

# Age of menarche as a risk factor for gynecological cancer in Iranian women and review of the literature

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## Summary

**Background:** This study analyzed the age of menarche in different regions of Iran with a review of previous studies and examined the changes of menarche age over the past years. **Materials and Methods:** A descriptive and cross-sectional study which was conducted in 11 different provinces of Iran with a sample size of 26,831. The year of birth and age of menarche in the population obtained through health records which were available in the health centers collected and also questioning the subjects under investigation. **Results:** The highest average age of 14.6 years obtained from Kermanshah province and the lowest was from Kerman with 12.98 years. The lowest average was observed with age group under 30 (13.22) and the highest age of menarche (13.53) belonged to the 30 to 40 year age group. The average age of menarche in this study was 13.24 years. **Discussion:** A declining trend of about two to four months for each ten years has been observed in girls born in 1920s to 1940s and then an upward trend of about nine months for ten years in subjects born in 1950s and 1960s. The stressful condition of war and poor economic and social conditions of Iranian people can justify this upward leap. However in women under 30 years of age, the menarche age showed a rapid declining trend to 13.22 years. **Conclusion:** Obtaining accurate information and knowing all the factors affecting this issue can be very useful in planning the public health in women and health educational programs.

**Key words:** Age of menarche; Risk factors; Gynecological cancer.

## Introduction

Menarche is an important phenomenon of puberty which represents the successful development of this event and is the beginning of the ability to reproduce. Puberty is a transition period from childhood to the teenage girls that is associated with the developmental process. Menstrual bleeding is a very first sign of the onset of puberty [1].

This is a research topic in many academic centers around the world since attention to the evolution of puberty and menstruation is a very important point in the primary care of adolescent girls and mothers and is also important in terms of the economic and social future.

The importance of age of menarche has existed for years before and its first scientific record has been found about 150 years ago [2].

Pubertal timing mechanism is not yet fully understood and to predict the pubertal age all cases that can have an impact on this process will have to be considered [3]. These can be the mechanisms of physiological, genetic, behavioural, and environmental factors that can each have an impact on pubertal process. Since the process of increasing and decreasing age of menarche can have serious reproductive and health outcomes for women, extensive studies on this issue have been conducted in many countries [4-12]. However, in Iran, a comprehensive study to determine the age of menar-

che has not yet been done. Most of the available studies investigated the age of menarche in a particular area with evaluation of the effect of the other factors on menarche age.

This study analyzed the age of menarche in different regions of Iran with a review of previous studies and examined the changes of menarche age over the past years.

## Materials and Methods

This is a descriptive and cross-sectional study which was conducted in 11 different provinces of Iran with a sample size of 26,831. Collected information included the year of birth and age of menarche in the population obtained through health records which were available in the health centers and also questioning the subjects under investigation. All these information were in reference with full review of other studies regarding the age of menarche in Iran through searching articles in all the databases of Iranian such as SID web site with searching keywords of age of menarche, menstruation, and puberty. In this initial search, 16 articles in Persian were obtained. The full text of all information and articles obtained were analyzed using statistical software SPSS, version 15.

## Results

In this study, the authors evaluated 26,831 women born from 1984 to 2001 that were included from eleven different Iranian provinces. The average age of menarche in this study was 13.24 years. The age of menarche according to various Iranian provinces is shown in Table 1.

The highest average age of 14.6 years was obtained from Kermanshah province and the lowest was from Kerman with 12.98. Table 2 shows the average age of menarche in different age groups with ten-year separation. The lowest average was observed with age group under 30 (13.22) and the highest age of menarche (13.53) belonged to the 30 to 40 year age group.

