Original Article

Factors Associated with Milk Consumption among College Students of Yazd University of Medical Sciences Based on Theory of Planned Behavior

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Abstract

Introduction: Daily milk consumption can be introduced as a healthy dietary pattern associated with a range of health benefits. This study aimed to determine factors associated with milk consumption among students of Yazd university of medical sciences based on the theory of planned behavior.

Materials & Methods: This cross-sectional study was conducted on 385 students in 2014, who were selected via stratified random sampling. The study data was collected from a questionnaire based on the indirect construct of theory of planned behavior. Finally, the study data were analyzed using the T-test, Chi-square, and Fisher's exact tests.

Results: In the present study, 64% of the students consumed milk daily. The behavioral intention, behavioral beliefs, normative beliefs, control beliefs, and perceived power were significantly associated with the milk consumption ($p<0.05$).

Conclusion: Educating the students in regard with the importance of receiving enough amount of milk, modifying their misconceptions as well as reinforcing positive beliefs can be effective in increasing milk consumption. In addition, increasing access to milk in university campuses should be taken into consideration.

Keywords: Milk consumption; Students; Theory of planned behavior

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Introduction

Milk, regarded as a nutrient, contains multiple compounds, which is an excellent source of protein, fat, sodium, potassium, phosphate, zinc, vitamin A, and vitamin B. Milk is also recognized as an important source of calcium, which is essential for the suitable growth of bones and teeth [1, 2]. According to the literature, there is a positive association between milk consumption and reduced risk of cardiovascular diseases. Increasing the consumption of milk and dairy products to 3 to 4 units per day can decrease the incidence of cardiovascular diseases and stroke by 10-20% and blood pressure to 40%. It also will save 14 million $ in health costs [3-5]. Moreover, consumption of fresh milk leads to better weight control [6].

Despite the many benefits that can be expressed for milk consumption, available statistics state that an increase in the age may lead to reduced milk consumption , by which a variety of soft drinks are replaced. The shift may cause a calcium deficiency, increased risk of osteoporosis, and fractures in the adulthood [7]. Although scant information has been reported on the reasons why the consumers may choose milk as their desired drink, according to the results of some studies, milk consumption is partially affected by poor access, health and sanitary conditions, and lifestyle-related factors. In addition gender, age, education level, occupation, ethnicity, product features, and price may affect food choice behaviors, attitudes, and beliefs [8, 9].

According to the results reported by Klesgeet et al., milk consumption is related to body weight, fruits and vegetables intake, age, education level, stomach problems caused by drinking milk, and physical activity level [10]. Thompson et al. demonstrated that self-efficacy and perceived norms are positively correlated with low-fat milk intake [11]. Furthermore, Babolian et al. proposed that individual factors such as attitudes and beliefs have great impact on the milk consumption [12].

Using a theory is helpful to identify effective factors or mediators in different patterns of milk consumption. The theory of planned behavior is often considered as a suitable framework to study the nutritional behaviors among young people [11, 13]. According to this theory, the intention is the most important determinant of behavior and those with stronger intention are more likely to make healthy behaviors. As a matter of fact, the intention is controlled by three main structural items: attitude, subjective norms, and perceived behavioral control. Attitude is defined as the degree, to which a person has a favorable or unfavorable evaluation of his (her) behavior, including behavioral beliefs and outcome evaluation. Subjective norms measure the importance of others to perform or not to perform a behavior, including normative beliefs and motivation to comply, which show an individual's tendency to follow them. Perceived behavioral control, which involves control beliefs and perceived power, is defined as the individual's

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perception of difficulty or ease of doing a behavior[14].

While young people become independent of their parents, they get vulnerable to develop unhealthy behaviors that could bring them a higher risk for the chronic diseases [15, 16]. It seems important to identify the factors affecting milk consumption, particularly in young people. Since there is a few Iranian studies conducted on colleague students in this regard [17], the current study was carried out to identify the factors related to milk consumption within students of Yazd university of medical sciences based on the theory of planned behavior.

