



Consumption of Milk and Milk Products Among Young People of Pakistan; Cross Sectional Study

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Abstract

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Background: Consumption of milk and milk products between 10-24 years of age is chief important; a crucial bone development age and during recent years consumption of milk and milk products had been decreased among young people. Current study was aimed to investigate the consumption of milk and milk products among young people of Pakistan.

Methods: Study design was Cross-sectional; two hundred individuals aged 10-24 years were selected via convenient sampling. Self-structured questionnaire with a combination of closed and open ended questions was used for data collection.

Results: Study provided that 152(76%) sample consumed milk once daily 298 ± 234.90 ml and 48(24%) did not consumed milk.

Conclusion: Results concluded that the consumption of milk and milk products among young people was low as compared to the recommended dietary allowances; thus a need to provide knowledge regarding the importance of milk consumption to assist in reducing bone health disorders

Keywords: Bone health, recommended dietary allowances, milk consumption, young people

Introduction

World Health Organization (WHO) termed individuals aged 10-19 years as adolescents, individuals aged 15-24 years as youth and as these both age groups are overlapping so collectively they are termed as young people i.e.10-24 (1). This period of life span is a critical period for bone accretion; during this period individuals are expected to acquire peak bone mass (2). Peak bone mass is totally dependent on bone mineral percentage accreted during growing years, many modifiable and non-modifiable factors i.e. genetics, gender, hormonal status and lifestyle influence the achievement of peak bone mass (3). Risk of bone health disorders are dependent on bone mineral density and bone mineral content maintained and achieved during this crucial

period (4). As adolescence is a transitional phase i.e. childhood to adulthood and is a complex mixture of rapid physical and mental growth; fulfilling the nutritional requirements during this phase of development is very important because imbalanced diet could end up not only with linear growth failure but also with altered psychomotor functions (5). International Osteoporosis Foundation (IOF) in 2009 reported; in Pakistan out of 9.9 million subjects' 7.2 million women have osteoporosis. Moreover, it is expected that frequency of osteopenia is about 40 million in Pakistanis, and both genders are correspondingly suffering from this problem. It is also estimated that the prevalence of osteoporosis in Pakistan would increase to 11.3 million (2020) and 12.91 million (2050) (6).

Bone growth stunted due to the deficiency of proteins, calcium, vitamin D, vitamin C, magnesium, zinc, manganese and copper. Half the volume of the extracellular material of bone consists of protein and the other half of calcium phosphate crystals; protein, calcium and phosphorous are required in bulk by bone cells. Among food groups, dairy products are very complex due to their nutrient composition and the effect of consumption of dairy products is more accounted as compared to the consumption of single nutrient. In concern to bone health, dairy products are inevitable due to presence of bone health mineral i.e. calcium (7)

Milk and milk products are the excellent source of calcium and the recommended dietary allowance of calcium for youth is 1300mg/day (8). Consume 3 servings of milk a day or 1300mg of calcium to maintain bone mineral density (9). One serving of milk contains 250ml milk, one serving of yogurt contains 3/4cup yogurt and one serving of cheese includes 1^{1/2} ounces of cheese. One cup whole milk contains 291mg calcium, one cup yogurt contains 415mg calcium, 1/2 cup cottage cheese contains 77mg calcium (10).

Many factors contribute to the inhibition of milk's key nutrient absorption i.e. calcium in the body. Increased caffeine consumption i.e. >500-600mg/day via tea (7-9cups) and coffee (4-7cups) hinder calcium's absorption in the body; though the recommendation for caffeine consumption is up to 400mg/day⁻¹ (11). Other than caffeine, sugar also imposes a detrimental effect on bone health and metabolism; consumption of 100grams sugar a day promotes to negative calcium balance (12).

A descriptive study was conducted on 205 young adults aged 19-24 years in Ankara with an objective to determine the consumption of milk and knowledge about milk among the selected sample; data was collected via questionnaires and face to face interview sessions. Results concluded that 42% consumed milk regularly and 58% had irregular milk consumption and the results of other objective showed that males had higher knowledge about milk than females i.e. 17.54 ±4.36 and individuals aged 22-24 scored higher i.e. 18.14± 4.34 than individuals aged between 19-21 about knowledge of milk (21).

