

## Associated Factors of Milk Consumption among Students: Using Health Belief Model (HBM)

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### Abstract

#### Background

Among various food products, milk and dairy products are among the most basic nutrient foods. The consumption of milk and dairy products in Iran is much lower than the global rate of per capita consumption. This study used Health Belief Model to determine associated factors of milk consumption among 7-9<sup>th</sup> students.

#### Materials and Methods

This cross-sectional descriptive analytical study was conducted on seventh to ninth grade students in the city of Qom. Using multistage cluster sampling method, a total of 390 students were enrolled onto the study. In order to collect data in this study, we used a researcher made questionnaire which was designed based on health belief model. Using SPSS version 20.0 software, the collected data was analyzed via descriptive statistics and independent t-test and Chi-square test.

#### Results

Of all the participants, 41% consumed milk daily and 59% did not consume milk. The perceived benefits ( $P=0.007$ ), perceived barriers ( $P<0.001$ ), perceived self-efficacy ( $P<0.001$ ) had statistically significant relationships with daily milk consumption. Accordingly, the scores of perceived benefits and perceived self-efficacy for milk consumption among students who consumed milk daily were higher than those in students who did not consume milk daily.

#### Conclusion

The daily milk consumption associated with perceived benefits, perceived barriers and perceived self-efficacy. Therefore, there is a need to utilize educational programs based on health belief model for increasing of milk consumption.

**Key Words:** Health belief model, Iran, Milk consumption, Students.

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## 1- INTRODUCTION

Nowadays, the consumption of milk and its products is considered as an indicator of development in human communities. Ongoing research on dairy products has shown a high correlation between the consumption of these products and the level of public health (1). Among various types of food, milk and dairy products are among the most basic nutritious foods with the closest affinity to a perfect food. They are a rich source of essential nutrients such as high-quality proteins, calcium, minerals, phosphorus, vitamin A, and vitamin B12 (2). Enough calcium intake during growth age which can be achieved through the consumption of milk and its products could greatly help to stabilize body calcium level and increase bone density (3, 4). In addition, the consumption of milk can increase the body's resistance against many infectious diseases and diseases caused by malnutrition (5).

The number of students are 13 million people in Iran that forms 16 percent of the population (6). In fact, school age is one of the important periods of life affecting the formation of bone mass (3, 4). According to most previous studies, the majority of school-aged children do not consume the recommended units of milk and dairy products (7), and this deteriorates the calcium supply in children (8). Lack of sufficient and continuous consumption of milk and its products cause many side effects at different stages of life. On the other hand, according to nutritionists the most important complications caused by inadequate consumption of milk and its products are as follows: physical growth retardation especially in children and adolescents, bone diseases, teeth and gums diseases, vulnerability to infectious diseases, vision problems, osteoporosis, short life, premature aging, mental diseases, and sleep disorders (9). Unfortunately, the rate of consumption of

milk and dairy products in our country (Iran) is much lower than the global per capita rates of consumption (5). Based on the results of a study conducted in the city of Sari- Iran, 50.1% of children consumed milk only occasionally and 5.5% of children did not consume milk at all (7). Overall, the recommended level of daily calcium intake for children aged 6 -10 years and 9 – 18 years, respectively, is 800 - 1200 and 1300 milligrams per day (3, 4). Promoting the right culture of milk consumption in the community and improving and increasing rate of milk consumption per capita can lead to the reduction and elimination of overwhelming costs imposed on thousands of children suffering from malnutrition in the country. Thus, economic and health policy makers and planners should make every effort in order to boost and promote the culture of milk consumption and increase the rate of milk consumption per capita in the community (5). In addition, in order to change behavior of school-aged students, they need to be trained about both the importance of breakfast and also the consumption of a variety of valuable foods such as milk and its products (10).

Using different types of theories, health education specialists have introduced new models which are very effective and useful (11). Health Belief Model is one of these models which had been designed by Rosenstok to be used as a basis for behavior change and disease reduction (12). This model shows the relationship between health beliefs and health behaviors and is based on the assumption that preventive behaviors can be formed based on personal beliefs; in other words, this model considers behavior as a function of knowledge and attitude of an individual (13, 14). Health Belief Model puts an emphasis on the following general rule: people show a good reaction to health message and try to prevent diseases only when they feel a serious danger (perceived

threat), and perceive a benefit which can be achieved through changing a special behavior; in such a condition, they easily overcome the obstacles which may likely hinder these changes (15). Considering the low milk consumption in schoolchildren and its association with calcium intake and consequent osteoporosis and negative effects in later life (7), it seem necessary studied related factors to milk consumption in the students. Therefore, this study aimed to determine associated factors of milk consumption among students using health belief model (HBM).

