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Menarche Age of Mothers and Daughters and Correlation between them in Saudi Arabia

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Abstract

Objective: Menarche is the hallmark maturation event of every female child. The menarcheal age of mothers is thought to be a good predictor of the menarcheal age of daughters. The aim of this study is to evaluate the current age at menarche of young girls and to examine its correlation with that of mother's menarcheal age.

Materials and methods: This was a questionnaire-based cross sectional study conducted at Jeddah in Saudi Arabia. The target study population included young girls between ages 12 and 16 years, experiencing Age at menarche. The sample size for analyzing the relationship between menarcheal age of daughters and mothers was 165. SPSS 16 was used to analyze the extracted data.

Results: The mean menarche age for the mothers (12.97 ± 1.71 years) was significantly higher than the daughters (11.5 ± 1.48 years). In addition, a significant positive correlation was observed between mother's menarcheal age and daughter's menarcheal age (r=0.264, P=0.023).

Conclusion: The results of the survey clearly demonstrated that a phenomenon of acceleration is involved. Various environmental and genetic factors are also involved which influences the age at menarche. It is essential to broaden the cross sectional study with regards to other factors such as body mass index and physical activity at Menarcheal age.

Keywords: Menarche age; Mother; Daughter; Early menarche; Saudi Arabia

Introduction

Female reproductive maturation is a complex physiological process. Age at menarche is significant as it marks the beginning of female fertility and is influenced by various environmental and genetic factors [1-3]. First menstrual bleeding is referred to as menarche. It is responsible to mark the development of reproductive cycles in women. Different kinds of hormonal changes occur in the body of young girls at the time of their puberty. From the early period of the prenatal life, endocrine regulation of sexual maturation takes place. These early developments in the puberty cycle can disturb a child; socially and emotionally [4].

Early age of menarche is evident through physical and genetic changes, such as, increase risk of breast cancer and other gynecological cancers [5], risk of type 2 diabetes [6], obesity [7], cardiovascular disease [8], and psychological disturbance [9]. Early onset of menses is also common in girls who start smoking at initial stage of their life [10]. In addition, there are numerous other factors, such as, parental influence, family conditions, and environmental conditions that contribute to the early onset of menarche [11].

Chemicals also play an integral role in causing early onset of menarche in young girls. Some specific chemicals disturb the endocrine systems of young girls, as a result, hormonal changes are observed. Working with heavy metals and chemical inhalation can also lead to the disruption of these hormones. Lead is one of the heavy metals, present in almost majority of the products such as paints, industrial waste, pipes and petrol. In order to reduce the harmful effects of such heavy metals, their usage should be reduced [12].

The aim of this study is to evaluate the current age at menarche of young girls and to examine its correlation with mother's age of menarche.

Methods

This survey was a cross sectional study which included a convenient sample of participants from Jeddah in Saudi Arabia. Data was collected in July, 2014. Participation of these individuals was voluntary. Target study population included all young girls between the ages of 12 and 16 years old who experienced menarche. Recruitment was carried out by research assistants, and students. Participants were invited by the research team, from multiple locations. During conscription, the aim and design of the questionnaire was demonstrated to the participants, and mentioned as a preface on each questionnaire. School going girls gave their consent to answer the questionnaire. Menarche data was attained by means of status-quo technique regarding age at menarche

by inquiring a female of her present status i.e. if she has had her 1st menses at the time of inspection.

The original proposed idea intended to evaluate the efficacy of 3 different survey methods including mail, web access, and by class room distribution; however this component was not accomplished. A self-administered questionnaire was developed and used to collect research data. This questionnaire consisted of 10 queries based on the review of available health surveys, and associated literature (Questionnaire 1). The survey was divided into different parts.

1. Nationality	Saudi
	Others
2. Marital status	Single
	Married
	Widow
3. Age	12-13 years
	14-15 years
	15-16 years
	30-40 years
	60 or Above
4. Education level	Less than high school
	High school
	Graduate degree or advanced professional degree (Master, Ph.D., M.D., J.D., etc.)
5. Rank your Socio Economic Status	Very low
	Low
	Average
	High
6. Do you have siblings?	Yes
	No
7. Does anyone in your family experienced early puberty	Yes
	No
8. What is your height?	144-155 cm
	156-166 cm
9. Mother age of menarche	10-Dec
	13-15
	16 and above
10. Is puberty a distressing condition?	Yes
	No

Questionnaire 1: Review of available health surveys, and associated literature.