A cross sectional study entitled "Social support and dairy products intake among adolescents: a study from Iran" was conducted on 402 high risk adolescents enrolled in 7th grade with an objective to determine the consumption of milk and milk products as per

recommended daily servings. Data was collected via self-structured questionnaire contained questions regarding perceived social support, physical activity and sedentary behaviors along with this a food frequency questionnaire (FFQ) for measuring milk consumption. Results of the current study concluded that average daily intake of milk and milk products was 1.64 servings per day and overall 14.2% adolescents consumed milk and its products as per the recommendations (22).

Methodology

Study design and sampling:

This was a quantitative, non-experimental, and cross-sectional study conducted from (January 2020- April 2020). Sample size of this study was two hundred young adults aged 10-24 years collected via convenient sampling technique; before collection informed written consent was taken from the sample. The purpose of this study was to determine the consumption of milk and milk products among young people.

A self-structured questionnaire with a combination of closed and open ended questions was distributed among the samples of the study. Questions asked from the selected sample included the socio-demographic profile and frequency of consumption of milk and milk products via food frequency questionnaire (20). Income level was classified as lower class, middle class and upper strata (13).

Statistical Analysis:

Normality of data was determined using Shapiro Whilk test and statistical analysis was done by ANOVA followed by Tukey's Test. A p-value of ≤0.05 was considered as statistically significant.

Results

Demographic profile i.e. age, gender, income status and educational levels of the samples stated in table 1.1.

Table 1. Socio-Demographic characteristics

Variable	Frequency	Percentage (%)
Gender		
Male	114	57.0
Female	86	43.0
Age (Years)		
10-14	20	10

15-19	65	42.5
20-24	115	57.5
Income Status		
Lower class	0	0
Lower Middle class	45	22.5
Upper Middle class	75	37.5
Middle class	51	25.5
Upper class	29	14.5
Education Level		
Undergraduate	127	63.5
Graduate	73	36.5

Table 2. General frequency of consumption of different types of milk

Types of milk	Frequency (n)	Percentage (%)	P. value
Fresh Milk			
Buffalo milk (Whole)	12	6.0	
Buffalo milk (Skimmed)	19	9.5	
Goat milk (Whole)	0	0	
Goat milk (Skimmed)	0	0	
Camel milk (Whole)	0	0	
Camel (Skimmed)	0	0	
Ultra Heat Treated (UHT)			
Good Milk	0	0	
Milk Pak	49	24.5	<0.001
Olpers	41	20.5	
Nurpur	0	0	
Dayfresh	0	0	
Pasteurized milk			
Anhaar	9	4.5	
Prema	10	5	
Malmo	0	0	
Gourmet	0	0	
Adams	0	0	
Powdered milk			
Nido	11	5.5	
Types of Milk products			
Yogurt			
Homemade yogurt	46	23	
Packaged yogurt	17	8.5	
Cheese			
Cottage cheese	2	1	
Mozzerrela cheese	11	5.5	
Cheddar cheese	12	6.0	
Milkshake			
Fresh fruit milkshake	71	35.5	

Tea			
Fresh milk tea	81	40.5	
Packaged milk tea	30	15	
Tea Whitener Tea			<0.05
Everyday	87	43.5	
Tarang	2	1	
Cupshup	0		
Qudrat	0		
Tea Max	0		
Milk based desserts	34	17	
Addition of sugar			
Yes	166	83	<0.05
No	34	17	

* p-value significant at <0.05

Consumption of ultra-heat treated milk was statistically higher than other types of milk; study provided that 90(45%) consumed ultra-heat treated milk (UHT) then followed by fresh milk i.e. 31(15.5%) then followed by pasteurized milk i.e. 19(9.5%), then followed by powdered milk i.e. 11(5.5%). Data analysis revealed that consumption of tea made of tea whitener was 1600.86 ± 257.30 ml that was high as compared to the recommendations. It was also found that 166(83%) sample added sugar in milk and milk products and quantity of sugar added in milk and milk products by selected sample was 110 ± 20 g/day that was in elevation as compared to the recommendations; p value was statistically significant ($p = <0.05$).

