

## **Assessment of the influencing factors on age of menarche among girls in Tikrit city.**

*Enas Abdulla, Nisreen M. Ibraheem*

*Department of community Medicine, College of Medicine.*

### **Abstract**

Menarche means onset of menstruation which is part of the maturation process. However, variability in menstrual cycle characteristics and menstrual disorders are common(1). The purpose of this study is to identify the average age and influencing factors on menarche among secondary school girls in Tikrit city. The study is a cross sectional done from first of November 2008 to 28th of February 2009 in Tikrit city, there were 150 females included in the study from two intermediate schools (75 girls from each). The sample classified according to classes (stratified sampling) then random sampling chosen from each strata. Data collection done by using questionnaire and direct measurement of weight and height. From this study it has been found that the age of menarche range from (9-16) years, with a mean age of 12.8 year and their age of menarche corresponding their mother or sisters age of menarche. The mean for age of menarche decrease from (13.3,12.7, to12.3)years as the BMI increase from (15-19, 20-25, to >25) respectively. 27(75%) of girls with age of menarche <12 years, do not perform any sport. Early age of menarche(9-12) associated with high percentage of girls 28(52.8%) with stress, such as absence of their fathers or presence of other problems, while only 3 (5.6%) with delayed age of menarche had positive stressful environment.

Conclusion: From these results we can conclude that the mean age of menarche decrease as the BMI increase. There was significant association between age of menarche and sporting and stressful conditions, while there was no significant association with sleeping hours.

### **Introduction**

simple language and properly explained to avoid any form of misunderstanding and to facilitate accurate response by the subjects Menarche is the first menstrual period, or first menstrual bleeding. From both social and medical perspectives it is often considered the central event of female puberty, as it signals the possibility of fertility. Menarche is the most commonly remembered milestone of puberty for most women. Menarche can occur within a wide range of ages, and the timing is influenced by both genetic and environmental factors. The average age of menarche in the United States is about 12 years and 8 months(1) . Menarche usually occurs about two years after the first changes of breast development (thelarche). Over the centuries, menarche has occurred younger, just as people have grown taller, due to improved diet and health(2). Menarche affected by many factors as food preference that lead them to obesity therefore the obese girls irrespective of their ethnic origin have earlier age at menarche. This has been associated with increased levels of leptin in obese children, and other studies

reported that girls with early menarche, tended to have higher BMI than girls with average or later menarche(3,4) .In addition to that distribution of body fat in the gluteofemoral part encourage early menarche than obesity in the upper part(5). Other factors associated with early menarche are increasing sleeping hours(6), and high-conflict life style (stressful environment)(7), while increasing physical activity associated with delayed onset of menarche (8). Ethnicity, it was reported that the African American girls had had their menarche earlier than white Americans (9). Genetic factors have been suggested to influence menarcheal age by HLA linked genes (10). The study is conducted to identify the average age and influencing factors on menarche among adolescent girls in Tikrit city.

### **Subjects and methods**

The study is a cross-sectional study carried out from first of November 2008 to 28th of February 2009 in two intermediate schools (each school grads from first to third class) were selected randomly from Tikrit city. The

size of the study sample is 150 female students (75 from each school). Stratified sampling applied on each school that made each school had three groups or strata, and from each group 25 student were selected randomly.

Data collected by using of questionnaire, The questionnaire was verbally interpreted in. The questionnaires were retrieved immediately after completion to minimize interpersonal communication among the subjects. Many difficulties has been faced during data collection mainly shying and poor understanding of some girls to the term menarche. The questionnaire include the following variables: age, time of first menses for the student and for her mother or sister (if known), sleeping hours, sporting, presence of problems in her life& or Stressful environment as absence of father, migration, exposure to violence. Weight and height were directly measured by researchers (using mechanical scale and tape measure) to calculate body mass index which equal to  $\text{weight(kg) / height (m)}^2$  . Data presented mathematically by mean, and standard deviation, also tables and chart, while data analyzed by using Chi-square to test significance level.