Other information regarding the age of menarche according to geographic area in other Iranian and international articles using data from previous studies is shown in Table 3. The authors compared their result and discovered the following: the highest average age of 14.6 years was obtained from Kermanshah province and the lowest was from Kerman with 12.98 years. The lowest average was observed with age group under 30 (13.22) and the highest age of menarche (13.53) belonged to the 30 to 40 year age group. The average age of menarche in this study was 13.24 years. A declining trend of about two to four months for each ten years has been observed in subjects born in 1920s to 1940s and then an upward trend of about nine months for ten years in subjects born in 1950s and 1960s. The stressful condition of war and poor economic and social conditions of Iranian people can justify this upward leap. However in the present study, women under 30 years of age showed a rapid declining trend of menarche age to 13.22 years.

## Discussion

Menarche is the first menstrual bleeding in adolescent girls and has a major role in psycho-social welfare as well as future health of women [1-4]. This study analyzed the age of menarche in different parts of Iran with a review of past studies and an evaluation of changes which has been made over the years. The average age of menarche in this study was 13.24 years. A declining trend of about two to four months for each ten years has been observed in subjects born in 1920s to 1940s and then an upward trend of about nine months for ten years in subjects born in 1950s and 1960s. The stressful condition of war and poor economic and social conditions of Iranian people can justify this upward leap. However in the present study, women under 30 years of age showed a rapid declining trend of menarche age to 13.22 years.

The first recorded age of menarche has been reported 150 years ago in mid 19<sup>th</sup> century in which they found that the age of menarche in girls in that decade was 16-17 years [3-10]. However in recent decades, many studies worldwide have shown that age of menarche in different countries has declined [10]. Studies where age of menarche has been determined in 67 countries, showed that in the 1960s and 1990s, the age of menarche has reached approximately 13.53 years. In other words, age of menarche has dropped three to four months per decade. Studies in other countries as in the USA and Canada also confirmed this finding [10-

Table 1 – The average age of menarche according to different Iranian cites.

The average age of menarche	City names
13.62	Esfahan
12.98	Kerman
14.06	Kermanshah
13.40	Mashhad
13.46	Qum
13.38	Shiraz
13.63	Tabriz
13.44	Yazd
13.15	Gorgan
13.03	Rasht
13.57	Tehran

Table 2 – The average of age menarche in different age groups.

Average age of menarche	Age groups
13.22	Under 30 years
13.53	30 - 40 years (born 1968 to 1979)
13.44	40 - 50 years (born 1952 to 1968)
13.50	50 - 60 years (born 1958 to 1949)
13.52	Over 60 years (born before 1949)

Table 3 – The comparison of other studies on age of menarche in Iran [3-8].

Average menarche age	City	Year of publication	Author's name
14.54	Tehran 1	2008	Rabbani
12.68	Tehran 2	2003-2004	Razzaghy-Azar
12.95	Tehran 3 (shargh)	1994	Aminoroaya
12.7	North of Tehran	1993	Salari
14.34	South of Tehran	1994	Mohamadi
13 ± 0.06	Mashhad		Dehkordi <i>et al.</i>
12.91 ± 1.23	Shiraz		Ayatollahi
12.07 ± 3	Ardebil		Nemati
12.7 ± 1.15	Shahrekord		Dneshshahraki
12.6	Bandar abass		Fazeli
13.4 ± 1.4	Shahre ray		Moghimi
12.9 ± 0.8	Shahrod		Delvarianzadeh
12.2 ± 1	Mazandaran		Abdollahi
12.5 ± 1.1	Mazandaran	2006	Delavar
13.1	Esfahan		Alavi
12.65	Esfahan	2005-2006	Kashani <i>et al.</i>
13.54 ± 1.30	Gorgan	2008	Gharravi
12.20 ± 1.45	Gorgan	2008	Gharravi
13.86 ± 1.51	Iran 1990		Mohammad
13.65 ± 1.47	Iran 1999		Mohammad

13]. An American study showed that the age of menarche reached 12.75 years in 1960s and 12.3 years in 2000 [13].

In India, age of menarche has declined about three to four months per decade and shows a more rapid reduction

in comparison to the countries in North America and Europe. This could be due to improved diet and growing trend in India's economic and social conditions in recent years [13-14].