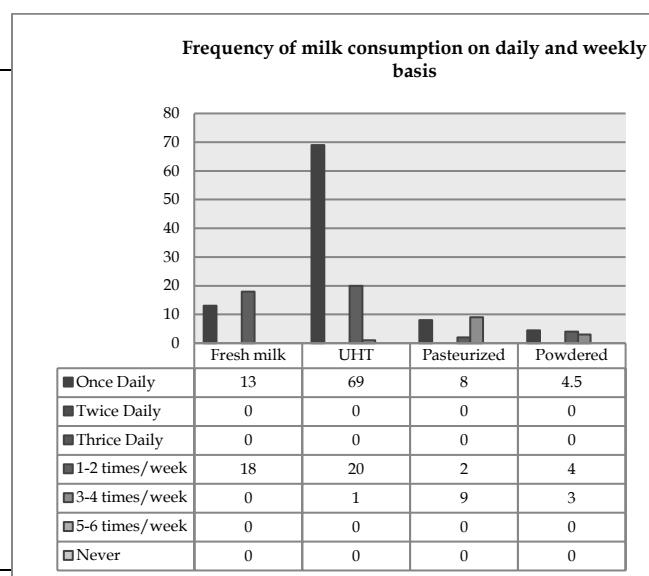


Figure 1. Frequency of milk consumption on daily weekly and weekly basis

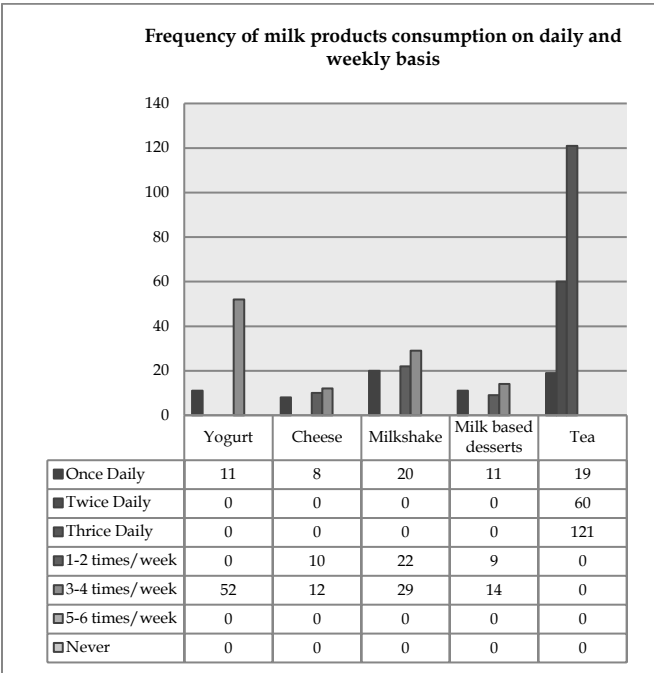


Figure 2. Frequency of milk products consumption daily, weekly and monthly

Above mentioned figure shows that consumption of ultra-heat-treated milk on daily basis was higher i.e. 69(34.5%) as compared to other types of milk.

Table 3. Serving size of milk and milk products consumed daily

Types of products	Serving size/Daily M±SD
Milk	298±234.90ml
Cheese	3.80±1.24oz
Yogurt	3.37±1.91oz
Milkshakes	200±100ml
Milk based desserts	6.8±3.4oz
Tea	1600.86±257.30ml
Addition of sugar	110±20g

*Consumption of milk and milk products among study sample was low as compared to recommendations; difference was statistically significant ($p < 0.05$) and obtained using Tukey's test.

Discussion

Results of the current study indicated that consumption of milk among young people was low as compared to the recommendations i.e. 298±234.90ml (Heaney, 2009) states that three or four glasses of milk should be consumed daily whereas results of the current study are not in accordance to the