The initial part enclosed age group, marital status, nationality, education level, and socio economic status. However, questions in the second division examined mother's age of menarche, adequacy of the nutrition, family history of early puberty, and general awareness related to puberty. The questionnaire also included physical examination focusing height and pubertal staging (Tanner staging). The physical measures were also taken by the trained advocates. Population with history of endocrine disorders, immunodeficiency, renal disease, neurologic, muscular disorders and chronic respiratory illnesses were excluded. In addition, verbal and written consents were obtained from young girls and their guardians before starting the questionnaire. Statistical analysis was done using Statistical Package for the Social Sciences version 16 (SPSS 16). Results were considered significant with P-value (less than) 0.05. Pearson correlation analysis was utilized to examine the correlation between age at menarche of mothers and their daughters.

Results and Discussion

A total of 165 questionnaires were filled and included in the analysis. The mean menarche age for the mothers was 12.97 years and for the daughters was 11.57 years with 1.5 years difference between the means. The mean menarche age for the mothers was significantly higher [12.97 (SD 1.71) years] than the mean menarche age for the daughters [11.57 (SD 1.48) years] (P=0.023) (Table 1). The minimum age of menarche of daughters was 8 years compared to 9 years for mothers. The maximum age for both mothers and daughters was 16 years. There was a positive correlation between mother's menarcheal age and daughter's menarcheal age (r=0.264).

	N	Minimum	Maximum	Mean	Std. Deviation
Age of menarche for mothers	74	9	16	12.97	1.712
Age of menarche for child	91	8	16	11.57	1.484
Valid N (list wise)	165				

Table 1: Mean age at menarche of mother and daughter in Jeddah, Saudi Arabia.

In this study, most of the menstruating females were of age range 12 and 16 years. Although, changes in puberty and time are specifically influenced by genetic factors, but numerous other aspects for instance, nutrition, general health status, geographical location, and socio-economic status also influence the menstruation onset and its progression. Maternal weight gain during pregnancy, birth size, and gestational diabetes are responsible for constituting the genetic factors leading to early possibility of menarche [13]. Genetic factors contribution in the early onset of menarche is measured to be about 57-82% [3]. However, since recent years, studies on environmental factors contributing to early onset of menarche have been quite popular. These studies have gained popularity because environmental factors can be controlled that can lead to chances of survival in late adulthood [14]. Consumption of alcohol or any other kind of drug leads to the increased chances of early onset of menarche in girls [15].

Diet is also one of the most important factors in this study [16]. Whatever a mother consumes during pregnancy tends to impact a child's health. Furthermore after the birth of the child, every mother has to feed the baby. If health of a mother is good then all the effective nutrients are transferred in the body of young girls. In recent decades, the Menarcheal age is continuously declining due to various different plausible factors [17], one of which includes increasing childhood obesity rates, which is one of a postulated primary factor [18]. Gillman [19] suggests that breastfeeding can often prevent high weight during childhood. A possible relationship exists between the onset of puberty and obesity. It is probable that breastfeeding tends to decline the early puberty risk. Due to modern trends, mothers have stopped breast feeding their children for various reasons due to which, they gain weight.

Increased weight is also one of the reasons for early onset of menarche in girls. Due modern trends and civilizations, mothers have stopped feeding their children due to various reasons; as a result, young girls gain excessive weight before puberty that leads to signs of early puberty. In addition, nutritionists argue that there are certain kinds of food products, which contribute to the chances of early puberty in young girls. For example, intake of foods, higher in carbohydrates, fats and proteins result in unnecessary fat accumulation in the body leading to puberty [20]. For instance, cow milk is one of a contributing factor towards the issue. This is because animal protein factor contributes to the production of insulin in the body [21].

On the other hand, soya bean is immensely consumed by Saudi population, which is considered to be good for health. At times, it mildly disrupts the endocrine system of young girls [22]. When young girls are put on formula feeding in the initial course of their lives, they usually take isoflavones [23]. This type of intake either represses or induces the expression of gonadotropin releasing hormone in their bodies. In addition, deficiency of vitamin D can also indirectly contribute towards the early onset of puberty through childhood obesity [24].

