

## Determinants of milk and milk product consumption among primary school children in a district of Ankara, Turkey

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**Aim.** Determination of influencing factors of milk and milk product consumption among a group of primary school children in Ankara. **Methods.** In this cross-sectional study, the study population consisted of 356 students in two grades (5<sup>th</sup> and 8<sup>th</sup>), and 335 (193 5<sup>th</sup> grades, and 142 8<sup>th</sup> grades). The participation rate was 94%. The SPSS program 15.0 was used for data entry and basic statistical analysis. The chi-square test for cross tabulations and logistic regression to identify influencing factors of milk consumption were used. **Results.** Of the 335 students; 193 were in 5<sup>th</sup> grade, and 142 were in 8<sup>th</sup> grade. The mean age was 10.1±0.4 in 5<sup>th</sup> grade, and it was 13.3±0.7 in 8<sup>th</sup> grade. In the logistic regression analysis significantly positive associations were determined between “milk consumption of the students” and the grade (OR=6,934, 95%CI=2,634-18,254; p<0.001), male sex (OR=2,713, 95%CI=1,220-6,030; p=0.014), presence of milk at home everyday (OR=2,935, 95%CI=1,086-5,281; p=0.030), buy milk with pocket money (OR=2,303, 95%CI=1,036-5,121; p=0.041), eat breakfast everyday (OR=4,994, 95%CI=2,161-11,541; p<0.001), and prefer to drink milk instead of cola (OR=2,961, 95%CI=1,210-7,248; p<0.001). **Conclusion.** School-based interventions to promote milk consumption in earlier grades with a holistic approach can contribute to children’s understanding of the health benefits of milk at earlier ages.

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### Introduction

There has been strong evidence of an association between consumption of milk throughout life and health status. The contents of milk, such as immunoglobulin, growth hormone, enzyme inhibitors, anti-

bacterial agents, protein and peptides, fatty acids, vitamins, minerals are essential for life (1). Because milk and other dairy products have beneficial effects on bone health, obesity, serum total cholesterol (TC), blood pressure, chronic diseases including some types of cancer (2-6), recommended dietary intake

guidelines have been developed for different age groups, sex, and specific conditions such as pregnancy 700 g (baby), 400 g (child), 350 g (adolescent), 250 g (adult), 350 g (elderly), and 500 g (pregnant woman) (7).

Infancy and childhood periods are given specific importance because human beings learn most of their behaviors at younger ages. Learning to drink milk at these ages is made necessary by a number of factors such as inadequate nutrition education, existence of negative role models (parents, etc), having different soft drink options, the physical and biological properties of consumed milk (heat, type, etc) (8, 9). Economical factors are additional limitations for milk consumption in the Turkish community. Such factors determine the different consumption prevalence in different countries.

Milk consumption was predominantly localized to countries in Europe, however, there has been a shift recently to Asian countries (10). In 2002, the annual per-capita consumption of fluid milk in Turkey was found to be 20 kg, and this amount is behind other developed countries (11).

Studies to define the milk consumption amount and to determine the related factors may contribute to the solution of increasing the consumption amount in childhood. With this perspective, this study was conducted to investigate possible influencing factors such as socio-demographic characteristics, regular breakfast consumption, and the pocket money spending preferences of primary school pupils in Ankara.

## Methods

### *Subjects*

The study schools were the two schools in the Primary Health Care Unit region where the researchers had to work for their internship period (two months). The participants consisted of 335 students (193 5<sup>th</sup> graders,

and 142 8<sup>th</sup> graders). The total population was 356 students and the participation frequency equal to 94.1%. Six students were not at school, and 15 students were busy with some other social activities during the study.

Two different grades (5<sup>th</sup> and 8<sup>th</sup> grades) were assessed. The main reason for having two different grades was to define the age influence on milk consumption. The mean age was  $10.1 \pm 0.4$  in the 5<sup>th</sup> grade, and it was  $13.3 \pm 0.7$  in the 8<sup>th</sup> grade.

### *Instruments*

#### *Assessment of milk intake*

Final year medical students with one academic consultant assessed food intake by means of a brief self-administered diet history questionnaire. The questionnaire asked about the frequency and amount of ingestion of selected foods including milk, yogurt, and other milk products. One cup of milk or 1 dish of yogurt was generally considered 1 serving in Turkey.