Materials and Methods

This cross-sectional study was conducted on 385 students of Yazd university of medical sciences in 2014. According to the results of the pilot study with confidence of 95% and accuracy of 0.05,353 was determined as the population size using the formula ($n = Z^2 \sigma^2 / d$) with the possibility of 10% missing. Thus, 385 students were asked to complete the questionnaires, who were selected by stratified random sampling. In this regard, the lists of students were obtained from the university faculties and then the cases were selected from each faculty based on the number of students via simple random sampling.

To collect the study data, a researcher-devised questionnaire with the three following sections was used: 1- Demographic items (Age, sex, marital status, grade, and residence), 2- Items on milk consumption behavior and its related factors (e.g., do you drink milk every day?).The Pearson correlation coefficient for this construct was reported 0.71. 3- Items on other constructs of the theory of planned behavior. In this part, the behavioral intention was measured via three questions (e.g., I intend to take pasteurized low-fat milk every day), and Cronbach's alpha for this scale was 0.74. Behavioral beliefs were measured by 10 questions (e.g., daily consumption of milk may help increase my bone density), and Cronbach's alpha for this scale was 0.84. Outcome evaluation was examined via 10 questions (e.g., increased bone density due to milk consumption is desirable to me), which Cronbach's alpha for this scale was 0.78. In order to evaluate normative beliefs, four questions were applied (e.g., my family believes that I should consume milk everyday), that the Cronbach's alpha for this scale was 0.81. Motivation to comply was also measured utilizing four questions (e.g., my family's opinions about daily consumption of milk is important to me), and Cronbach's alpha for this scale was reported 0.79. Moreover, control beliefs were evaluated with six questions (e.g., for me it is impossible to buy milk considering its high cost), with Cronbach's alpha of 0.70 for this scale. The perceived power was examined by six questions (e.g., for me it is difficult to consume milk due to its high cost), and Cronbach's alpha for this scale was reported 0.76.

Each item was measured by a 7-point Likert scale ranging from 1 (extremely disagree) to

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7 (extremely agree).The mean values of the item scores were calculated to give an overall score for each construct of the theory of planned behavior.

In order to substantiate the content validity of the questionnaire, seven health education experts' opinions were probed. Finally, content validity index (CVI) and content validity ratio (CVR) were determined to be 0.81 and 0.87, respectively. To complete the questionnaires, the researchers attended each faculty of the university and expressed the study purpose, and then the questionnaires were distributed to be completed. The data were analyzed applying SPSS software (ver, 16) via chi-square test, Fisher's exact test, and independent t-test. Furthermore, the level of significance was set at 0.05.

Results

In the current study, the participants had the average age of 22.13± 3.47 years, who were in the age range of 18-38. Among the participants, 65.2% were females and 18.4% were married (Table 1).

Table 1: Distribution of demographic characteristics of the students

Variables		Number	%
Age	≤20	91	23.6
	20-24	205	53.2
	≥25	89	23.1
Sex	Male	134	34.8
	Female	251	65.2
Marital status	Married	71	18.4
	Single	314	81.6
Grade	BS	267	69.4
	Master degree	49	12.7
	Medical degree or PhD	69	17.9
Residence	Dormitory	289	75.1
	Non-Dormitory	96	24.9

The study results showed that 66% of the students had milk consumption. Among those who took milk daily, 85.4% consumed a glass of milk and 14.6% had two glasses per day. Most students used milk with breakfast (55%), 25% as a snack, and 20% before sleep.

The study results revealed that there was a significant difference in consumption of milk with regard to the students' sex (p=0.019), i.e. 71.1% of male and 62.2% of female students consumed milk. Furthermore, the dormitory and non-dormitory residents were significantly different in consumption of milk (p=0.002). Dormitory residents used lower amounts of milk, while there was no statistically

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significant association between milk consumption and age (p=0.480) on the one hand, as well as marital status (p=0.115), and educational level (p=0.065) on the other hand.

The mean, standard deviation, and scores range of the planned behavior theory construct is demonstrated in (Table 2).