recommendations (7). One cup whole milk contains 291mg calcium and recommended dietary allowance of calcium for youth is 1300mg/day (10). In Pakistan's population decreased calcium intake is one of the most prominent influencer for causing osteoporosis; study concluded that 30.7% individuals were suffering from osteoporosis and 44.5% were suffering from osteopenia (14). A similarly study was conducted in Karachi to determine the nutritional status, dietary practices and physical activities of adolescents in public and private schools and concluded that 50% of the adolescent boys and girls were at the risk of calcium deficiency (5). A study was conducted in which they examined data from repeated cross sections of the National Health and Nutrition Examination Survey (NHANES), 1999 to 2016 and targeted population was individuals aged 2-20years. According to survey 32.4% consumed whole milk, 41.8% consumed milk with 4%fat, 11.8% consumed milk with 1%fat and 10.3% consumed fat free milk. Results of the current study are not in accordance with the above discussed study i.e. individuals consumed more fresh skimmed milk i.e. 19(9.5%) as compared to fresh whole milk 12(6.0%) (15). American heart association recommends low-fat or reduced-fat ranges in place of whole (4%) milk for those aged 2 years and older (16).

A study investigated consumer behavior in yogurt purchase and consumption. Study only enrolled subjects who purchased yogurt from the particular outlet i.e. PARC Agrotech Company Limited (PATCO) shop in the National Agriculture Research Center (NARC) only twenty seven individuals fill up their developed questionnaire. Results of the study concluded that 9(33.33%) individuals consumed yogurt daily, 1(3.70%) consumed yogurt 1-2 times/week and 7(25.93%) consumed yogurt 3-6 times/week. Results of the current study are in accordance with the above study i.e. 13(20.6%) consumed yogurt daily, 31(49%) consumed yogurt twice a week and 19(30%) consumed yogurt thrice a month and daily yogurt consumption in selected sample was 3.37±1.91oz. In both studies, consumption of yogurt was not as per the recommendations (17). However, literature states that consume three servings of milk or milk products daily (9) and one serving of yogurt is 3/4cup (10)

The results of present study concluded that 100% of the selected sample consumed tea daily. A study

reported that consumption of caffeine containing food items influences a negative impact on the absorption of calcium in the body in such a way caffeine lowers the kidney reabsorption of calcium and other than the renal reabsorption caffeine also decreases the efficiency of intestinal calcium absorption. Other than these two factors caffeine consumption also lowers the levels of inositol in the blood that also plays a role in the metabolism of calcium which then eventually leads to the excretion and mal-absorption of calcium (18). Effect of caffeine consumption on calcium balance and bone health is dependent on the quantity of both variables i.e. caffeine and calcium. Author concluded that consuming 800mg of calcium a day and along with 400 mg of caffeine a day does not have any generous effect on the health of bones (11). Whereas results of this current study concluded that daily tea consumption among young people was 1600.86 ± 257.30 ml.

Other than caffeine consumption, consumption of white sugar also have a very negative substantial influence on the bone health and calcium status; excessive sugar consumption eventually takes to osteoporosis in such a way it increases urinary calcium excretion, it decreases calcium absorption, it hinders calcium transportation to intestines, it obstructs vitamin D activation, it increases osteoclastic activation and decreases osteoblastic activation. Consumption of 100grams of sugar a day contributes to increased urinary evacuation of minerals i.e. calcium, magnesium and potassium (12). Results of this study concluded that daily sugar consumption among young people was 110 ± 20 g.

127(63.5%) were undergraduates and 73(36.5%) were graduated; as 100% of the current study sample was educated. Literature states that; to improve the consumption of milk and milk products one approach that could be very helpful in refining the intake micronutrients is improving the public's knowledge about nutrients and health because mal-concepts and mal-beliefs negatively effects food consumption (19).

Conclusion

Results concluded that the consumption of milk and milk products was low among young people as compared to the recommendations. Thus current study highlighted the need to facilitate measures that must be followed to increase awareness regarding importance of milk consumption as per recommendations and the consequences of not

consuming milk for young people; a bone modeling age. Along with this regular bone mineral density must also be screened for early detection and eradication of any bone health disorder.

Recommendation

Future studies must be conducted:

- To assess the frequency of consumption of milk and milk products in other age groups i.e. infants, toddlers, pre-scholars, school going and adults and among pregnant and lactating females.
- To determine the reasons that leads to decreased consumption of milk and milk products among different age groups.
- To determine the effect of plant based calcium sources on bone health of individuals with lactose intolerance or vegetarianism.

Limitations

Bone mineral density of the selected sample was not measured due to lack of funds though it should be measured to assess the relationship between bone mineral density and consumption of milk and milk products.

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