

SHORT ARTICLE

Factors influencing age at menarche – a school based cross sectional studyNarayanan Namboothiri G¹, Varghese Iybu Chacko², Anusha Rashmi³, Shreyaswi Sathyanath⁴, Manjula Anil⁵

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Abstract

Hormones, life style, animal proteins etc are factors that influence menarche. Like-wise a declining trend in age at menarche has been noticed over the past few years. This study was taken up with the objectives to study factors that are associated with menarche in our study population. Hence a school-based cross-sectional study was undertaken for the same which showed the mean age of menstruation was 12.5 years. It was significantly influenced by milk intake ($p < .05$). Mothers' age at menarche was also found to be significantly associated with their daughters' age at menarche. Conclusion: This study provides an insight into determining factors affecting age of menarche, focusing on dietary and maternal factors. Milk consumption was found to be an important factor.

Keywords

Menstruation; Menarche; Milk; Diet

Introduction

Menarche being a life changing event is a stage of life when a girl starts changing biologically, physically and emotionally. A lot many internal and external factors contribute towards menarche. It has been noticed over the years that there has been a downward trend in the age at menarche attributed to availability of resources such as food and health related services.(1)

Although sexual precocity and timing of puberty appears earlier in girls than in boys, the issue needs to be addressed in both the genders. Self-assessment methods have been non reliable, however comparison between peers is more promising.(2)

Though it has been noted that the timing of menarche is largely under genetic control, factors such as diet, stressors etc has been seen to either accelerate or delay the maturation process.(2)

Studies have shown that consumption of animal proteins tends to alter the maturation process and thus also hastening the growth process. Surprisingly even milk is

one such component. Animal proteins tend to increase IGF-1.(2,3)

In the backdrop of the above, present study was planned to find out the relationship between dietary factors and age at menarche among the high school students in the rural field practice area of a Private Medical College in Mangalore.

Aims & Objectives

1. To assess the association between dietary factors and age of menarche of the study population
2. To assess the association between mothers age at menarche and age of menarche of the study population

Material & Methods

A cross-sectional study was conducted among selected high schools of rural field practice area of a private institute in Mangalore. Study was conducted between January 2019 to April 2019 among children studying in Government and Private high school. All girls studying in

8th,9th and 10th standard in the selected schools meeting the inclusion criteria was done after school permissions and parental consent. The study was conducted in 2 schools by purposive sampling within 10 km radius of the rural field practice area. Total students enrolled were 391 of whom 16 students were absent at the time of study conduction. The final sample size was 375. Information was collected using a pretested semi-structured questionnaire from the students and their Mothers. Descriptive analysis along with Chi square test has been used to summarize the findings.

Results

The mean age of the students was 14 years. Majority of the participants had attained menarche at 13 years of age (42.4%) followed by 12 years (25.5%). Mean age at menarche was 12.5 years. Early menarche (< 12 years of age) was observed in 21 participants (7.4%).

(Table 1) shows that among the girl students who had attained menarche (n=283), 255(90.1%) were non vegetarians. Intake of junk foods was seen in 61.8% (>5 times per week). Most mothers had also attained menarche at 12-13 years. It was noted that 75.6% of the study subjects consumed milk on a regular basis compared to 24.4% who did not. Increased frequency of milk consumption was significantly associated with age at menarche (p=.02) (Table 2).

Discussion

Mean age at menarche ranged from 12.8 years to 13.6 years in various studies.(4,5) Our study also reveals a similar trend where mean age of menarche was 12.5 years. In accordance with the findings of the studies by Ramezani Tehrani et al (5) we also found that mothers age at menarche was a good predictor. Indian studies have also seen declining trend of menarcheal age.(6)

Al Agha et al(7) found a significant relationship between early age at puberty and consumption of animal meat. Our study did not find any significant relationship of menarche with type of diet. Around 63% of those who consume junk foods >5times per week had attained menarche before 13 years of age (p = 0.91). A study by Anita et al(8) found a correlation between the habit of consuming junk food > 2 x 1 week with early age of menarche with an OR of 1.9. High fats lead to weight gain and increase in estrogen levels. A Study conducted by Goon et al(9) suggested that girls who have attained menarche are significantly heavier, have higher BMIs than pre-menstrual subjects in the same age matched group attributing the same to effects of leptin on GNRH release from hypothalamus. Our study findings did not show significant association between BMI and age at menarche.

While a study by Andrea s Wiley(3) suggests some association between milk consumption and early menarche, study by Bhattarai S(10)shows no such association. Our study showed there is a significant

association with age at menarche and frequency of milk consumption (p=0.02)

Conclusion

In our study mothers age at menarche and milk consumption were significant factors. However, there are several other factors which may influence the onset age of menarche such as ethnic origin, genetic inheritance, socio economic status, weight, health status education, physical activity which needs to be studied as well.

Recommendation

More in-depth study is required to understand how the underlying factors affect the age at menarche.

Limitation of the study

Limited option amongst schools granting permission to conduct the study.

Authors Contribution

All authors have contributed as required in various phases from proposal to article write up.

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Tables

TABLE 1 GENERAL FACTORS ASSOCIATED WITH AGE AT MENARCHE

	Age at menarche			Total	χ ²	P value
	10 - 11 years	12 - 13 years	14 - 15 years			
1. Diet						
Vegetarian	2(10%)	17(8.8%)	9(12.9%)	28(9.9%)	0.945	0.623
Non vegetarian	18(90%)	176(91.2%)	61(87.1%)	255(90.1%)		
2. Junk foods consumption						
≥ 5 times	12(60)	121(62.7)	42(60)	175(61.8)	0.188	0.909
< 5 times/week	8(40)	72(37.3)	28(40)	108(38.2)		
3. BMI						
Underweight	8(40)	118(61.3)	50(71.4)	176(62.3)	12.013	0.062
Normal	10(50)	71(36.7)	19(27.1)	100(35.3)		
Overweight	2(10)	3(1.5)	1(1.5)	6(2.1)		
Class I obesity	0	1(0.5)	0	1(0.35)		
Total	20	193	70	283		
4. Mothers age at menarche						
10-11 years	6(26)	10(5.3)	4(5.6)	20	24.448	< 0.01
12-13 years	13(56.5)	116(61.3)	33(46.4)	162		
14-15 years	4(17.5)	63(33.4)	34(48)	101		
Total	23	189	71	283		

TABLE 2 MILK CONSUMPTION PATTERN AND ITS ASSOCIATION WITH MENARCHE

	Age at menarche			Total	χ ²	P value
	10 - 11 years	12 - 13 years	14 - 15 years			
1. Milk consumption						
Yes	13(65)	148(76.7)	54(75.7)	215(75.6)	1.425	0.490
No	7(35)	45(23.3)	16(24.3)	68(24.4)		
2. Frequency of milk intake						
≥ 5 times/week	13(65)	113(58.5)	38(54)	164(58)	7.690	0.021
< 5 times/week	7(35)	80(41.5)	32(46)	119(42)		
3. Quantity of milk intake						
≤1cup/day	16(80)	188(97.4)	69(98.6)	209(97.9)	1.11	0.571
>1cup/day	4(20)	5(2.6)	1(1.4)	74(2.1)		
4. Type of milk						
Cow milk	18(90)	184(95.3)	69(98.6)	271(95.8)	4.313	0.365
Goat milk	2(10)	7(3.6)	1(1.4)	10(3.5)		
Buffalo milk	0	2(1)	0	2(0.7)		
Total	20	193	70			