Table 2: Means, standard deviation and score range of theory of planned behavior constructs in students

Constructs	Mean	SD	Range of scores
Behavioral intention	12.92	4.94	3-21
Behavioral belief	43.87	7.06	10-70
Outcome evaluation	43.49	8.48	10-70
Normative belief	14	5.30	4-28
Motivation to comply	15.63	5.61	4-28
Control belief	31.28	8.35	6-42
Perceived power	28.52	8.64	6-42

The most positive behavioral belief was shown to be the belief that milk consumption reduces the osteoporosis (44.7%) and the most negative attitude towards milk consumption was the unpleasant taste of milk (27.8%). Approximately, 15.3% of the students reported that their families believe they should regularly consume milk on a daily basis. Considering the control beliefs, 14% of the students reported that when their families do not use milk, they are more likely to reduce their drinking of milk. Moreover, milk consumption was seemed to be low when access to milk was difficult in dormitory or outside the home (19.7%).

The data presented in Table 3 demonstrated that intention behavior (p=0.001), behavioral beliefs (p=0.001), normative beliefs (p=0.046), control beliefs (0.001), and perceived power (0.001) were significantly correlated with the milk consumption.

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Table 3: Means and standard deviation of theory of planned behavior constructs on milk consumption or lack of milk consumption

Consumption of milk	Yes		No		
Constructs	**Mean**	**SD**	**Mean**	**SD**	**P**
Behavioral intention	13.64	4.83	11.71	4.89	0.0001*
Behavioral belief	44.87	7.24	42.18	6.44	0.001*
Outcome evaluation	43.94	8.41	42.73	8.56	0.177
Normative belief	14.40	5.24	13.34	5.18	0.046*
Motivation to comply	15.64	5.54	15.61	5.74	0.961
Control belief	32.93	7.92	28.50	8.24	0.0001*
Perceived power	29.72	8.64	16.52	8.31	0.001*

p-value is significant(*)

Discussion

In the present study, the results demonstrated that about one-third of the students did not have daily consumption of milk. Taking a 200-ml glass of low-fat milk provides 250 mg of calcium and to achieve daily recommended calcium intake three to four servings of dairy is required [17]. The results of the present study are consistent with those of Jafari et al. that reported 78.1% of the students did not receive a daily sufficient amount of dairy products [18]. Accordingly, the reports of the National Health and Nutrition of America showed that 39% of men and 43% of women in the age range of 20-29 received less than one share of milk or dairy during the day [19]. The first university years are often the first years that young people live in a new environment away from their families, and thus they may face many different choices of food that may lead to unhealthy dietary habits. Different studies have revealed that the diet of college students usually lacks dietary intake of fruits and vegetables, as well as milk and other dairy products [20]. Since peak bone density is reached in the third decade of life [21] adequate calcium intake along with other essential nutrients found in milk and other dairy products is important for the young adults, which should be considered by health professionals.

The findings of the present study reported that there was a significant correlation between behavioral intention and the milk consumption. Kassem and Lee [22] proposed the intention has a significant correlation with low-fat milk consumption in adolescence. In another study, Conner et al. [23] indicated that consumption of bread with high fiber and low-fat milk at breakfast has a significant association with the behavioral intention. There are also studies that showed intention to be a significant factor for consumption of fruits and vegetables, snacks, and sweet drinks [24, 25].

In this study, students who regularly drank milk had higher behavioral beliefs scores. Moreover, believing that milk consumption reduces osteoporosis and unpleasant taste of milk were the most important positive and

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negative beliefs of the students respectively. Observational and controlled trials have shown a positive association between dairy consumption and bone markers or bone mineral density [17]. Mahone and Haas, reported beliefs that discourage the use of dairy products namely, more pleasure of food and beverage than milk, poor access to higher education, and belief of receiving unnecessary fat and calories from milk [26]. In this regard, identifying the students' beliefs in regard with milk consumption and modifying negative beliefs or misconceptions along with strengthening the positive ones should be taken into consideration.

