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Original Research Article

Factors influencing the age of menarche among adolescents of Kurnool town, Andhra Pradesh.

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Abstract:

Background: The average age of menarche has decreased in both developed and developing countries over the past few years. Early menarche is associated with more of cardiovascular accidents and increased incidence for cancer.

Objectives: To assess the multiple factors associated with the age of menarche.

Methodology: It was a cross sectional study done for a period of two months among 100 adolescent girls in a junior college, Kurnool.

Results: The mean age of menarche of study participants was 12.31 years. Lower age of menarche was found in girls who had higher BMI .It was observed in this study that girls with more of junk food intake and non veg intake had early menarche.

Conclusion: The mean age of menarche in this region is comparable to many Indian states. The major determinant of age at menarche in this study was body mass index, dietary patterns

Key words: Factors, menarche, adolescence

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Introduction:

Adolescence is a period of transition from childhood to adult life during which pubertal development and sexual maturation take place. Menarche is a rather late event in puberty and usually occurs 6 months after peak height velocity is achieved

Menarcheal age has important health implications, as early menarche is associated with more cardiovascular incidents and higher all cause, including cancer, especially of the breast. Moreover, early menarche has been related to anxiety symptoms, depression, premature intercourse and violent behavior. Late menarche is associated with osteoporosis and increased fracture risk.

Various factors have been postulated to affect the age of menarche such as socioeconomic status, diet, nutritional status, environment, siblings, hereditary and genetic factors, religion, ethnicity, psychological stress, migration and chronic illness with opinions of both supporting and rejecting it (1-6).

The average age of menarche has decreased in both developed and developing countries due to improved health and nutrition. Most Indian studies have shown similar trends of decreasing age at menarche. 1,2,4

The objective of the current study is to assess the multiple factors influencing the age of menarche as majority of previous studies in India have focused their attention on single aspect of health only.

Materials & Methods:

It was a cross sectional study carried out from February to March 2024 among 100 adolescent girls of age 17-19 years in Vasavi Junior college for girls, Kurnool, Andhra Pradesh. Institutional ethical committee clearance was obtained. The sample size was estimated as 100,taking prevalence as 57% from the study Hannah Peters et al study[7] where it was observed that the most of the women attained menarche at the age of 14 and 13 years. A batch of 200 students was gathered and 100 students were selected by simple random sampling after explaining the scope of the study. Informed consent was obtained and predesigned questionnaire was used for collecting the data.

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Description of study tool:

Part 1- Personal identification details

Part 2- Anthropometry details

Part 3 - Diet history

Part 5- Menarche details

Variables :

Age of participants: age of the participant in completed years**.**

• **Socioeconomic status:** socioeconomic status according to Kuppuswamy Status Scale (2022) taking CPI as 186.30

• **Age at menarche:** Age in years closest to the completed year.

Body mass index: Weight (in kilograms) divided by square of the height (in metres). Classified according to Asian cut-offs as underweight (less than 18.5 kg/m2), normal (18.5-23 kg/m2), overweight (23-27.5 kg/m2) and obese (more than 27.5 kg/m2).[8]

After checking for completeness of data, the responses were entered and subjected to descriptive and inferential statistical analysis in spss version16.0. Chi square test was applied to test association between variables. p value <0.05 was considered statistically significant.

Results:

Table 1 Sociodemographic details of study participants

Variable		Frequency	Percentage
Age	**16**	26	26
	17	21	21
	18	28	28
	19	25	25
Religion	**Hindu**	68	68
	Muslim	23	23
	Christian	9	9
SES	**Class I**	21	21

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	Class II	47	47
	Class III	19	19
	Class IV	13	13
Type of family	**Nuclear**	90	90
	Joint	7	7
	Third generation family	3	3

In the current study, majority of the students were in the age group of 18 (28%) followed by 16 (26%), 19 (25%).Out of 100 participants, majority belong to Hindu religion (68%) followed by Muslims (23%) and Christians (9%).

Table 2. Current Anthropometric details of study participants

BMI	**Frequency(n=100)**	**Percentage**
Underweight (<18.5)	14	14
Normal (18.5-23)	67	67
Overweight (>23)	19	19

Out of 100 participants, majority of them were of normal BMI (67%) followed by 19% in the overweight range and 14% were of underweight

Table 3. Distribution of study participants according to age of menarche

Age of menarche	**Frequency (n=100)**	**Percentage**
10y	6	6
11y	16	16
12y	39	39
13y	26	26
14y	8	8
15y	5	5

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In the current study, out of 100 participants majority have attained menarche at 12 years (39%) followed by 13 years (26%), 11years (16%)

Table 4. Distribution of study participants according to dietary characters

Variable		Frequency (n=100)	percentage
Type of diet	Vegetarian	14	14
	Mixed diet	86	86
Frequency of non veg/week	< 2	57	57
	>2	29	29
Frequency of junk food /week	< 2	41	41
	>2	59	59
Frequency of fruits &vegetables /week	<2	68	68
	>2	32	32

It is clear from the table that majority of the participants in the current study take mixed diet (86%).Coming to the frequency of non veg intake, majority of the participants (57%) were taking less than 2 times per week.

