.4% consumed calcium supplements, 1.1% fish oil supplements, and 8.1% vitamin D (Table 2).

5. DISCUSSION

The results of the current study showed that the highest percentage of deficiency in the dietary diversity of the study subjects was related to grains, vegetables, and dairy products. The mean DDS was 4.60 ± 1.37; 64.3% of the dietary diversity scores were under 5. Mohajeri et al. showed that the mean and SD of food groups were 3.62 and 1.00, respectively, in their study, and dietary diversity in the samples had a low score.[1] In line with this study, Sealey studied preschoolers in Tobago, and their results demonstrated DDS of 4.19 ± 0.83. The consumption of fruits, vegetables, and grains had the lowest scores, while cereals and meats were most consumed.[5] The study findings of Labadarios et al. (2011) on South African adults showed that 60% of samples had poor dietary

Table 1. Statistical indicators covered in DDS based on Kant.

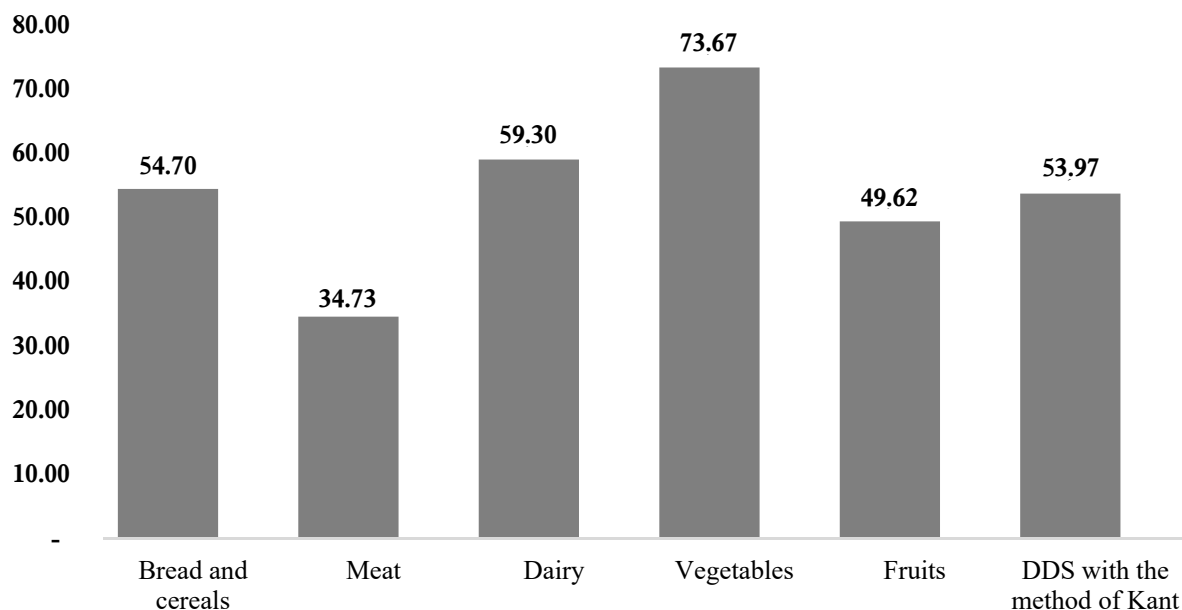| DDS of food pyramid groups	Mean	SD	Median	Minimum	Maximum
Bread and cereals	0.91	0.24	0.85	0.21	1.42
Meat	1.31	0.49	1.50	0	2.00
Dairy products	0.84	0.59	0.66	0	2.00
Bean and vegetables	0.53	0.35	0.57	0	1.71
Fruits	1.01	0.58	1.00	0	2.00
Total	4.60	1.37	4.58	1.35	7.78

Figure 1. Percentage of deficiency of main groups covered the food pyramid.

Table 2. Frequency of supplements use among nursing students group.

Supplements use		N(%)	Consumption status	N(%)
Calcium supplements (n = 185)	Yes	10(5.4)	Daily 1–2 times a week Sometimes	5(50.0) 4(40.0) 1(10.0)
	No	175(94.6)	–	–
Fish oil supplements (n = 185)	Yes	2(1.1)	3 times a week Once a week	1(50.0) 1(50.0)
	No	183(98.9)	–	–
Vitamin D supplements (n = 185)	Yes	15(8.1)	Daily 1–3 times a week 1–2 times per month	1(6.7) 8(53.3) 6(40.0)
	No	170(91.9)	–	–

diversity (DDS less than 4).[19] Additionally, Yeon et al. conducted a study on Korean girl students with DDS standard tools. Their results showed that the DDs in overweight students was 4.65 and in students with normal weight was 4.67.[20]

The research of Azadbakht et al. on female students of medical sciences showed that the mean and SDdeviation of DDS was 6.78±1.12 3. Jayawardena et al. (2013) in Sri Lanka showed that the DDSs in men and women were 6.23 and 6.50, respectively, and the association of food diversity with gender, location, and education was statistically significant ($P = 0.06$).[21] The findings of Keding et al. (2012) on women in rural Tanzania showed that the average DDS was 6.[22]

According to researchers, this difference in results may be attributed to differences in the characteristics of the study population and the number of participants. However, geographical and cultural factors should not be ignored. It seems that young students give less consideration to selecting proper nutrition.

In terms of supplement consumption of the subjects, who used calcium, vitamin D and fish oil, 5.4%, 8.1% and 1.1% re-

spectively. Fattahzadeh et al. showed that 66.8% of students used food supplements; moreover, age, gender, and marital status were significantly associated with supplement consumption.[23] Babanezhad et al. conducted a study during 2006–2010. Their results showed that there are dietary supplements consumption in 26.3% of cases, and supplement consumption was significantly related to age, gender, and marital status ($P < 0.05$). The frequency of supplement consumption was significantly higher in people 19 to 35 years of age, in married people, and among females.[24] The findings of the study of Denison et al. among men and older women in England demonstrated that 45.4% of men and 57.5% of women used at least one dietary supplement.[25] In the study of Kostecka in Poland, the prevalence of vitamin D consumption was 29%.[26]

Different results may be ascribed to economic and cultural conditions prevailing in the society and family as well as such factors as age, gender, education, and marital status. Based on the diversity of the diet designed according to the food pyramid groups and as an indicator of health, the results of this study showed that DDS and supplement consumption

among nursing students were low. Moreover, the residence of students had a positive impact on students' dietary diversity. The results also showed a low level of consumption of items from the vegetables, legumes, and dairy food groups.

6. CONCLUSIONS

Accordingly, DDS is a good way to determine the nutritional value of the diet of various communities and to predict the adequacy of the diet. Considering that the dietary diversity and supplement usage of the study population was insufficient, this problem is critically important. Educating people on how to follow a healthy diet to prevent chronic diseases is essential.

One limitation of the current study can be participant errors in recalling the type of feeding and the amount of food daily.

Conflict of interest
None declared.

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