In this study, the student' average score of normative beliefs who had daily consumption of milk was higher and most students mentioned that their families believe that they should regularly consume milk. Indeed, parental expectations and rules on food intake affect the food culture of the family [27]. In the study of Auld et al. [28], it was reported that some families do not have any expectations for daily milk consumption, which was found to act as a barrier to consumption of milk by their children. Grumbine et al. [29] proposed a direct relationship between milk consumption by students and its consumption in their family. Healthy eating habits like milk consumption are established during childhood and early adolescence within the family environment. Healthy eating habits among adolescents and young adults would have a strong impact on their health in later stages of life. Therefore, parents should be trained to encourage their children to adopt healthy eating behaviors.

The present study results revealed that control beliefs and perceived power were significantly associated with milk consumption among students. As a result, when milk is absent in the family diet, the individual is less likely to consume milk. Moreover, not having access to milk in dormitory or outside home makes milk consumption difficult. Studies have shown that people's beliefs regarding availability of the resources and necessary opportunities to achieve behavior (control beliefs) and how each of these resources and opportunities facilitates the behavior (perceived ease) affect people's perceived behavioral control [30]. According to Kassem and Lee, adolescents strongly believe that access to low-fat milk and having enough money to buy it out of home as well as its availability at home are associated with consumption of low-fat milk [22]. The supply of high quality milk in universities can help enhance milk consumption among college students. The present study reported that male students and those not living in dormitory consumed higher amounts of milk. Indeed, the findings of the present study are in agreement with those reported by Mahon and Haas [26]. Dura Trave reported that there were no differences in the frequency of dairy products consumption with regard to age, type of residence, level of university studies, or class timetables in college students in the age range of 19-24. In addition, in contrast

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to our study, low-fat dairy products consumption was higher within women [31]. Since this study was carried out on the students of a medical science university, conducting a similar study on students of nonmedical universities is recommended. Furthermore, given that milk consumption can be influenced by a range of structural factors, carrying out similar studies on the basis of other behavioral theories and models of health education seems to be beneficial.

Conclusion

Educating the importance of milk consumption, modifying misconceptions, reinforcing positive beliefs and increasing access to milk in university campuses can be effective in increasing milk consumption among college students.

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References

1. Uenishi K. Prevention of osteoporosis by foods and dietary supplements. Prevention of osteoporosis by milk and dairy products. Clinical Calcium 2006; 16(10):1606-14.
2. Bus AE, Worsley A. Consumers' Sen-sory and Nutritional Perception of three types of milk. public health nutrition. 2003; 6(2):201-8.
3. Miller GD, Jarvis JK, Mc Bean LD. Handbook of dairy foods and nutrition. London: CRC Press; 2007.
4. Larsson SC, Mannisto S, Virtanen MJ, et al. Dairy foods and risk of stroke. Epidemiology 2009; 20(3):355-60.
5. McCarron DA, Heaney RP. Estimated healthcare savings associated with adequate dairy food intake. American Journal of Hypertension 2004; 17(1):88-97.
6. Crichton GE, Alkerwi A. Whole-fat dairy food intake is inversely associated with obesity prevalence: findings from the Observation of Cardiovascular Risk Factors in Luxembourg study. Nutrition Research 2014; 34(11):936-43.
7. Cullen KW, Zakeri I. Fruits, vegetables, milk, and sweetened beverages consumption and access to a la carte/snack bar meals at school. American Journal of Public Health 2004; 94 (3):463-7.
8. Wham CA, Worsley A. New Zealanders' attitudes to milk: implication for public health. Public health nutrition .2003; 6 (1): 73-8.
9. Peng Y, West GE, Wang C. Consumer attitudes and acceptance of CLA- enriched dairy products. Canadian Journal of Agricultural Economics 2006; 54 (4): 663-84.

