
Age of Menarche in a Sample of Iraqi Girls and Associated Factors

Najlaa F.Al-Jassar *
F.I.C.M.S

Lamia Dhia Al- Deen*
PhD

Najat M.Al- Bayatti*
M.P.H

Menahel N.Al Qadhi**
M.Sc.

Abstract:

Objectives: The present study is an attempt to determine the age at menarche in a sample of apparently healthy Iraqi girls, from 5th class of primary school to 3rd class of intermediate school in Al-Kharkh area of Baghdad Governorate.

Methods: The study was conducted during the period from 1st of October 2001 to the 1st of April 2002.

The sample was comprised of 2654 girls, which was selected as multistage random sample including 10% of primary and 10% of intermediate school in Al-Kharkh districts. The data were collected through direct interview, weight and height were measured for each girl, and body mass index was calculated.

Results: The study showed that mean age at menarche of the adolescent girls was 12.61±1.74 year, it was found that there was a relationship between age of menarche and mothers and sisters age at menarche, family size, and body mass Index .

Conclusion: Significant association between age of menarche and body mass Index.

Key Word: Age of Menarche

Introduction:

Menarche is one of the two major component in the reproductive life of women .Because this biological trait has important cultural, Social, and epidemiological implications, increasing attention has been recently devoted by scientists to understanding the cause of age variation in the timing of this event^[1].

Several factors have been shown to significantly influence age at menarche, such as genetic parameters^[2], socioeconomic conditions^[3], general health and life style^[4], nutritional status^[5], seasonality^[6], physical activity^[7], altitude level^[8], and level of education^[9].

Age at menarche is a milestone in pubertal development of secondary sex characteristics denoting approaching the adult appearance^[2].

Mean age at menarche varies substantially between women across different countries or across different ethnic groups^[10].

This study was conducted with the aims to ascertain the age of menarche at present time among a sample of adolescent Iraqi girls, as well as to find- out the relation of certain epidemiological factors which may affect the onset of age at menarche.

Material & Methods:

Across- sectional study with a multi -stage random sample procedure was carried out including 10% of primary and 10% of intermediate and high schools from Al- Karkh area of Baghdad Governorate.

A sample of 2387 urban and 261 rural adolescent girls were included in the study during the period between the 1st of October 2001and the 1st of April 2002. The grades included were from

the 5th grade of primary school to the 3rd grade of inter mediate school.

The methods consisted of two parts:

1-Interview:

Each girl in the selected class was asked about whether she had started menstruation or not, by month/year, and a special questionnaire form that had been prepared for this purpose was filled and it included general sociodemographic information as well as family history of mothers' and sisters' menarcheal age and information related to health condition of the adolescent girls.

2-Anthropometric measurements:

The anthropometric measurements used in this research were those recommended by the WHO, these include weight and height to calculate the body mass index (BMI). Weight was measured by using a well calibrated digital scale adapted by UNICEF (Kubota, Japan) to the nearest 100g. The height was measured using a measuring instrument to the nearest 0.1 cm using Somatometer (France by Stanlex Mabo) with a horizontal head board that can be brought into contact with the upper most point on the head.

The BMI was calculated using the equation (wt Kg/ ht m²)^[11], the girls were divided into four groups according to their BMI as: under -weight BMI<20; Normal weight BMI 20 - < 25; Over weight 25 - < 30; Obese BMI > 30^[12].

The data were presented in simple measures of number, percentage, mean, and standard deviation. Analysis of data done using: Z test and ANOVA (F test). Statistical significance was considered when ever P value <0.05.

Results:

The mean age at menarche for the Iraqi adolescent girls in the total sample of 2654 girls

studied is 12.61 ± 1.74 years ranging between 9.0 to 16.0 years, where 90.2 % were from urban area, 32.7 % of them had started menstruation, while 9.8% of girls were from rural area, 39.5 % of them had started menstruation .Their mean age at menarche was 12.60 years, 12.70 years respectively.

The current study shows that the mean age at menarche of the adolescent girls coincide with their mothers and sisters age at menarche (12.46 ± 1.62) years and (12.89 ± 1.71) years respectively.

The mean weight of the menstruating girls is 52.05 ± 10.94 Kg, their mean height is 154.89 ± 5.66 Cm, and their BMI is 21.62 ± 3.99 Kg/cm².

The current study shows significant association between BMI and age at menarche of the newly

menstruating girls, where 167 girls are under weight whose BMI is <20 Kg/cm², their mean age at menarche is 12.94 ± 1.69 years, 144 girls are of normal weight (BMI 20 - <25) their mean age at menarche is 12.83 ± 2.05 years, 37 girls are over weight (BMI 25 - <30), their mean age at menarche is 12.26 ± 1.76 years, while obese newly menstruating girls with BMI >30 , their mean age at menarche is 11.81 ± 1.62 years.(Table 1).