## **2- MATERIALS AND METHODS**

### **2-1. Study design and population**

This cross-sectional descriptive analytical study was conducted on 7-9<sup>th</sup> grade students in Qom city, Iran.

### **2-2. Methods**

In this study we used multistage cluster sampling method; first, using stratified sampling method, four public schools (girls and boys) were selected as clusters from four municipal zones. Then, using simple random sampling method, a specific number of students proportionate to the total number of students at each cluster were selected. While determining the sample size based on Vahedi et al.'s study (7) with  $\alpha=0.05$ ,  $d= 0.02$ , and the prevalence of lack of milk consumption was set at 19.4%, the sample size was calculated by using the sample size formula as 390 students.

### **2-3. Measuring tools: Validity and Reliability**

In order to collect data on the consumption of milk in students, we used a researcher made questionnaire that was consisted of two parts; the first part included 10 demographic questions and was used to collect data on age, gender, father's education, mother's education, father's occupation, mother's occupation, family

income level, school shift, milk consumption by parents, having breakfast by students. The second part was used to evaluate the constructs of Health Belief Model including perceived susceptibility (four questions), perceived severity (four questions), perceived benefits (six questions), perceived barriers (four questions), and perceived self-efficacy (four questions). Using a five-point Likert type scale, each of the above items was scored from one to five, from totally agree to totally disagree. It is worth noting, in order to ensure the accuracy of the answers some questions were formulated in reverse form. In addition, milk consumption behavior was evaluated using with three multiple-choice questions.

In order to assess the reliability of the instrument, a pilot study was conducted on 30 students selected from the target population (students), and Cronbach's alpha coefficient was calculated for perceived susceptibility ( $\alpha = 0.73$ ), perceived severity ( $\alpha = 0.89$ ), perceived benefits by ( $\alpha = 0.91$ ), perceived barriers ( $\alpha = 0.76$ ), perceived self-efficacy ( $\alpha = 0.90$ ), and milk consumption behavior ( $\alpha = 0.77$ ). Expert panel method was used to assess the validity of the questionnaire.

### **2-4. Ethical consideration**

It should be noted that before the start of the study, the aim of the project was explained and the target group were ensured about the confidentiality of their data. The selected subjects were enrolled into the study only after obtaining fully informed consent.

### **2-5. Inclusion criteria**

The inclusion criteria were consisted of being 7-9<sup>th</sup> grade Iranian students and being satisfied to participate in the study.

### **2-6. Exclusion criteria**

The exclusion criteria including; having digestive problems, just partial completing

of the questionnaire and unwillingness for participation in current study.

### 2-7. Data Analyses

Using SPSS version 20.0 statistical software, the collected data was analyzed through descriptive and analytical statistics. Independent t-test was used to measure the relationship between milk consumption and constructs of the Health Belief Model. In addition, Chi-square test was used to assess the relationship between some other factors (including gender, parents' occupation and education, age group, and milk consumption by parents) and the use or non-use of milk in students.

### 3- RESULTS

Overall, 390 students participated in the current study. The age range of students was 12 - 17 years and the majority of students (42.6%) were 14 years old. Of all the students, 194 (49.7%) were male and 196 (50.3%) were female. The majority of parents (27.4%) of the studied students had high school diploma. Concerning parents' occupation, the most of fathers (33.6%) were self-employed and of mothers (85.5%) were housewife. The most of students' families (52.3%) had a middle-income level. The results also showed that 286 (73.3%) students eat breakfast regularly. Moreover, of all the fathers of students, 279 (71.5%) persons consumed milk.

