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Knowledge, Attitude and Nutritional Behavior of Female High School Students about Consumption of Calcium-Rich Foods in Khorramshahr City, South West of Iran

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Abstract

Background: Calcium is the most abundant mineral in the human body. This mineral is provided only by the consumption of foods containing calcium that it is recommended to use at least1300 mg daily for adults. This study is aimed to investigate the nutritional behavior of female high school students about Consumption of Calcium-Rich Foods.

Materials and Methods

At a descriptive-analytical study, the method of sampling was based on multi-stage random clustering that 168 students were selected from 3 school (each school 56 female students). The data were collected by a research-made questionnaire containing questions in 4 parts including: the demographic features, the knowledge and attitude of students about consumption of calcium-rich foods and the fourth part included semi-quantitative food frequency table (FFQ) that was taught to the subjects and the correct understanding of the education was evaluated. The data were analyzed by SPSS-17.

Results: The mean age of girls participated was 16± 0.738 years. There were significant relationship between all demographic variables such as job, education and monthly income and consumption of calcium-rich foods ($P<0.05$). The knowledge of students about Consumption of Calcium-Rich Foods were 28% (poor), 50.6% (moderate) and 21.4% (good) respectively; and attitude of them were: 29.2%(poor), 47.6% (moderate) and 23.3% (good) respectively. Moreover, 57.1% of the students had not consumed enough calcium in their regimes. There was a significant correlation between students attitudes and their behavior of the consumption of calcium-rich foods ($P<0.05$; $r=0.181$).

Conclusion: The current study indicated that in female students, the improvement of students' attitude and knowledge about consumption of calcium-rich foods can be achieved using focused group discussion and suitable education. According to the results of this study, students' knowledge and attitude of students about consumption of calcium-rich foods are not acceptable.

Key Words: Attitude, Behavior, Calcium, Knowledge, Student.

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1- INTRODUCTION

Calcium is the most abundant mineral in the human body (1). Calcium and dairy products play major roles in the maintenance of health and in the prevention of chronic diseases (2, 3).The need for this mineral is only provided by consuming calcium-rich foods and at least1, 300 mg is needed daily for adults (4). In relation with calcium-rich foods, it is said that milk and dairy products are good sources of calcium (5). In addition, dark green leafy vegetables like broccoli, spinach, parsley, lettuce and cabbage are more preferable than other vegetables, as well as vertebrate fishes such as herring, salmon and sardines are rich sources of calcium. Also, roasted soybeans, baked beans and dried figs have some calcium (6). During the puberty 75-85% of the bones were formed (7). Therefore, regular intake of calcium and other materials during this period leads to strong bones and reduces the risk of osteoporosis in the future (8). Regarding the risk of developing osteoporosis in women with increasing their age and the fact that minerals are added to the skeleton shortly after the age of 20, the implementation of preventive interventions programs and the use of calcium in young girls are emphasized (9, 10).

The studies conducted on the field of knowledge, attitude and performance in the different age and gender groups in the field of osteoporosis in the world and Iran showed that the lack of desirability in terms of knowledge, attitude and performance (11-13).The knowledge of female students about calcium intake and consumption of milk and dairy products is less than the recommended dose. For example, a research conducted on the knowledge of female students about osteoporosis, calcium intake and physical activity in Kalaleh city, indicates that an unacceptable situation of little knowledge of girls in this regard (14). Also, another study conducted by Vahedi et al.in the primary schools of Sari city indicated that 59% of boys and 55% of girls consumed milk and dairy products less than the recommended dose(15).In Iran, according to the latest information about household food consumption, calcium is the most restricted food material in the diet(16). Outside of Iran, according to the study of Nassar et al. that conducted in Kuwait, high consumption of soft drinks has been associated with lower intakes of milk and calcium-rich foods (17). According to the study of Gopinath et al. that conducted in Australia, consumption of dairy products, particularly cheese, could have a beneficial effect on blood pressure (BP), particularly among girls and dairy consumption was assessed from validated semi-quantitative food frequency questionnaires (18).

Given the importance of what has been mentioned so far about calcium intake among adolescent girls and since no comprehensive study was conducted in Khorramshahr city (**Figure.1**), the aim of the present study was to investigate the nutritional behavior of female high school students of Khorramshahr regarding the consumption of calcium-rich foods.

Fig.1: Location of Khorramshahr city, Iran

2- MATERIALS AND METHODS

2-1. Study Design and Population

This study was a descriptive- analytical study which evaluated the status of knowledge, attitude and behavior of female high school students of Khorramshahr city regarding the consumption of calcium-rich foods. Behavior of students indicate their performance about use of calcium-rich foods. At first, three schools were chosen using simple random-cluster sampling. Schools were selected from 3 economic regions in Khorramshahr and since the number of students in each school was almost equal, 56 samples from each school were selected by random sampling using the attendance list.