According to the number of servings of milk consumed, participants were classified into five groups: no intake, 1-2 per month, 1-2 per week, 3-6 per week, every day.

#### *Procedure*

Prior to the study, a pre-trial of the questionnaire was conducted in a socio-demographically similar school on 20 students. The questionnaire was re-formed due to the feedbacks before the study.

#### *Data Analysis*

The SPSS program 15.0 was used for data entry and basic statistical analysis. The dependent variable of the study was “*everyday milk consumption*”; and there were various independent variables. The chi-square test was used to compare frequencies between the independent variables and “milk consumption of the students”. A  $p < 0.05$  was

considered significant. Odds ratios (OR) and 95% CI were calculated in the logistic modeling to identify influencing factors on milk consumption (grade, sex, think that milk prevents diseases, presence of milk at home everyday, buy milk with pocket money, eat breakfast everyday, prefer to drink milk instead of cola).

## Results

Of the 5<sup>th</sup> grade participants, 104 were male (53.9%) and 89 female (46.1%). Of the 8<sup>th</sup> graders, 73 were male (51.4%) and 69 female (48.6%). Fifth and eight grade students were similar in terms of sex ( $p = 0.660$ ), number of siblings ( $p = 0.605$ ), family type ( $p = 0.871$ ), number of households ( $p = 0.674$ ), and receiving pocket money status (0.06) (Table 1). As expected, the two groups were statistically significantly different by grade ( $p < 0.001$ ). The mean age was  $10.1 \pm 0.4$  in 5<sup>th</sup> grade, and it was  $13.3 \pm 0.7$  in 8<sup>th</sup> grade (Table 1).

Milk consumption increased by age. The students in 5<sup>th</sup> grade consumed milk less than the 8<sup>th</sup> graders ( $p < 0.001$ ). The frequency of everyday milk consumption among the 8<sup>th</sup> graders was higher compared to the frequency in 5<sup>th</sup> graders ( $p < 0.001$ ). The amount of consumed milk did not statistically significantly differ between the two grades ( $p = 0.140$ ) (Table 2).

In the logistic regression analysis; “*everyday milk consumption of the students*” had significantly positive associations with grade (OR = 6.934. 95%CI = 2.634-18.254;  $p < 0.001$ ), male sex (OR = 2,713, 95%CI = 1,220-6,030;  $p = 0.014$ ), presence of milk at home everyday (OR = 2.935. 95%CI = 1.086-5.281;  $p = 0.030$ ), buy milk with pocket money (OR = 2.303. 95%CI = 1.036-5.121;  $p = 0.041$ ), eat breakfast everyday (OR = 4.994. 95%CI = 2.161-11.541;  $p < 0.001$ ), and prefer to drink milk instead of cola (OR = 2.961. 95%CI = 1.210-7.248;  $p < 0.001$ ) (Table 3).

## Discussion

Milk is a major contributor of protein and calcium as well as other food elements to the body. Milk intake changes due to age, gender, and specific conditions such as pregnancy. For children it is probably equal to 400 gram (two-three cups) per day (12, 13). In our study population, both the milk consumption frequency and milk intake (grams of milk) decreased by grade (Table 2, 3). This might have been caused by a number of factors. First, the probability of being exposed to environmental stimulators in terms of soft drink consumption could have increased with age. And there is evidence that higher consumption of soft drinks was inversely related with consumption of milk in young children (9, 14). Second, the response of the students to such exposures may be different at different ages and the parents’ influence might have been weakened as age increases.

Gender influence was found to be a predictor of less milk consumption in some studies. For example, calcium intake by the females related with inadequate milk consumption was determined among Asian children (15-17). In our study, gender was also found to be a determinant for milk consumption. The frequency among males was statistically significantly higher compared to the frequency in females (OR = 2.713; 95%CI = 1.220-6.030;  $p = 0.014$ ) (Table 3).

