International Journal of Homoeopathic Sciences

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A survey on dairy and dairy products influence on early menarche: A non-randomized analytical cross sectional observational study

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Abstract
Menarche is first menstrual period which is phase of transition from childhood to adulthood. Many studies revealed decline in age of menarche.
Background: There is large concern over early puberty. Dairy products are considered as one of the reason for decline in age of puberty due to presence of steroid hormones.
Objective: Main objective of this study is to identify whether Dairy & dairy products has any role for early puberty.
Methods: An online cross-sectional study has been conducted (between September 2022 to nov-2022) at MNR Homoeopathic medical college & hospital, Sangareddy, Telangana, India using NHANES Diet questionnaire.
Results: Weak negative relationship between intake of dairy products consumption for early menarche.
Conclusion: Further detailed study with large sample survey is needed to draw the statement whether dairy products has directly proportional ratio in declining the age of puberty.

Keywords: menarche, milk, age

Introduction

Menarche is first menstrual period which is phase of transition from childhood to adulthood. Usually mean age of menarche is in between 11-14 years, but there is evidence of decline in age of menarche in both developing and developed countries. Various factors responsible for early menarche are socioeconomic conditions, nutritional status, food habits, and lifestyle. Intake of milk and milk products may have association with decrease in age of menarche has raised chaos because of presence of hormones in milk and milk products. Prolactin, steroids including estrogens, progesterone, corticoids, and androgens are the most important hormones found in milk and other dairy products apart from it there are also other harmones like insulin-like growth factor-1, prostaglandins are present in milk. Major concern over dairy products is that during digestion many hormones and growth factors are destroyed or deactivated, but some hormones or growth factors may survive even after digestion and remain bioactive in the plasma of milk-drinkers. Milk comes from bovine species but there growth pattern is different from humans like calves grow faster and of larger sizes. And now doubt raises that consumption milk which is from another species may change human growth pattern and maturation. A research had been done in Spanish women about decline in age at menarche where they observed decline from an average of 13.72 years in the 1925-1929 birth-cohorts to 12.83 years in the 1958-1962 birth-cohorts. The European Prospective Investigation into Cancer & Nutrition (EPIC) study revealed the mean age at menarche was decreased in participants who born from 1912 to 1964 in nine European countries Recent study by Population Association of America noted a significant decline in the age at menarche worldwide which was observed irrespective of their socioeconomic status, and race. A decline in age of menarche was also reported in 20th century in several countries such as Canada, Japan, Taiwan, Russia, Turkey, and Indonesia. A similar study showed that average age of menarche in India was 14 years in 1955 and evidence from Indian Human Development survey showed that there has been a reduction in age of menarche by nearly one month per decade. A study conducted in west Bengal showed that the mean age of menarche is 12.8 years and another study conducted in urban area of south India in 2018 showed that mean age of menarche is 13 years. This secular declining trend of menarcheal age is known to cause many health problems in women.

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Hence effort has done to know whether there any weak or strong relationship between intake of milk and decline in age at menarche. A non-randomized cross sectional sampling method through online survey has done on BHMS female students Of MNR Homoeopathic Medical College, Sangareddy, Telangana through Google form by using Diet History Questionnaire, Version 2.0. Participants who are having habit of taking milk before menarche are considered. This study was done in between September 2022 to nov-2022.their scoring was calculated and data is analyzed based on feedback response of questionnaire to evaluate the relation between intake of dairy products and early menarche. Dairy foods were defined as any food or beverages that were produced from the milk of mammals.

Settings and Design
An online non randomized study has been conducted in between September 2022 to nov-2022. The survey was conducted in the form of questionnaire which was available online on Google forms. The survey questionnaire link was generated and forwarded amongst the BHMS students of MNR Homoeopathic medical college & Hospital, Telangana.

Participants
The participants for the survey were selected from students of BHMS. Participants were informed that by responding to the questionnaire, they were agreeing to participate in this survey willingly and permit to utilize its outcomes in the form of publications. In any stage participant intended to leave the survey, they were free to close the link without clicking the submit tab. All information received had been kept strictly confidential and the data was analyzed without revealing the identity of any individual participant.