As mentioned the method of sampling was based on multi-stage random clustering that 168 students were selected. After collaborating with central office of education, explaining of study, completion of a written consent by student`s parents and verbal consent by students, and dismissing of exclusions, the participants filled the researcher-made questionnaire by two educated person. The study had not missing data.

In this study the following formula was used to determine the sample size: the sample size calculated 167.88≈168 persons by using the following formula:

$$n = \frac{(z_1 - {}^{\alpha}/_{2})(s)^2}{(d)^2}$$

Where confidence interval (CI) of 95%, standard deviation (s) of 0.33 and estimating error (d) of 0.05 and Z shows standard normal distribution. The students were asked to report the standard serving size (unit) and the frequency of calcium-rich foods consumption in month or year and then the frequency of each food which was based on the amount of calcium-rich food was converted to gram of calcium. For this analysis, all food items were changed by dividing to the weekly, monthly and annual intake by 7, 30 and 365, respectively to obtain daily intake.

2-3. Measuring tools

In this study a researcher made questionnaire was used in 4 parts; the first part presents the demographic features (parents' education, parents' job, the monthly income of the family, history of osteoporosis, type of residential property).

The second part presents 21 items about the knowledge of students with options (yes, no, I have no idea) with the scores of 2, 0 and 1, respectively and the score of knowledge was within the range of 0-42. The third part included 15 attitude questions based on Likert scale from totally agree (5) to totally disagree (1) and the range of attitude was between 15 and 75. The fourth part included semi-quantitative food frequency table (FFQ) that was taught to the subjects and the correct understanding of the education was evaluated. Food frequency included a list of calcium-rich materials including: dairy (milk, yogurt, cheese, curd, and ice cream), legumes (beans, soya beans, and peas), dried fruit (dried figs, dried apricots), fish (canned fish, fatty fish, and sardines), vegetables (lettuce, broccoli, parsley and cress) etc. (19, 20).

2-3-1. Validity and Reliability

The questionnaire was rendered to 10 health and nutrition experts for approving the validity and the content validity rate (CVR= 0.82) and content validity index (CVI= 0.72) were measured. In order to determine reliability, the questionnaire was filled by 25 students. The Cronbach's alpha coefficient was approved for knowledge (0.82), attitude (0.71) and the food consumption including dairy products (0.85), legumes (0.82), nuts (0.78), fish (0.81) and vegetables (0.79).

2-4. Inclusion Criteria

Inclusion criteria included female high school students that were satisfied to participate in the study.

2-5. Exclusion Criteria

Exclusion criteria included having disease related to calcium such as osteoporosis and failure to fulfill the questionnaire correctly and completely.

2-6. Ethical Considerations

This study was approved by the Ethics Committee of Ahvaz Jundishapur University of Medical Sciences, with ID code No. 93112 and the goals of the study were explained to all participants and all of them accepted to participate and were assured consider the confidentiality of their individual information as well as the voluntary nature of participating in the study.

2-7. Data Analyses

All statistical analyses were performed at a confidence level (CI) of 0.05 using SPSS version 17. Collected data were analyzed using the descriptive statistics including the percentile and frequency and median of consumption of calcium-rich foods. In this study, Chi-square test was used to evaluate the relationship between behavior of consumer and demographic variables.

The Pearson test was used to examine the correlation between knowledge, attitude and behavior of students. The knowledge and attitudes as well as the level of consumption of calcium-rich foods were obtained in the target population by using questionnaire. Also, in order to determine the standard deviation (SD), a standard deviation of 330 was obtained by 10 subjects in the pilot test and the sample size in this study was obtained as 168 subjects, considering the confidence level of 95% (P value < 0.05) and test power of 90%.

3-RESULTS

The mean age of student was 16 $\pm$ 0.738 years. Since the number of students in each school was almost equal, 56 samples from each school were selected by random sampling using the attendance list. Approximately all student participated in our study.

According to results 40.4% of students' family had low income, 38.09% moderate income and 21.42% had good income. Of all participants (n=168), the main resource for calcium-rich foods included milk 13.69% (n=23), yoghurt 19.64% (n=33), cheese 36.30% (n=61), ice cream 11.90% (n=20) and vegetables 16.80% (n=11). But it should be noted that only 42.9% of students have received the recommended calcium daily.

Table.1 shown that there was a significant correlation between demographic variables with consumption of calcium-rich foods ($P<0.05$). Based on the standard table of recommended foods (Recommended Dietary Allowance: RDA), the daily intake of calcium for adolescents is 1,300 mg daily (5). The result of this study showed that the moderate daily calcium intake of students was 415 mg that this is very lower than the recommended amount of calcium intake. Dairy products were the most consumption of calcium-rich foods in students, and nuts were the lowest consumption of calcium-rich foods in students (**Figure.2**).