The economic status of the family is associated with healthy food intake in general and the presence of milk every day at home might be closely dependent on the purchasing power of the family. In a study from China conducted in 2002 showed that the frequency of milk drinking among 12-14 year old adolescents was strongly associated with high socio-economic status (18). Although we did not have detailed information in terms of the families’ economic status, we found a strong relationship between milk consumption and the presence of milk

Table 1 Socio-demographic characteristics of the students (October, 2007)

Characteristics	5 <sup>th</sup> grade		8 <sup>th</sup> grade		p
	Number	%	Number	%	
Sex					0.660
Male	104	53.9	73	51.4	
Female	89	46.1	69	48.6	
Age					
Mean±SD	10.1±0.4		13.3±0.7		
Median	10		13		
Number of siblings					0.605
<2	89	46.1	59	41.5	
2	68	35.2	51	35.9	
>2	36	18.7	32	22.5	
Mean±SD	1.76±1.13		1.95±1.38		
Median	2		2		
Nuclear family					0.871
Yes	167	86.5	124	87.3	
No	26	13.5	18	12.7	
Number of households					0.674
<4	84	43.5	65	45.8	
4	63	32.6	40	28.2	
>4	46	23.8	37	26.1	
Mean±SD	3.91±1.23		3.92±1.42		
Median	4		4		
Receive pocket money					0.065
Yes	147	76.2	95	66.9	
No	46	23.8	47	33.1	
Total	193	100.0	142	100.0	

Table 2 Milk consumption status (October, 2007)

	5 <sup>th</sup> grade		8 <sup>th</sup> grade		p
	Number	%	Number	%	
Milk consumption					
Yes	187	96.9	107	75.4	<0.001
No	6	3.1	35	24.6	
Everyday milk consumption					
Yes	144	74.6	47	33.1	<0.001
No	53	25.4	95	66.9	
Amount consumed per day (cup)					
≤2	121	54.8	100	45.2	0.140
>2	72	63.2	42	36.8	
Mean±SD	2.43±1.67		1.50±0.78		
Total	193	100.0	142	100.0	

Table 3 Predictors of “everyday milk consumption” of the students (October, 2007) (n = 335) <sup>a</sup>

	Milk consumption status <sup>b</sup> n(%)	Adjusted OR (95% CI)	p
Grade			<0.001
5 <sup>th</sup> *	75.4	1.0 <sup>c</sup>	
8 <sup>th</sup>	96.9	6.934 (2.634-18.254)	
Sex			0.014
Female	83.5	1.0 <sup>c</sup>	
Male	91.5	2.713 (1.220-6.030)	
Think that milk prevents diseases			0.451
No	83.4	1.0 <sup>c</sup>	
Yes	91.9	1.356 (0.614-2.995)	
Presence of milk at home everyday			0.030
No	82.6	1.0 <sup>c</sup>	
Yes	90.5	2.935 (1.086-5.281)	
Buy milk with pocket money			0.041
No	79.6	1.0 <sup>c</sup>	
Yes	90.9	2.303 (1.036-5.121)	
Eat breakfast everyday			<0.001
No	59.1	1.0 <sup>c</sup>	
Yes	92.1	4.994 (2.161-11.541)	
Prefer to drink milk instead of cola			<0.001
No	81.3	1.0 <sup>c</sup>	
Yes	94.5	2.961 (1.210-7.248)	

<sup>a</sup> Logistic regression model included grade, sex, presence of milk at home everyday, buy milk with pocket money, eat breakfast everyday, prefer to drink milk instead of coke. For each category, other variables were adjusted.

<sup>b</sup> Percentage without adjustment

<sup>c</sup> Reference category

at home every day (OR = 2.935, 95%CI = 1.086-5.281; p = 0.030) and buying milk with pocket money (OR = 2.303, 95%CI = 1.036-5.121; p = 0.041) (Table 3).

In this study we had a number of limitations. First, we conducted this survey in 2 primary schools. For this reason we cannot generalize the results. Second, milk consumption and other information were determined from the personal statements of the students with a “food and milk consumption” survey. An observation based method is a more objective way to get more “objective” data which we recommend for further studies.

School-based intervention can contribute to children’s understanding of the health benefits of milk. Children will choose healthier options from canteens such as milk. The

key to success in this regard is to ensure student involvement (19). After the study, we planned and organized conferences at the study school. We conducted the conferences for the schools and grades differently. The teachers were also invited to the conferences. In the last 10 minutes of the conferences, the questions of the students were answered by the presenters.

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