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# Age at menarche among Iraqi adolescent in Baghdad 2017

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**Abstract**

Background: Menarche is a biological trait affected by several factors (genetic parameters, socioeconomic conditions, general health, and lifestyle, nutritional status, seasonality, physical activities, and level of education). Exposure to wars and conflicts are factors affecting menarche, too. Iraqi population was exposed to wars and conflicts, this study was planned to demonstrate the effect of wars and conflicts on menarche.

Methods: A total of 444 female intermediate school students was included in the study. They were recruited by multistage random sampling technique (one side of Baghdad of the two was selected randomly, one educational directorate out of the 3 directorates was selected randomly, 4 intermediate schools were selected out of 9 intermediates at the selected directorate were chosen randomly, one class of the chosen schools was selected randomly, then one class from each school was selected randomly). An interview was carried out with each student in the selected class. The requested information was demographic data, age at menarche, crowing index (household divided by number of room), physical activity and body mass index.

Results: Age at menarche was 11.8 ± 1.8 year. Crowding index was positively affected age at menarche (p=0.01). Weight was negatively affected age of menarche (p=0.000). Age at menarche was positively associated with active female and / or athlete female (p=0.0001). Watching reality or horror movies was associated with low age at menarche (p=0.0001). Practicing video games was associated with low age at menarche (p=0.0001). Chronic diseases were associated with increase age at menarche (p=0.03). Exposure to violence was associated with low age at menarche (p=0.0001)

Conclusion: Age at menarche was 11.8 ± 1.8 year. Socioeconomic status, weight, physical activity, watching horror movies and playing videogames were affecting age at menarche.

**Keywords:** age at menarche, Iraq, active female, watching horror movies, playing videogame

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## Introduction

Menarche is in a pubertal of secondary sex characters denoting approaching the adult appearance. It is a biological trait that scientists are trying to understand the causes of age variation in timing of the event.[1] Several factors affecting the age at menarche e.g., genetic parameters,[2] socioeconomic conditions,[3] general health and lifestyle,[4] nutritional status,[5] seasonality,[6] physical activity,[7] and level of education.[8]

Publishing on the effect of wars and conflicts on age of menarche in Iraq is scarce. This was the impetus to carry out this work.

## Materials and methods

A total of 444 female students was included in the study. Their age was 13.7 ± 1.3 year. They were selected by multistage random sampling technique. One side (Al-Karch) of two sides in Baghdad was selected randomly. Al-Sydia district (south west of Baghdad) was selected from districts in selected side randomly. Four intermediate schools were selected out of 9 schools in Al-Sydia. One class from each level of education i.e., 1$^{st}$, 2$^{nd}$ and 3$^{rd}$, was selected randomly. All students in the selected class were included in the study.

Interview was carried out with each female student whether she had started menstruation or not. The required information was age at menarche, demographic data (age, educational level of parents, household, and number of rooms (crowding index "CI"), physical activity and chronic diseases. Anthropometric measurement (height and weight). BMI was classified according to WHO.[1]

The effect of independent variables on age of menarche (dependent variable) was tested by chi square test (for categorial variables) and student's t test or ANOVA (for continuous variables). P < 0.0s was considered significant.

## Results

Age at menarche was 11.8 ± 1.8 year.

Table 1 shows the effect of the studied variables on age at menarche.

Age at menarche living in houses of crowding index of ≥ 3, 2 and < 2 reported were 12.1 ± 1.6 year, 12.2 ± 1.9 year and 11.5 ± 1.8 year, respectively. There were significant differences in age of menarche by differences in crowding index (F = 1.6, d.f.= 27, 258; p = 0.01).

Underweight, normal weight, overweight and obese female students showed age at menarche at 13.2 ± 1.2; 12.3 ± 1; 10.2 ± 1.5 and 9.2 ± 1.6 year, respectively. Age at menarche was varied significantly between different BMI (F= 97, d.f. =3,283; p= 0.0001).

The age of menarche among nonphysical active, physically active and athletes' students were 10.7 ± 1.8; 11.7 ± 1.6 and 13.0 ± 1.7 year, respectively. Age at menarche was significantly varied with physical activity of female students (F = 23.6, d.f. =2, 284; p = 0.0001).

Those watching comedy, reality, romantic, action and horror movies showed age at menarche of 12.7 ± 1.5, 11.8 ± 1.4, 12.7 ± 1.4, 12.2 ± 1.1 and 10.9 ± 1.8 year. Significant variations in age at menarche were observed between girls watching different types of movies (F = 17.7, d.f. = 4, 284; p = 0.0001).