As shown in **Table.1**, 41% of students consumed milk daily and 59% did not consume milk. In addition, of all students who consumed milk daily, 24.4% consumed a glass of milk daily and 2.3% consumed less than one glass of milk daily. Based on the results, there was no statistically significant relationship between the daily consumption of milk by students and students' age ( $P= 0.82$ ), fathers' educational of level ( $P= 0.38$ ), mother's educational of level ( $P= 0.35$ ),

father's job ( $P= 0.06$ ), mother's job ( $P= 0.71$ ), family income level ( $P= 0.08$ ), and school shift ( $P = 0.93$ ). On the other hand, as shown in **Table.2**, there was a statistically significant relationship between the daily consumption of milk in students and students' gender ( $P= 0.03$ ), eating breakfast ( $P < 0.001$ ), and parents' daily consumption of milk ( $P= 0.002$ ). So that, the rate of daily consumption of milk in boys (46.4%), was higher than the girls (35.9%). In addition, the most of students (73.5%), who did not consume milk, skipped breakfast as well. Moreover, the most of parents (70.9%) who did not consume milk, their students did not consume milk as well.

As shown in **Table.3**, there was no statistically significant relationship between the daily consumption of milk in students and perceived susceptibility ( $P= 0.45$ ), and perceived severity ( $P= 0.62$ ). However, there was a statistically significant relationship between daily consumption of milk in students and the perceived benefits ( $P= 0.007$ ). So that, the score of the perceived benefits of milk consumption obtained by the students who consumed milk daily was higher than the scores obtained by students who did not consume milk daily. In addition, there was a statistically significant relationship between daily consumption of milk in students and perceived barriers ( $P<0.001$ ).

Accordingly, the score of the perceived barriers obtained by the students who did not consume milk daily was higher than the scores obtained by students who consumed milk daily. Moreover, there was a statistically significant relationship between the daily consumption of milk in students and perceived self-efficacy ( $P< 0.001$ ). So that, the score of the perceived self-efficacy obtained by the students who consumed milk daily was higher than the scores obtained by students who did not consume milk daily.

**Table-1:** The frequency of daily milk consumption in 7-9<sup>th</sup> students

Variables		Number	Percent
Daily consumption of milk in students	Yes	160	41
	No	230	59
Amount of daily consumption of milk in students	Less than a glass	9	2.3
	One glass	95	24.4
	Two glasses	37	9.5
	More than two glasses	18	4.6

**Table-2:** The relationship between daily consumption of milk in students with students' gender, eating breakfast in students, and milk consumption in students' parents

Variables	Frequency of daily consumption of milk in students (number[%])			P-value
	Sub-group	Yes	No	
Gender	Male	90 (46.4)	104 (53.6)	0.03
	Female	70 (35.9)	125 (64.1)	
Eating breakfast in students	Yes	132 (46.3)	153 (53.7)	0.001
	No	27 (26.5)	75 (73.5)	
milk consumption in students' parents	Yes	129 (46.4)	149 (53.6)	0.002
	No	30 (29.1)	73 (70.9)	

**Table-3:** The relationship between Health Belief Model constructs and daily consumption of milk in students

Health Belief Model constructs	Daily consumption of milk in students( mean+ SD)		P-value
	Yes	No	
Perceived susceptibility	73.81 ± 12.98	72.79 ± 13.21	0.45
Perceived severity	69.28 ± 12.99	69.93 ± 13.04	0.62
Perceived benefits	86.51 ± 12.08	83.07 ± 12.30	0.007
Perceived barriers	36.34 ± 16.82	44.75 ± 15.65	0.001
Perceived self-efficacy	73.53 ± 15.92	63.23 ± 16.72	0.001

SD: Standard deviation.

#### 4- DISCUSSION

In this study, the constructs of Health Belief Model were identified as determinants of milk consumption among school-age students. Accordingly, perceived benefits, perceived barriers, and perceived self-efficacy had a statistically significant relationship with daily consumption of milk by the studied students. In the present study, the rate of daily consumption of milk in students was lower than the standard rates, as 59% of the students did not consume milk daily. However, in Kahni et al.'s study, 55.1% of studied children consumed milk daily (8).