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10. Klesges RC, Harmon-ClaytonK, Ward KD,Kaufman EM, et al. Predictors of milk consumption in a population of 17- to 35-year-old military personnel. Journal of the American Dietetic Association 1999; 99(7):821-6.
11. Thompson VJ, Bachman C, Watson K, et al. Measures of self-efficacy and norms for low-fat milk consumption are reliable and related to beverage consumption among 5th graders at school lunch. Public Health Nutrition 2008;11(4):421-6.
12. Babolian Hendijani R, AbKarim MS. Factors affecting milk consumption among school children in urban and rural areas of Selangor, Malaysia. International Food Research Journal. 2010;17(1): 651-60.
13. Riebl SK, Estabrooks PA, Dunsmore JC, et al. A systematic literature review and meta-analysis: The Theory of Planned Behavior's application to understand and predict nutrition-related behaviors in youth. Eating Behaviors. 2015; 18:160-78.
14. Fila SA, Smith C. Applying the Theory of Planned Behavior to healthy eating behaviors in urban Native American youth. International Journal of Behavioral Nutrition and Physical Activity (IJBNPA) 2006;3 (1):11.
15. Huang YL, Song WO, Schemmel RA, et al: What do college students eat? Food selection and meal pattern. Nutrition Research 1994; 14(8):1143-53.
16. Winkleby MA, Cubbin C: Changing patterns in health behaviors and risk factor related to chronic diseases, 1990-2000. American Journal of Health Promotion. 2004; 19 (1):19-2.
17. Rizzoli R. Dairy products, yogurts, and bone health. American Journal of Clinical Nutrition. 2014; 99(5): 1256-62.
18. Jafari F, Beladian-Behbahan SE, Samadpour M, et al. Application of the stages of change model to dairy consumption among students of Shahrekord University of Medical Sciences. Journal of Shahrekord University of Medical Science. 2014; 15(6): 65-74. (Persian)
19. Larson NI, Neumark-Sztainer D, Harnack L, et al. Calcium and dairy intake: Longitudinal trends during the transition to young adulthood and correlates of calcium intake. Journal of Nutrition Education and Behavior. 2009; 41(4), 254-60.
20. De Bate R, Topping M, Sargent R. Racial and gender differences in weight status and dietary practices among college students. Adolescence. 2001; 36:819-833.
21. Walsh JS, Henry YM, Fatayerji D, et al. Lumbar spine peak bone mass and bone turnover in men and women: a longitudinal study. Osteoporosis International. 2009; 20(3):355-62.
22. Kassem NO, Lee JW. Understanding reduced-fat milk consumption among male adolescents using the Theory of Planned Behavior. American Journal of Health Education. 2005; 36 (1):16-24.
23. Conner M, Hugh-Jones S, Berg C. Using the two-factor Theory of Planned Behavior to predict adolescent breakfast choices. Educational and Child Psychology. 2014; 28(4): 37-50.
24. McClain AD, Chappuis C, Nguyen-Rodriguez ST, et al. Psychosocial correlates of eating behavior in children and adolescents: A review. The International Journal of Behavioral Nutrition and Physical Activity 2009; 6:54.
25. Blanchard CM, Kupperman J, Sparling PB, et al. Do ethnicity and gender matter when using the theory of planned behavior to understand fruit and vegetable consumption? Appetite. 2009; 52(1):15-20.

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26. Mahon AK, Haas EJ. A mixed-methods approach to targeting college students' dairy behaviors. American Journal of Health Behavior.2013; 37(5): 703-10.
27. Zabinski MF, Daly T, Norman GJ, et al. Psychosocial correlates of fruit, vegetable, and dietary fat intake among adolescent boys and girls. Journal of the American Dietetic Association 2006; 106:814-21.
28. Auld G, Boushey CJ, Bock MA, et al. Perspectives on intake of calcium-rich foods among Asian, Hispanic, and white preadolescent and adolescent females. journal of Nutrition Education and Behavior 2002; 34(5):242-51
29. Grumbine R, Mills E, Collins N, et al. Beverage consumption of college students: factors that influence their choices. Undergraduate Research Journal for the Human Sciences 2011; 10(1):8-18.
30. Ajzen I, Fishbein M. Understanding attitudes and predicting social behavior. Englewood Cliffs, N.J.: Prentice-Hall, Inc; 1980.
31. Durá Travé T. Intake of milk and dairy products in a college population. Nutrición Hospitalaria. 2008; 23(2):89-94.

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