Table.2 revealed that 21.4% of the people had good knowledge, 50.6% had moderate knowledge and 28% had poor knowledge about calcium-rich foods. According to this table, in regards to calcium-rich foods, 29.2% of people had poor attitude, 47.6% had moderate attitude and 23.3% had good attitude and 42.9% of students had a desirable consumption of calcium-rich foods and status of 57.1% was undesirable.

Table.3 shown that there was a significant correlation between the calcium-rich foods consumption and attitudes (P=0.019 and

r=0.181); also there was a significant correlation between the knowledge and attitude students about calcium-rich foods (P=0.041 and r=0.158); but there was no significant correlation between knowledge and consumption behavior of calcium-rich foods (P=0.912 and r= 0.009).

Table-1: The relationship between demographic variables and consumption behavior of calcium-rich foods among girl students

Demographic Variable			Consumption of calcium-rich foods		P-value
			Desirable number, (%)	Undesirable number, (%)	
Job	Father	Unemployed worker Employee Other	1(0.6) 4(2.38) 3(1.78)	43(25.6) 35(20.83) 82(48.80)	0.001
	Mother	Housewife Employee	8(4.76) 0	155(92.26) 5(2.97)	0.001
Educational status	Father	Illiteracy and primary Middle school or diploma Collegiate	3(1.78) 2(1.19) 3(1.78)	46(27.38) 95(56.54) 16(9.52)	0.001
	Mother	Illiteracy and primary Middle school or diploma Collegiate	5(2.97) 1(0.6) 2(1.19)	80(47.61) 75(44.64) 5(2.97)	0.001
The monthly income of the family		Less than 5 million Rials (poor) 5 million Rials to 10 million Rials (moderate) More than 10 million Rials (good)	4(2.38) 1(0.6) 3(1.78)	64(38.09) 63(37.5) 33(19.64)	0.001
History of osteoporosis		Positive Negative	2(1.19) 6(3.57)	43(25.59) 43 117(69.64)	0.001
Type of residential home ownership		Rental Personal Organizational	2(1.19) 6(3.57) 0	35(20.83) 35 114(67.85) 11(6.54)	0.001

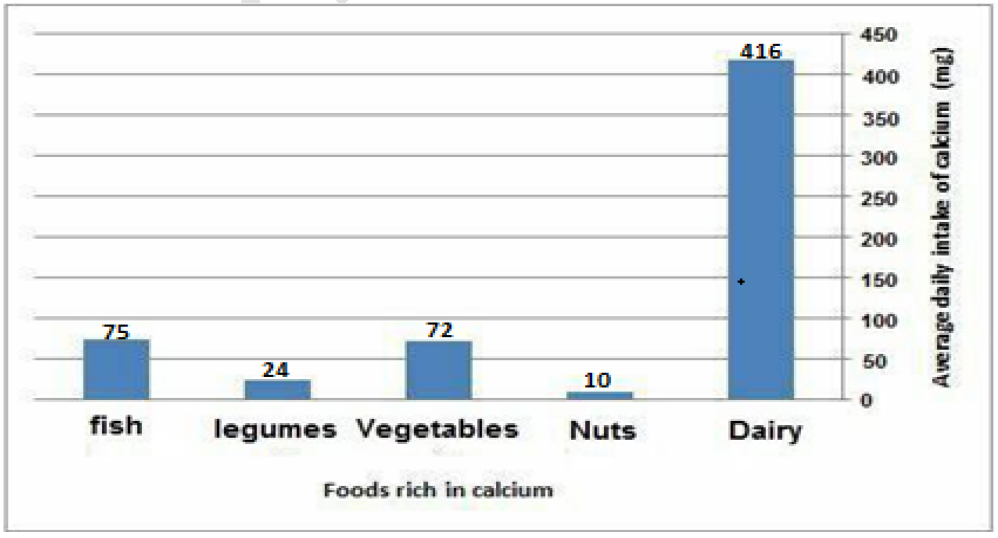

Fig.2: The comparison of the consumption of calcium in food (dairy products, legumes, nuts, vegetables and fish) among girl students (mg).

Table-2: The status of knowledge, attitude and consuming of calcium-rich foods of the girl students

Variables		Number	Percent
Knowledge	Poor	85	28
	Moderate	36	50.6
	Good	47	21.4
Attitude	Poor	49	29.2
	Moderate	80	47.6
	Good	36	23.2
Consuming of calcium-rich foods	Desirable	72	42.9
	Undesirable	96	57.1
	Total	168	100

*Percentile: 25% or lower is poor; 25-75% is Moderate and 75% and more is good.