## **Result**

The total number of girls included in this study were 150, the age of menarche among them range from (9-16) years with a mean age of (12.8+1.50)year. About 84(56%) of girls had menarche at age between (12-14), and lower percentage 30(20%) had menarche at age between (14-16). Figure-1

There is a reversal relation between age of menarche and Body Mass Index (BMI) as (Table 1) show that the mean for age of menarche decrease steadily from (13.3,12.7, to12.3)years as the BMI increase from (15-19, 20-25,to >25) respectively. The higher percentage of girls 20(66.7%) with age of menarche (14-16) years had BMI<20 .

Table-2 showed that 18(60%) of girls who had menarche between (14-16) were slept (8-10) hours, while lower percentage 6(7.2%) of girls who had menarche between (12-14)years were slept <8 hours. It is clear that there is no significant relation between age of menarche and sleeping hours $X^2=3.26$  P-value 0.514 d.f=4.

Table -3 showed strong, and significant association between age of menarche and sporting  $X^2=17.2$ , P-value 0.002 d.f=4. Three quarters 27(75%) of girls with age of menarche (9-12) years do not perform any sport, while low percentage 6(16.7%) of girls who had regular exercises their menarche (9-12) years.

The study noticed that there is a moderate significant association between the age of menarche for the girls in the study sample and the age of menarche for their mothers or sisters.  $X^2=6.3$ , P-value 0.042, d.f=2. Majority of girls with different age of menarche (9-12, 12-14, 14-16) had positive family history for the same or corresponding age with their first degree relative females (mother, sisters) 83%, 60.7%, and 60% respectively. Table-4

The study referred that there was highly significant relation between stressful family environment and the age of menarche,  $X^2=39.88$ , p-value 0.0001 , d.f=2. Early age of menarche(9-12) associated with high percentage of girls 28(52.8%) with stress, such as absence of their fathers or presence of other problems, while only 3(5.6%) with delayed age of menarche (14-16) years had positive stressful environment. Table-5.

## **Discussion**

Results of this study revealed that the average age of menarche was between (12-14 year) with mean age of 12.8 , this result agreed other study which referred mean age of menarche (12.8) year also.(11) . There was a reversal relation between age of menarche and Body Mass Index (BMI) that the mean for age of menarche decrease steadily from (13.3,12.7, to12.3)years as the BMI increase from (15-19, 20-25,to >25) respectively.

Ribbon obtained same results that the girls with BMI (20-25) have menarche at age (12-14) years old (12) . This study showed that late menarchial age obvious in obese girls (BMI>25kg/m<sup>2</sup>), and this agreed with Valenzuela results(13), this demonstrated that chronic elevation in serum leptin concentration advance the nocturnal increase in serum LH as well as other parameters of female puberty(12). However, since puberty often causes weight gain, it is difficult to determine whether obesity causes early puberty or vice versa(13).

Regarding the relation between menarche and sport, present study agreed with Herman-Giddens study that both of them showed that the girls who do not sport have early menarche, while delayed menarche was more frequently in athletes female than in the general population(13). Late menarche or amenorrhea that related to athletic training is mainly caused by changes in hypothalamus, then decrease in estrogen level, which can cause serious damage to the bones, briefly hypothalamus affected by a critical level of body fat and the effect of stress(14).

This study show anon significant relation between average time of sleeping and age of menarche, that the girls who sleep (8-10) hours had late menarche (14-16)years, while Sonis(15) and other studies(16) disagreed with present study. They proved that increase sleeping hours associated significantly with early age of menarche, probably due to increase resting time and decrease energy expander which precipitate obesity.

Present study, and other study done by Guillette found that girls with family history of early menarche developed menarche earlier than those without family history, this mean that genetic factors from mother affect the sexual development and body growth of girls(17).

The study showed that females with stressful events like absence of their father (if they in the prisons or died), migration due to violence or violence itself in Iraq , and other stressful conditions associated with earlier menarche (52.8%) than those without stress. This result agreed with other studies which assured that girls growing up in families with high-conflict life style or absent fathers, puberty will occur earlier(18,19).

### **Conclusion**

Most of girls in this study had average age of menarche between(12-14)years old with mean of 12.8 year, and most of them at that age (12-14) years had BMI between (20-25). The study concluded that menarcheal age of girls in the study corresponds their first degree relative (mothers, sisters) menarcheal age. High percentage of girls who had menarche (9-12)years was not perform any sporting, and lived in stressful environment. While there was no significant relation between menarche and sleeping hours.