The distribution of the adolescent girls according to their mothers education level, crowding index, social activities, and sport activities are shown in Tables (2, 3, 4, and 5) respectively.

Table 1: The mean age at menarche of the newly menstruating girls according to their BMI*.

BMI	No. of Adolescent girls	Age at menarche (Mean± SD) (Year)	Range (Year)
Under weight(<20)	167	12.94 ± 1.69	10.0-14.0
Normal weight(20-<25)	144	12.83 ± 2.05	10.0-16.0
Over weight(25-<30)	37	12.26 ± 1.76	10.0-15.0
Obese(>30)	13	11.81 ± 1.62	10.0-14.0

*F=6.511, df =3; 357, P=0.0001

Table 2: The distribution of the adolescent girls according to their mother educational levels*.

Level of Education	Total No.	Menstruating girls		Age at menarche (Mean ± SD) (Year)
		No	%	
Illiterate	189	81	42.9	12.91 ± 1.67
Read and write	156	46	29.5	12.90 ± 2.17
Primary	541	205	37.9	12.89 ± 1.72
Intermediate	630	195	31.0	12.80 ± 2.17
Secondary	607	178	29.3	12.53 ± 1.61
Higher	520	176	33.8	12.46 ± 1.66

Note: 11 girls give no responses.

*F= 3.4, df = 5875, P= 0.005

Table 3: The distribution of the adolescent girls according to the crowding Index*

Crowding index	Total No. of the girls	Menstruating girls		Age at menarche (Mean± SD) (Year)
		No	%	
≤3	2072	676	32.6	12.58±1.72
4_6	511	173	33.9	12.63±2.06
7and more	71	36	50.7	13.08±68
Total	2654	885	33.3	12.61±1.74

*F=2.58, df= 2.882, P= 0.075.

Table 4: The distribution of the adolescent girls according to their social activities.

Computer and video	Total	Menstruating girls		Age at menarche (Mean ±SD) (Year)	P value
		No	%		
Yes	183	90	48.2	12.55±1.78	0.55
No	2471	792	32.1	12.63±1.73	
Social clubs					
Yes	131	74	56.5	12.55±1.56	0.60
No	2523	811	32.1	12.63±1.75	

Table 5: The mean age at menarche of the adolescent girls in relation to sport activities.

Swimming	No. of Adolescent girls	Age at menarche (Mean± SD)(Year)	Range (Year)	P value
Yes	60	12.62±1.69	9.0-15.0	0.955
No	825	12.63±1.74	9.0-16.0	
Other sports				
Yes	36	12.64±1.90	9.0-14.0	0.824
No	849	12.62±1.73	9.0-16.0	

The present study reveals that 34 (1.3 %) adolescent girls had chronic diseases which included anemia, epilepsy, hypertension , and diabetes ,their mean age at menarche was $13.0 \pm$

1.85 years compared to 851 apparently healthy adolescent girls whose mean age at menarche was 12.61 ± 1.73 years .(Table 6).

Table 6: The mean age at menarche of the adolescent girls in relation to chronic diseases*

Chronic diseases	No. of Adolescent girls	Age at menarche(Mean \pm SD)(Year)	Range (Year)
Yes	34	13.00 ± 1.85	10.0-15.5
No	851	12.61 ± 1.73	9.0-16.6
Total	885	12.61 ± 1.74	9.0-16.0

*Z test, P= 0.071

Discussion:

It has been suggested that the variation in the mean age at menarche is the result of genetic and environmental differences, and that differences between rural and urban groups and between different socioeconomic status, nutrition, and different health related concomitants of socioeconomic status^[12].

The current study shows that the mean age at menarche is 12.61 ± 1.74 years , this result coincides with that reported ,by Rudha 1980, in Baghdad^[13].In the USA , the mean age at menarche has decreased at a rate of 3-4 months per decade over the past 100 years and is now around 13 years ,this change is believed to be due to improved nutrition^[14].Some observations were reported in Denmark , where there is a halt in the secular trends towards earlier menarche in the region at same time between 1966 and 1983^[15]. The European menarcheal age was significantly higher than those for Afro- Caribbean and Indo-Pakistani girls ,and for those Europeans who lived in the same geographical area of London in 1966 reflecting the role of the social factors in influencing the age at menarche^[16].

The present work shows that an earlier age at menarche in those girls who had fewer number of siblings than those who had more siblings ,this result was in general agreement with other findings elsewhere^[17&18].

The current study reveals a significant association between Body Mass Index (BMI) and onset of age at menarche, which coincides with the results of Power et al 1997, who found a strong evenly graded association between timing of puberty and BMI, with higher mean BMI for earlier matures^[19].