Age at menarche among students with chronic disease was 13.3 ± 2.6 year, and among students without chronic diseases was 11.7 ± 1.8 year. Age at menarche was significantly differ between those with and without chronic diseases (t = 2.6, d.f. = 285, p = 0.03).

Age at menarche among students exposed and nonexposed to violence were 11.3 ± 1.8 year and 12.4 ± 1.7 year, respectively. The difference in age at menarche between those exposed and nonexposed to violence was significant (t = 5, d.f. = 241, p = 0.0001).

Table 1 Distribution of factors affecting age at menarche

| variable | total | Age at menarche | |
|---|---|---|---|
| | | mean | SD |
| Crowding index | | | |
| < 2 | 175 | 11.5 | 1.8 |
| 2 | 84 | 12.2 | 1.9 |
| ≥ 3 | 28 | 12.1 | 1.6 |
| | | F=1.6, d.f.=2, 259, p =0.01 | |
| Body mass index | | | |
| Underweight | 83 | 13.2 | 1.2 |
| Normal | 93 | 12.3 | 1.0 |
| Overweight | 106 | 10.2 | 1.5 |
| obese | 5 | 9.2 | 1.6 |
| | | F=97, d.f.=3, 283, p =0.0001 | |
| Physical activity | | | |
| Nonactive | 59 | | |
| Active | 177 | | |
| Athlete | 51 | | |
| | | F=23.6, d.f.=2, 284, p =0.0001 | |
| Movies watched | | | |
| Comedy | 58 | 12.7 | 1.5 |
| Reality | 35 | 11.8 | 1.4 |
| Romantic | 43 | 12.7 | 1.4 |
| Action | 18 | 12.2 | 1.1 |
| Horror | 133 | 10.9 | 1.8 |
| | | F=17.7, d.f.=4, 284, p =0.0001 | |
| Chronic disease | | | |
| Yes | 6 | 13.3 | 2.6 |
| no | 281 | 11.7 | 1.8 |
| | | t = 2.6, d.f.=285, p = 0.03 | |
| violence | | | |
| exposed | 241 | 11.3 | 1.8 |
| nonexposed | 199 | 12.4 | 1.7 |
| | | t = 5, d.f. = 239, p = 0.0001 | |

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**Discussion**

Age at menarche was 11.8 ± 1.8 year. It is similar to that reported in Basra (southern Iraq) last decade (11.7 ± 0.9 year).[2]

The observed figure (11.8 ± 1.8 year) is lower than that reported in Baghdad previously (12.6 ± 1.7, 12.2 ± 2.2 and 12.07 ± 1.3 year).[3-5] This difference i.e., age at menarche becomes earlier, might be attributed to the stressors and conflicts. It was documented that stressful family environment (family conflict, poverty and insufficient parenting) predisposes of development of internalizing disorder which might accelerate menarche.[9]

Socioeconomic factors and psychosocial stressors were linked to timing of menarche.[6] Literature attributed the early age at menarche to familial conflicts, alteration in family structure, stressful home circumstances, paternal absence in childhood and poor attachment relationship.[7,8] In the last decades Iraq witness conflicts,[10] altered the family structure and created stressful home circumstances. The observed age at menarche (11.8 ± 1.8 year) is similar to that reported in Pakistan (11.7 ± 1.2 year).[12]

Observed age at menarche (11.8 ± 1.8 year) was earlier than that reported in wealthy countries e.g., Kuwait (12.4 year)[13], Turkey (12.7 year)[14], France (12.5 year)[15] and Canada (12.7 year)[16]. These differences might be explained by the effect maternal malnutrition during years of wars, sanctions, and civil war. It was reported that effect of maternal malnutrition affects the generations.[17]

It is well established that exposure to violence is associated with early menarche.[7,9] Iraq has been exposed to war, widespread violence (continuous violence) in the last decades.[10,11] These events might explain the earlier menarche.

Scientific records showed a decline trend in monarchial age in developed countries.[16]

In the line of that of other studies[16,19], age of menarche was negatively associated with BMI.

Age at menarche was positively associated with CI. The CI is a rough indicator for socioeconomic status.[20] Socioeconomic status in Iraq has been changed by internal migration and displaced families.

Age at menarche was significantly affected by Physical activity ($p = 0.001$). Physical activity and athlete delay age at menarche. It is consistence with that reported by others.[21]

Watching horror movies was associated with early age at menarche ($p = 0.0001$). It agrees with that of other articles.[22]

Earlier menarche was associated with exposure to violence ($p = 0.0001$) which similar to that reported in literature.[23]

**Conclusion**

Age at menarche was 11.8 ± 1,8 year. Socioeconomic status, BMI, physical activity, watching horror movies and exposure to violence were the determinants of age at menarche.

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