Table-3: The correlation between knowledge, attitude and behavior of consumption of calcium-rich foods among girl students

Variables	Knowledge		Attitude		Behavior	
	r	P-value	r	P-value	r	P-value
Knowledge	1	0.042	0.158	0.041	0.009	0.912
Attitude	0.158	0.041	1	0.034	0.181	0.019
Consumption of calcium (Behavior)	0.009	0.912	0.181	0.019	1	0.044

4- DISCUSSION

The aim of our study was to investigate the knowledge, attitude and nutritional behavior of female high school students in Khorramshahr- Iran in terms of consumption of calcium-rich foods. In this study, there was a significant correlation between demographic variables such as education level of parents, occupation of parents, monthly income, family history of osteoporosis, type of property with consumption of calcium-rich foods.

The results of the study of Vahedi et al. showed that the use of milk had a significant relationship with education level of fathers (15). In the study of Kaheni et al, there was a significant relationship between dairy consumption of students with mother's job (21). In a study that was conducted by Namakin et al., the results showed that there was a significant relationship between the education level of parents and consumption of milk and dairy students and also there was a significant relationship between economic level of households and consumption of calcium-rich foods(22). Haapalati et al. reported that there was a significant relationship between father's job and family eating pattern (23). The findings of these studies about the demographic variables are consistent with outcomes of our study. Based on our results, 50.6%, 28% and 21.4%of students had moderate, poor and good knowledge about consuming calcium-rich foods, respectively. Also 29.2%, 4736% and 23.2% of female

students had poor, moderate and good attitude, respectively. In addition, 57.1% of students had less daily calcium intake than the recommended amount (1,300 mg daily) and did not have enough calcium-rich foods. The results of Ghaffari etal. were consistent with the results of our study and showed that the knowledge of female students in the field of calcium intake was low and was not at an acceptable level, so that all respondents had poor to moderate information in this regard (14). The results of the study of Rahmani et al. showed that there was a significant correlation between milk consumption and the nutritional knowledge of children (13).

In this study, 42.5% of students drank less than two glasses of milk daily. The results of the study of Toner and Ungan on 270 women in Turkey showed that only 36% of respondents were able to identify correctly good sources of calcium (24). In the study of Hollie et al. on 406 rural women in U.S.A found that only 18% of people gave correct answers to questions related to calcium and more than half of the women were asked for more information about calcium-rich foods before 50 ages (25). The results of the present study showed that 29.2%, of students had poor attitude and 47.6% had moderate attitude regarding consuming calcium-rich foods. The results of the study of Ahadi et al. found that 37.3% of students did not use the distributed milks. According to this study, there was no statistically significant relationship between the acceptance of the distributed milks and knowledge of students, but the level of acceptance and attitude were correlated (26). In the present study, there was a statistically significant relationship between knowledge and scores of consumption of calcium-rich foods,but the correlation was not significant in association with attitude. In this study, 57.1% of students had not enough intakes of calcium-rich foods. The results of the study of Amini et al. showed that a significant number of students had less consumption than the recommended level of dairy products (27). In addition, the results of the study of Omidvar et al. (16) and Kaheni et al. (19), showed that the use of milk and dairy products among students was less than the recommended amount, which is consistent with the results of the present study. The results of the study of Cook et al. showed that in the United States, 39% of men and 43% of women (20-29 years) consume less than even 1 daily serving of dairy products (28).The results of the study of Daniela et al. showed an insufficient calcium intake by adolescents and suggested that certain subgroups of adolescents need specific strategies to increase the intake of this nutrient (29). Geller et al. showed that less than 10 percent of Afro-Americans women were achieved themselves calcium from food sources (30).In the study of Jalili and colleagues was conducted on 770 women in Kerman, it was found that their knowledge were 44% which show the inadequate knowledge of them. Most participants were unaware of risk factors such as lack of calcium intake; and only 0.6 percent of participants had adequate intake of calcium (31). In the study of Jafari and colleagues, the results showed the majority of students had not enough daily consumption of dairy products that was consistent with our study (32).

4-1. Limitations of the study

The small sample size of include studies are potential limitation of this study. There is still need to further studies to access additional information about this subject. Another limitations of the current study, were low of the same study in this field and conducting in female schools.

5. CONCLUSION

The results of the study showed that educational interventions and programs must focus on increasing knowledge and attitude of students to increase consumption of calcium-rich foods. Lack of calcium has bad effects, if it would not be prevented in students, it will lead to the loss of bone density and fractures in the old ages. According to the results of this study, percent of students with good knowledge and attitude were 21.4% and 23.2%, respectively that are not suitable. There was significant correlation between students' attitudes and their behavior on the consumption of calcium-rich foods.

6-AUTHORS CONTRIBUTIONS

- Study design: NG, HG, GS.
- Data Collection and Analysis: GS, MHH, NG.
- Manuscript Writing: R V, NG.

7- CONFLICT OF INTEREST: None.

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