Exercise training is known to have the potential to modify body composition and induce a

preferential loss of body fat. ^[20]. In the current study , we failed to find a significant association between the type and amount of exercise with age at menarche , perhaps due to the low contribution of sport in the life style of the adolescent girls ,and exercise practiced in both urban and rural areas were usually not intensive physical training that alter the hypothalamic-pituitary axis in adolescent girls , that cause an alteration in menstrual function and bone density .It was found that competitive athletes especially those in sports requiring thinness , may present with delayed development ,delay menarche and irregular menses.^[21]

The current study shows no significant association between chronic diseases and age at menarche , this finding was also in agreement with that reported by others^[22&23].

To sum up, the result of this study demonstrated clearly the relationship between age of menarche and BMI and supported the important role of nutritional education of adolescent girls and their families.

References:

- 1-Thomas F, Renud F, Benetice E, Demeen T. & Guegan J. (2001). International Variability of Ages at Menarche and Menopause: Patterns and Main Determinants. *Human Biology*; 73(2): 271-90.
- 2-Treolar S. Dok & Martin. (1998). Genetic influences on the age at Menopause. *Lancet*; 35: 1084-85.
- 3-Lnoto R., Kaprio J. & Utela A. (1994). Age at natural menarche sociodemographic status in Finland. *Am. J. Epidemiol*; 139: 64-76.
- 4-Brow D. Koenig T & Demorales A (1996). Menarcheal age, fatness and fat distribution in Hawaiian adolescents' .*Am. J. Phys Anthropol*; 99: 239-47.

- 5-Simondon K. Simon I. & Simondon F. (1997). Nutritional status and age at menarche of Senegal's adolescents .Ann. Hum. Biol; 24: 521-32.
- 6-Boldsen J. (1992) Season of birth and recalled age at menarche J Bios Sci; 24: 167-73
- 7-Malina R (1983). Menarche in athletes, a synthesis and hypothesis Ann. Hum. Biol; 10: 1-24.
- 8-Gonzales G & Villena A (1996).Body mass index and age at menarche in Peruvian children living at high altitude and at sea level. Hum. Biol; 68: 265-75
- 9-Saar E. Shalev C, Dalal L. & Sod-Moriah U(1988). Age at menarche, the influence of environment Condition .Int .J Biometerol.; 32:33-5 1998).
- 10-Moradia A., Kchatcharian N & Gostanzo M. (1998). The World Health Organization Collaborative study of Neoplasia and steroid contraceptives: International variability in ages at menarche, First live birth and menopause .Ann. J. Epidemiol; 148: 119- 205.
- 11- Brlow, W. & Dietz, P. (1998). Identification of children for evaluation and treatment of obesity .Assessment of obesity. Pediatric; 3 (9): 29.
- 12- World Health Organization (1995): The use and interpretation of anthropometry, Tech. Rep Series, Report of WHO Expert Committee, No. 845, pp 1-8.
- 13- Rudha S. (1980) .Adolescent and menstruation, A clinical paper submitted in partial fulfillment of requirement for higher Diploma.
- 14-Carr B. & Bradshaw D. (1999). Pubertal development. In: Principles of internal Medicine 14th ed., Mossby Co , New York , P: 345
- 15- Helm P & Grolund L. (1998). A halt in the secular trend towards earlier menarche in Denmark, Acta Obst. Gyneol. Scand, 77(2):198-200.
- 16-Uluigiaszek J., Evans E. & Miller S-(1998). Age at menarche of European, Afro-Caribbean and Indo-Pakistani School girls living in London Ann.Hum.Biol.; 18(2):167-75.
- 17-Cameron N.d Nagdee J.(1996).Menarcheal age in two generations of south African Indians,Ann.Hum.Biol.;23(2):113-9.
- 18-Malina M. Katzmarzy T. Bonci M. Ryan C. & Wellens E. (1997). Family size and age at menarche in athletes, Med. Sci. Sports Exerc.; 29(1): 99-106.
- 19-Power C.,Lake J&Cole T.(1997).Body Mass Index and height From children to adulthood in the 1958 British birth Ghort, Am. J Clinical Nutrition; 66 (5): 1094-95.
- 20-Fabbri A., Giannini D. & Arersa A. (1999). Body Fat distribution and responsiveness of pituitary adrenal axis to Corticotrophin releasing hormone stimulation in sedentary and exercising Women J. Endocrinol. Invest; 22 (5): 377-85.
- 21- Greene W.(1999).Menstrual irregularities associated with athletics and exercise,Compr.Ther.,25(4):209-15.
- 22-Ftzpatrck B. Chacko R & Held P. (1984).Iron deficiency anemia in black females during late adolescence .J Adolescent Health Care; 5:71-74.
- 23-Spencer D. (2002). Women's health and epilepsy, Medicine Journal; 3(4): 15-17.

*From Comm. Med. Dep. Coll. of Med. Al-Mustansiriya Univ.

**From MOH.