Questionnaire
Questionnaire had taken from National Institutes of Health, Diet History Questionnaire, and Version 2.0. First 2 questions are of demographic data including their habit of milk, age of menarche. Rests of question were taken from questionnaire which consists of ---39 questions. First 3a to 5c questions were related to intake of milk, form, amount, fat free are not. Question 6a to 6c and 8a to 8c is related to yogurt intake form and fat estimation. From 7a to 7c information about milk is consumed along with other food or not. 9a to 9c about cottage cheese products, 10 a to 10c about pudding or custard habit. 11a to 11c about sour cream,12a to 12c about cheese intake either directly or in burger, sandwiches ,13a to 13c about cream cheese ,14a to 14c about whipped cream,15a to 15c about having habit of milk with tea or coffee

Results
This study was done in online mode. participants who has the habit of consuming dairy products are included in this study. 53 members participated in study of which 43 participants had habit of taking milk before menarche. and 13 people do not have habit of taking milk before menarche. Participants who are having the habit of taking dairy products before menarche are considered. All participants are between ages of 18-22 yrs. age of menarche in number is 10 people for 14 yrs, 14 people for 12 yrs, , 15 people for 13 yrs, 2 people for 15 yrs, 1 people for >15 yrs,1 people for 8 yrs.

Table 1: Demographic data screening questioner sent in online mode

Name
Age
Gender
Do you have habit of drinking milk before menarche

Table 2: Habit of milk intake before menarche

S. No	Do you have habit of drinking milk before menarche	Total
1.	YES	43
2.	NO	13

Table 3: Age of menarche who have habit of milk intake

S. No	Age at menarche	Have the habit of drinking milk
1.	8	1
2.	9	0
3.	10	0
4.	11	0
5.	12	14
6.	13	15
7.	14	10
8.	15	2
9.	More than 15 years	1

Table 4: Age of menarche who do not have habit of milk intake

S. No	Age at menarche	Do not Have the habit of drinking milk
1.	8	0
2.	9	0
3.	10	1
4.	11	1
5.	12	5
6.	13	1
7.	14	1
8.	15	2
9.	More than 15 years	2

Table 5: Questionnaire as per Diet History

S. No	Habit	1 day per month or less	2-3 days per month	1 day per week	2-3 days Per week	4-5 days per week	6-7 days per week
1a	How often did you drink milk as a beverage	16(37.2)	2(4.7)	5(11.6)	7(16.3)	7(16.3%)	6(14%)
2a	How often did you drink chocolate milk as a beverage (including hot chocolate	30(69.8%)	4(9.3%)	3(7%)	4(9.3%)	1(1%)	1(1%)
3a	How often did you drink flavored milks as a beverage	25(58.1%)	5(11.6%)	6(14%)	2(4.7%)	1(9.3%)	4(9.3%)
4a	How often did you drink yogurt as a beverage?	24(55.8%)	4(9.3%)	4(9.3%)	7(16.3%)	3(7%)	1(1%)
5a	Do you consume milk with cereals?	30(69.8%)	7(16.3%)	4(9.3%)	1(1%)	1(1%)	0(0%)
6a	How often did you eat yogurt?	19(44.2%)	5(11.6%)	4(9.3%)	8(18.6%)	1(2.3%)	6(14%)
7a	How often did you eat cottage cheese?	32(74.6%)	5(11.6%)	4(9.3%)	1(1%)	1(1%)	0(0%)
8a	How often did you eat pudding or custard?	34(79.1%)	5(11.6%)	1(2.3%)	2(4.7%)	1(2.3%)	0(0%)

9a	How often did you eat sour cream?	38(88.4%)	2(4.7%)	2(4.7%)	1(2.3%)	0(0%)	0(0%)
10a	How often did you eat cheese (including low-fat; including on cheeseburgers or in sandwiches or subs)?	37(86%)	5(11.6%)	0(0%)	1(2.3%)	0(0%)	0(0%)
11a	. How often did you eat cream cheese?	39(90.7%)	2(4.7%)	1(2.3%)	1(2.3%)	0(%)	0(%)
12a	How often did you eat whipped cream	35()%	5(11.6)%	2(4.7)%	0(0)%	0(0)%	2(4.7)%
13a	How often do you drink coffee or tea with milk?	21(41.8)	3(7)%	4(9.3)%	8(18.6)%	7(16.3)%	0(0)%