The study conducted in Italy in 2010 showed that the age of menarche in Italian girls in the past decade has been established to be 12.46 years. This was contrary to studies in other countries that still show a decreasing trend. Other factors that were examined in this Italian study were overcrowded families and high maternal age at menarche which increased the age of menarche and having a high body mass index and living with parents which decreased the age of menarche. This study also showed that the age of menarche in girls was about a quarter below the age of menarche in their mothers [14]. Improved economic and social conditions and better nutrition causes increased weight and height during childhood which itself created a downward trend of menarche age from 16 to 13 years throughout the world. The rate of this reduction differs according to country [15].

Early sexual activity and other social and psychological problems are other complications of early menarche age. Based on studies, one of the main causes of early menarche in people with no certain diseases is obesity [16-18]. Children with early puberty, due to the rapid closure of the epiphyseal connections in the bones are at risk of decreased height in adulthood [19]. Given the fact that girls achieve their maximum height before the age of menarche and after that the potential for height growth is limited, it is concluded that high age of menarche could have a positive effect on average height.

The effect of maternal education on age of menarche in girls in a Dutch study showed that mothers with higher education level, have girls with lower age of menarche [17]. However, the opposite was seen in a Tehranian study [5]: a reverse relationship was found between the educational level of mothers and the age of menarche in girls.

In another review, it was observed that weight loss delayed the age of menarche by about 15 weeks while increased weight brought the age of menarche forward by 13 to 19 weeks [20].

In a Canadian study it was shown that among all social and economic indicators, only income had significant effect on age of menarche. The result of this study was unlike previous studies [10]. This study demonstrated that high-income is associated with lower age of menarche and vice-versa. This could be explained by the fact that better economic and social conditions and improved nutritional status cause lower age of menarche. Other explanations are that better socio-economic status was associated with a high level of stress that causes the lower age of menarche or associated obesity that could also lower the age of menarche.

Life without parents is strongly associated with early age of menarche. This result was obtained in European countries. In Iran, due to the strong family foundation and

not separating the children from the family until legal age has not yet been investigated. Bogaert *et al.* showed that absence of father in the family can create the possibility of 62.2 that age of menarche in girls occurs under 12 years [21]. Hypothesis raised that psychological and physical stress can cause metabolic changes in the body of teenagers which these changes can be seen in the menstrual cycle and continues beyond that [22]. Breast cancer [23], metabolic syndrome and osteoporosis [15], metabolic diseases [24], Alzheimer's [15], and overweight and obesity [25-26] increasing incidence of cardiovascular disease [27], community health problems because of early sexual activity, eating disorders, and poor performance are all examples of problems leading to lower age of menarche.

Improved economic and social conditions and better nutrition lead to increased weight and height during childhood which creates a downward trend of age of menarche from 16 to 13 years in countries throughout the world [15-18]. In the present study, the downward trend in the age of menarche has also been shown in Iran, except during the decades in which Iran was at war and eventually has been suggested that in Iran like in other advanced countries, the age of menarche in adolescents aged between 10 to 17 years [3-8, 19]. It is obvious that having accurate information and knowing all the factors affecting this issue can be very useful in planning public health in women and health educational programs which ultimately affect the health of the entire community [20-26]. In executive educational and health programs, the information should be given to the mothers and adolescents at the same time as it can be much more useful and more practical [26-29].

The American College of Obstetrics and Gynecology recommends that the first visit of a specialist should be for evaluation, screening, and preventive services and to provide a health guide for people aged 13-16 years [30]. This medical visit could be a training manual for teenage girls and their mothers regarding the physical development of adolescents based on maturity parameters and normal menarche indicators. Perhaps if this process is executed in the secondary schools during enrollment, parents would be more persistent and would become a widespread practice in the country [16-19].

## Conclusion

Obtaining accurate information and knowing all the factors affecting menarche can be very useful in planning public health in women and health educational programs which would ultimately affect the health of the entire community. In executive educational and health programs, the information should be given to the mothers and adolescents at the same time as it can be much more useful and more practical.

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