Plastic products are also responsible for such changes. In the modern world, it is observed that individuals litter plastic bags and wrappers all over the roads. These plastic products have a negative impact on the overall health of girls. Over several decades, secular trends are decreasing menarcheal age of daughters in comparison to mothers provided that environmental alterations contribute in the process [25]. Yet, these types of trends have not been identified in Saudi Arabia. Moreover, a relationship exists between the age of the mother at menarche and the age of the daughter at the time of menarche. This study was conducted to explore this relation in-depth. The possible correlation of a mother-daughter age at menarche has not been investigated extensively in the region and no local data is by far available. Therefore, this study explored the current mean age at menarche in girls living in Jeddah, Saudi Arabia and compares it with age at menarche of their mothers.

The study gives an evidence of the presence of secular trends in decreased age at menarche. This secular trend is demonstrated when the data indicating decreased mean menarcheal age by 1.5 years is compared with another cross sectional study that was done in Saudi Arabia a decade ago [26]. In 2003, a Saudi study revealed decrease age at menarche from 13.22 to 13.05 years with mean difference of 0.17 years [26], although, the differences are huge between the means, but both of them represents supporting evidences of deceased age of menarche. This could be attributed to different sample size and different comparison groups. This secular trend of decreasing age at menarche was observed worldwide. Conversely, in Denmark and United States, sexual maturation onset in girls has been declined in the last years [27,28]. Such a trend is also observed in different ethnicities (such as Caucasian, Indo-Pakistani, Hispanics, Caribbean, and African-American) [29]. On the contrary, in German girls, this secular trend in menarcheal age is stabilized [30]. Menarcheal age correlation between mothers and daughters of other ethnic groups were also examined. Talma [31] examined trends in menarcheal age in Dutch, Moroccan and Turkish girls living in Netherlands. The median age at menarche significantly declined between 1955-2009 (13.66-13.15-13.05 years). Conversely, decline in median menarcheal age was found in Moroccan and Turkish girls. On the other hand, Ong et al. [32] examined age at menarche in mothers in United Kingdom, this was considerably known to predict obesity risk and early growth in children.

Verma and Chhatwal [33] examined age at menarche in 400 Punjabi participants. Around 34% or one-third of the girls got menarche between 12.1-13 years of age. The mean menarcheal age was 12.38 years. Correspondingly, the oldest and youngest girl at menarche was 17 and 9.67 years old. Pouta et al. [34] conducted a quantitative study by recruiting participants of Northern Finland. The findings indicated that menarcheal ages of daughters and mothers slightly correlated (0.206) [median 13 years (interquartile range 13, 14) versus 14 (13, 15)]. Moreover, Ahn et al. [35] assessed age at menarche in Korean female. Trends between the years 1990-1994 were observed which showed 12.60 years (age at menarche). This age significantly declined from 3.11 years in 1980-1984.

The age at menarche is strongly associated with socioeconomic status [36]. Moreover, it also indicates better nutritional, health and socioeconomic status. Besides general ethnic diversification, both environmental and genetic factors tend to impact the maturation timing in females. These evidences come from the twin studies, where monozygotic twins attain menarche at a similar age (i.e. within two to three months). Comparatively, dizygotic twins differ in Menarcheal age by 9 months of average age. The onset of puberty is also considered to be transgenerational as in few studies a purely sizeable correlation exists in menarcheal age of a daughter and mother.

A research of Tehranian girls born during 3rd to 9th decades in last century indicated a decline in the menarcheal age from the year 13.88-12.98 years [37]. Another research of daughters and mothers with at least twenty five years difference in their date of birth demonstrated the menarcheal age of mothers and daughters was 13.6 ± 1.5 and 13.2 ± 1.4 respectively that indicated a decline in the menarcheal age from a single generation to the another one [38]. Sabte ahval undertook a national survey indicating that girls aged ten to nineteen years represent a huge percentile of Iranian girls population in total [39]. However, the aspects influencing the menarcheal age is not yet studied at national level and the results from various regional researches are contradictory [40].

Conclusion

In conclusion, it's alarming worldwide that there is a secular trend of deceased age at menarche. The Age of menarche considerably shows declining trends in Saudi Arabia. It is important that the healthcare professionals in Saudi Arabia focus on educational plans and encourage females to change their behavioral and nutritional patterns along with their lifestyle factors, so that complications caused by low menarcheal age can be prevented. It is essential to broaden this cross

sectional study with regards to other factors such as body mass index and physical activity on Menarcheal age. Moreover, it is also important to increase parent's awareness regarding the usage of products containing Xenoestrogen in order to acquire a healthy lifestyle.

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