Table 6: Questionnaire as per diet history

S. No.	Question	Less than 1 cup (8 ounces)1 table spoon,< 1slice,cup	1-1.5 cups (8 to 12 ounces)1-3 table spoon, 1 slice, 1 cup	More than 1.5 cups (12 ounces) >3 table spoon,>1 slice ,1 cup
1b	Each day you drank milk as a beverage, how much did you usually drink?	27(62.8%)	15(34.9%)	1(2.3%)
2b	Each day you drank chocolate milk as a beverage, how much did you usually drink?	33(76.7%)	9(20.9%)	1(2.3%)
3b	Each day you drank flavored milks, how much did you usually drink?	34(79.1%)	7(16.3%)	2(4.7%)
4b	. Each of the days you drank drink yogurt, how much did you usually drink?	32(74.4%)	11(25.6%)	0(0%)
5b	Each time milk was added to your cold cereal, how much was usually added?	33(76.7%)	10(23.3%)	0(0%)
6b	Each time you ate yogurt, how much did you usually eat?	28(65.1%)	13(30.2%)	2(4.7%)
7b	. Each time you ate cottage cheese, how much did you usually eat?	30(90.7%)	4(9.3%)	0(0%)
8b	. Each time you ate pudding or custard, how much did you usually eat?	38(88.4%)	4(9.3%)	1(2.3%)
9b	Each time you ate sour cream, how much did you usually eat?	42(97.7%)	1(2.3%)	0(0%)
10b	Each time you ate cheese, how much did you usually eat?	32(74.4%)	7(16.3%)	4(9.3%)
11b	Each time you ate cream cheese, how much did you usually eat?	38(88.4%)	5(11.6%)	0(0%)
12b	Each time you ate whipped cream, how much did you usually eat	33(76.7%)	8(18.6%)	2(4,7%)
13b	Each time milk was added to your coffee or tea, how much was usually added?	17(39.5%)	10(23.3%)	16(37.2%)

Table 7: Questionnaire as per diet history

S. No	Question	Never	About ¼ of the time	About ½ of the time	About ¾ of the time	Always
1c	How often was the milk reduced-fat or fat-free	16(37.2%)	8(18.6%)	9(20.9%)	2(4.7%)	8(18.6%)
2c	How often was the chocolate milk reduced-fat or fat-free?	24(55.8%)	6(14%)	5(11.6%)	1(2.3%)	7(16.3%)
3c	How often was the flavored milk reduced-fat or fat-free?	24(55.8%)	5(11.6%)	5(11.6%)	4(9.3%)	5(11.6%)
4c	. How often was the yoghurt reduced-fat or fat-free?	26(60.5%)	8(18.6%)	2(4.7%)	2(4,7%)	5(11.6%)
5c	How often was the milk reduced-fat or fat-free?	21(48.8%)	10(23.3%)	5(11.6%)	0(0%)	7(16.3%)
6c	How often was the yogurt you ate reduced-fat or fat-free?	24(58.8%)	7(16.3%)	6(14%)	0(0%)	6(14%)
7c	How often was the cottage cheese you ate reduced-fat or fat-free?	28(65.1%)	4(9.3%)	6(14%)	1(2.3%)	4(9.3%)
8c	How often was the pudding or custard you ate reduced-fat or fat-free?	26(60.5%)	5(11.6%)	8(18.6%)	0(0%)	4(9.3%)
9c	How often was the sour-cream you ate reduced-fat or fat-free?	33(76.7%)	5(11.6%)	3(7%)	0(%)	2(4.7%)
10c	How often was the cheese you ate reduced-fat or fat-free?	30(69.8%)	5(11.6%)	5(11.6%)	1(2.3%)	2(4.7%)
11c	How often was the cream cheese you ate reduced-fat or fat-free?	27(62.8%)	3(7%)	4(9.3%)	1(2.3%)	5(11.6%)
12c	How often was the whipped cream you ate reduced fat or fat free	28(65.1%)	5(11.6%)	4(9.3%)	0(0%)	6(14%)
13c	How often was the milk reduced-fat or fat free?	23(53.5%)	6(14%)	8(18.6%)	2(4.7%)	4(9.3%)

Discussion

Menarche, is a milestone event of pubertal development in girls as it represents the onset of the female reproductive system. Menarche is influenced by hereditary factors, socio economic factors, lifestyle factors. Recently concern for early menarche has been increased as there are chances of psychosocial and physical health problems in women

Paired t test results

P value and statistical significance:

The two-tailed P value equals 0.1187

95% confidence interval of this difference: From -1.07 to 7.73

Intermediate values used in calculations:

t = 1.7474
df = 8

Standard error of difference = 1.908

	Have Habit	No Habit
Mean	4.78	1.44
SD	6.34	1.51
SEM	2.11	0.50
N	9	9

Study shows that there is no major association between dairy and dairy products intake influence early menarche.

Conclusion
Further detailed survey on large number of participants is needed to evaluate the importance of dairy products in early menarche.

Acknowledgement: Nil

Author's contribution: Nil

Financial support and sponsorship: Nil.

Conflicts of interest: None declared.

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