According to dietitians, in order to supply the required level of calcium in the body, it is necessary to consume two cups of milk, 1 cup of yogurt, and 35 mg cheese daily (16). The most important likely reasons for not consuming milk by students are the followings: unavailability of milk (7), ethnic, local, cultural, and geographical features and conditions, social and personal capacity, socio-economic status of households, cultural beliefs of households, undesirable taste of milk (17), and cutting subsidy for milk (7). Mohammadi et al. conducted a study to investigate the effect of targeted subsidies plan and cash payments on households'

food security and dietary intakes among urban population of Tehran-Iran. The results of their study showed that after the implementation of targeted subsidies plan the consumption of milk and dairy products decreased in low-income areas and due to the rising prices there was a change in the trend of the purchase and consumption of milk (18). Results of Ahadi et al.'s study showed that 37.3% of students did not consume milk distributed in schools; among the various causes suggested for the consumption of milk by students, the highest percentage of the studied people said they consumed milk because of its usefulness for health. Probably this finding might be attributed to the good attitude of the students toward the benefits of milk consumption (19). The results of Jafari et al.'s study showed that 78.1% of students were not consuming adequate amounts of dairy products (20).

Based on the results of the present study, there was no statistically significant relationship between daily consumption of milk in students and age of students. The results of Dura Trave's study also showed that the frequency of consumption of dairy products had no statistically significant relationship with an age range of 19 - 24 years (21). However, the results of Kranz et al.'s study showed that people aged 4 - 18 years old, had a greater tendency to consume cheese, yogurt, and ice cream while they had inadequate milk intake (22). The results of Baghiani Moghadam et al. also showed a relationship between students' age and the frequency of consumption of dairy products (23). In this study, there was no statistically significant relationship between parents' educational level and parents' job with daily consumption of milk in students. It is in line with the results of a study by Ahadi et al. (19). However, this finding is inconsistent with the results of studies by Kaheni et al. (8), Esfarjani et al. (17), Vahedi et al. (7), and Faghieh et al. (5).

The observed difference might possibly be attributed to the presence of different ethnicities in Qom city, differences in cultural beliefs of households, and difference in times and places of the mentioned studies. In addition, the results of the present study also showed no statistically significant relationship between family income level and daily consumption of milk in students. However, the results of studies by Kahni et al. (8), and Esfarjani et al. (17), are not in line with the results of our study. The lack of consistency in the results might be attributed to many factors including lack of a culture of milk consumption, low price of milk, and the presence of different cultures in Qom city, Iran. In this study, there was no statistically significant relationship between school shift and daily consumption of milk in students. According to the results of Dura Trave's study, there was no statistically significant relationship between consumption of dairy products with class schedule (time table) of students aged 19 - 24 years old (21), which was inconsistent with the findings of Baghiani Moghadam et al.'s study (23). In the present study there was a significant relationship between gender and daily consumption of milk in students, so that, the daily consumption of milk was higher in boys than girls. It is consistent with the results of a study by Kaheni et al. (8), who reported that the consumption of milk and cheese was higher in boys than in girls while the consumption of yogurt was higher in girls than in boys. On the other hand, the results of a Vahedi et al.'s study (7), and Faghieh et al.'s study (5), showed a statistically significant relationship between students' gender and the consumption of milk and dairy products; as they reported, the consumption of milk and its products was lower in boys than in girls. In this study, there was a statistically significant relationship between eating breakfast and daily consumption of milk by students, so that the majority of

students who did not consume milk, skipped breakfast as well. This finding is consistent with the results of Park et al.'s study (24). The results of this study also showed that daily consumption of milk in students' parents had a statistically significant relationship with daily consumption of milk in students; so that, the majority of parents who did not consume milk had children who did not consume milk as well. It is consistent with the results of a study by Vahedi et al., which suggested a relationship between the consumption of milk by mothers and the consumption of milk by the students (7). The results of Gheysvandi et al.'s study showed that subjective norms of family and friends were effective in increasing the consumption of milk and dairy products (25). The results of Grumbine et al.'s study also showed a statistically significant relationship between the consumption of milk by the students and the consumption of milk by the family. This reflects the impact of family in the formation of healthy eating habits, including the consumption of milk in childhood and early adolescence (26).