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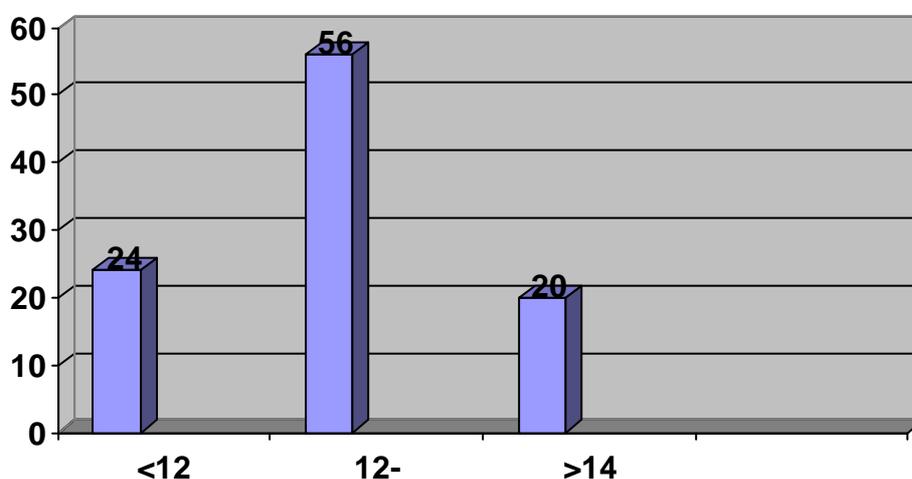


Figure (1) Average age of menarche

Table (1) Relation between age of menarche and BMI

Age at menarche (years)	15-19		20-25		>25		Total	
	NO.	%	NO.	%	NO.	%	NO.	%
9-	12	33.3%	21	58.3%	3	8.4%	36	24%
12-	24	28.6%	54	64.3%	6	7.1%	84	56%
14-16	20	66.7%	7	23.3%	3	10%	30	20%
Total	46	30.7%	92	61.3%	12	8%	150	100%
Mean& S.D	13.3+1.5		12.7+1.2		12.3+1		12.8+1.5	

**Table (2)** Relation between age at menarche and sleeping hours.

Age at menarche(years)	Sleeping hours						Total	
	<8		8-10		>10			
	NO.	%	NO.	%	NO.	%	NO.	%
9-	6	16.7%	21	58.3%	9	25%	36	24%
12-	6	7.2%	48	57%	30	35.7%	84	56%
14-16	3	10%	18	60%	9	30%	30	20%
Total	15	10%	87	58%	48	32%	150	100%
Chi-square test( $X^2$ )=3.26 P-value=0.514 df=4								

**Table (3)** relation of age at menarche and sporting

Age at menarche (years)	Sport performance						Total	
	Regular		Sometimes		No sporting			
	NO.	%	NO.	%	NO.	%	NO.	%
9-	6	16.7%	3	8.3%	27	75%	36	24%
12-	18	21.4%	30	35.7%	36	42.9%	84	56%
14-16	7	23.3%	14	46.7%	9	30%	30	20%
Total	31	21%	47	31%	72	48%	150	100%
Chi-square test=17.2 P-value=0.002 df=4								

**Table (4)** age at menarche in relation to family history.

Age of menarche(years)	family history				Total	
	Positive		Negative			
	NO.	%	NO.	%	NO.	%
9-	30	83.3%	6	17.7%	36	24%
12-	51	60.7%	33	39.3%	84	56%
14-16	18	60%	12	40%	30	20%
Total	99	66%	51	34%	150	100%
Chi-square test=6.3 p-value=0.042 df=2						

**Table (5)** age at menarche in relation to stressful family environment.

Age at menarche(years)	Stressful family environment				Total	
	Positive		Negative			
	NO.	%	NO.	%	NO.	%
9-	28	52.8%	8	8.2%	36	24%
12-	22	41.5%	62	63.9%	84	56%
14-16	3	5.6%	27	27.8%	30	20%
Total	53	35.3%	97	64.7%	150	100%
Chi-square test=39.88 P-value=0.0001 df=2						