Out of 100 participants, majority (59%) had intake of junk food /week more than two times whereas intake of fruits & vegetables is less than two times per week in majority of them (68%)

Table 5 Association between age of menarche and sociodemographic characters

Variable		Age of menarche			Total (n=100)	X^2 & P value
		<12	12-14	>14		
Religion	Hindu	7(10.29)	58(85.29)	3(4.41)	68	X^2=27.2923 P=0.000017
	Muslim	14(60.87)	8(34.78)	1(4.35)	23	
	Christian	1(11.11)	7(77.78)	1(11.11)	9	
Socioeconomic status	Class I & II	17(25)	48(70.59)	3(4.41)	68	X^2=1.1857 P=0.552751
	Class III &IV	5(15.62)	25(78.13)	2(6.25)	32	

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In the current study, there is significant association between age of menarche and religion (P=0.000017) with lower age of menarche for Muslims (60.87%).Also it is clear from the above table that there is no significant association between socioeconomic status and age of menarche(P>0.05)

Table 6 Association between age of menarche and BMI

BMI	Age of menarche			Total (n=100)	X^2 & P value
	<12	12-14	>14		
Underweight	1(7.14)	12(85.71)	1(7.14)	14	X^2 =23.9713
Normal	9(13.43)	55(82.09)	3(4.48)	67	P =0.000081
Overweight	12(63.16)	6(31.58)	1(5.26)	19	
Total	22	73	5	100	

From the above table, it is evident that there is significant association between BMI and age of menarche (P=0.000081) with lower age of menarche in the overweight student.

Table 7 Association between age of menarche and dietary pattern

Variable			Age of menarche			Total	X^2 & P value
			<12	12-14	>14		
Type of diet	Vegetarian		2(14.26)	11(78.57)	1(7.14)	14	X^2=0.6591
	Mixed diet		20(23.26)	62(72.09)	4(4.65)	86	P=0.719
Frequency of non veg/week		< 2	6(10.53)	48(84.21)	3(5.26)	57	X^2=21.0656
		>2	16(55.17)	11(37.93)	2(6.9)	29	P=0.000027
Frequency of junk food /week		< 2	4(9.76)	36(87.8)	1(2.44)	41	X^2=7.7334
		>2	18(30.51)	37(62.71)	4(6.78)	59	P=0.0209
Frequency of fruits &vegetables /week		<2	10(14.71)	55(80.88)	3(4.11)	68	X^2=7.0947
		>2	12(37.5)	18(56.25)	2(6.25)	32	P=0.0288

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It is clear from the above table that age of menarche is lower among those who have more in take of non veg, junk food and less intake of fruits and vegetables.

Discussion:

In various studies, mean age of menarche ranged from 12.8 to 13.6 years. [9.10] In the current study ,the trend was similar with mean age of menarche as 12.31years.

In the current study, age of menarche was not found to have any association with socioeconomic status. In contrast to this, a study by ICMR (1972) reveals decline in age at menarche with increase in per capita income of the family. Also in the Pandey M et al[11] . study the trend of lowering of age at menarche was well marked with increase in socioeconomic status. The higher socio-economic status is usually associated with small family norms, better living conditions, proper nutrition, could be the reason for earlier growth spurt and better physical and psychosexual maturity in them explaining the early onset of menarche.

In this study, it was found that there was significant association between BMI and age of menarche (p=0.000081) which means higher the BMI lower the age of menarche. Also in Pandey M et al[11].study age at menarche was found to be significantly lower in obese girls (12.25±1.12 years) as compared to underweight girls (13.04±1.40 years). A Study conducted by Goon et al[12] suggested that girls who have attained menarche are significantly have higher BMIs than pre-menstrual subjects who have not attained menarche in the same age matched group attributing it to the effects of leptin on GNRH release from hypothalamus

In our study, significant association was found between age of menarche and intake of non vegetarian food, (> 2 times/wk) with lower age of menarche among girls. Similar finding was observed in Al Agha et al [13] study with significant relationship between early age at puberty and consumption of animal meat. Harvard longitudinal studies on childhood health and development found that girls had earlier menarche if they consumed more animal protein[14]. Shastree et al [15]found that non vegetarian Maharashtrian girls would menstruate earlier than vegetarian Maharashtrian girls. Similar findings were noted in a study by A. Bagga in 2000[1].

In the current study, it was found that higher intake of junk food was associated with lower age of menarche. A study by Anita et al[16] 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.

Conclusion: In our study, mean age of menarche was 12.31 years which parallels the trend seen in several studies. The outcome of our study is that BMI and dietary patterns have a bearing on the mean menarcheal age. To conclude, earlier occurrence of menarche is an ominous event with

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long term risks which can be prevented by identifying the associated risk factors, adopting a healthy life style and self-care.

Limitations: The limitations of present study were the recall bias associated with reported age at menarche and use of post-menarcheal BMI as a proxy.

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Conflict of interest: There are no conflicts of interest

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