Based on the results of this study, there was no statistically significant relationship between perceived susceptibility and daily consumption of milk in students. On the contrary, the results of Alizadeh Sioki et al.'s study (27), and Deshpande et al.'s study (28), showed that perceived susceptibility had a significant effect on students' eating behaviors. Accordingly, perceived susceptibility had a statistically significant relationship with healthy eating behaviors. The results of a study by Naghashpour et al., showed that after implementing a training intervention program, there was a statistically significant relationship between perceived susceptibility and milk consumption (29). Differences in the time and place of the study and the presence of subjects from different ethnicities might by one of the

reasons for the discrepancy observed in the results. In the present study, there was no statistically significant relationship between perceived severity and daily consumption of milk in students. This finding is not in line with the results of Alizadeh sioki et al.'s study (27). According to the results of a study by Hazavehei et al., after training the subjects, there was a significant relationship between perceived severity and milk consumption (30). In addition, the results of a study by Baghiani Moghadam et al., showed a significant relationship between perceived severity and the consumption of milk by the students (23) that is inconsistent with the results of our study. The results of Naghashpour et al.'s study showed that after implementing a training intervention program, a statistically significant relationship was observed between perceived severity and milk consumption (29). This discrepancy in the results might be due to differences in the age groups studied, differences in nutritional habits, in each city, living standards, and cultural differences between communities. In this study, there was a statistically significant relationship between perceived benefits and the daily consumption of milk in students. So that, the score obtained for perceived benefits of milk consumption was higher in the students who consumed milk daily, as compared with those who did not consume milk daily. The results of Alizadeh Sioki et al.'s study showed that perceived benefits had the greatest impact on students' eating behaviors (27).

In addition, the results of Deshpande et al.'s study showed a significant relationship between perceived benefits and healthy eating behavior in high school students (28). According to the results of Baghiani Moghadam et al.'s study, there was a statistically significant relationship between behavioral beliefs and some factors such as the prevention of

osteoporosis through milk consumption (23). The results of Naghashpour et al.'s study showed that after implementing a training intervention program, a statistically significant relationship was observed between perceived benefits and milk consumption (29). Moreover, based on the results of our study, there was a statistically significant relationship between perceived barriers and the daily consumption of milk in students. So that, the score of perceived barriers was higher in students who did not consume milk daily, as compared with those who consumed milk daily. The results of Ahadi et al.'s study showed that 37.3% of students did not consume milk distributed in schools. Of all students who consumed the distributed milks, 63% reported they were consuming milk because it was good for their health; on the other hand, 63% of students who did not consume milk said they were not consuming milk because the taste of distributed milks was not good (19). The results of a study by Vakili et al. showed that some of the studied people did not consume milk because they did not like milk, did not like its smell and taste, or were affected by nausea and abdominal pain at the time of milk consumption (31).

Moreover, the results of Hass and Mahon's study also reported a number of perceived barriers to the consumption of dairy products such as the followings: enjoying other types of food and drinks more than milk, poor access to higher education, and considering milk as a source of unnecessary fat and calorie (32). Baghiani Moghadam et al.'s study reported a statistically significant relationship between the lack of milk consumption and its unpleasant taste (23). The results of Naghashpour et al.'s study showed that after implementing a training intervention program, a statistically significant relationship was observed between perceived barriers and milk consumption (29). According to the results of Auld et

al.'s study, some families did not expect their children to consume milk (33), and it had led to students' disregard toward milk consumption. In this study, there was a statistically significant relationship between perceived self-efficacy and the daily consumption of milk in students. Accordingly, the score obtained for perceived self-efficacy was higher in the students who consumed milk daily, as compared with those who did not consume milk daily. Hosseinejad et al. studied the role of self-efficacy in predicting students' eating behaviors and showed a significant positive relationship between the mean score of eating behavior and self-efficacy (34). According to the results of Deshpande et al.'s study, there was a statistically significant relationship between the score of perceived self-efficacy and healthy eating behavior (28). Moreover, Baghiani Moghadam et al.'s study showed a statistically significant relationship between perceived self-efficacy and milk consumption (23).

#### **4-1. Limitations of the study**

This study had some limitations; for instance we used a self-report tool to collect data. In addition, it was not possible to review the relationship between causes and effects. Moreover, because of the varying cultural, demographic, and economic conditions and the variety of factors related to the consumption of milk, the results of this study cannot be generalized to all the population living in the same area,.

#### **5- CONCLUSION**

Given that more than half of the students do not consume milk daily, it is necessary to identify the causes of such problems and overcome perceived barriers. In addition, there is a need to utilize training programs about the benefits of milk consumption; such programs must be designed for students and their parents based on health belief model and



continually taught by teachers or promoted by mass media. The families and schools must present role models for milk consumption. In addition, in order to get children used to the daily milk consumption, from an early age family members must accompany children and help them.

**6- CONFLICT OF INTEREST:** None.

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