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Full Length Research Paper

Age and menarche in girls in Saudi Arabia: An anthropometric study

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The menstrual cycle which is experienced by the females is an essential event in the female life cycle and it is known as menarche. The age of menarche is decreasing across the world due to various contributing factors. This research aims to identify the age of menarche among the school children of Riaydh. Moreover, it will also explore the relationship between the age of menarche and anthropometric measurements like weight, height and BMI. It is a quantitative descriptive study, which has used the normal methods of measurement of the weight and height of the girls. The target study population was 120 girls between the ages of 11 to 15 years. The current status of menarche was identified by the help of status quo method and the assessment was also carried out by the date of birth. The outcomes of research have shown that mean menarcheal age was 12.91 ± 1.1 years. Moreover, the mean BMI was found to be 26.7500. These evidences have indicated the persistent trends that are the decreased menarcheal age and the association of age of menarche with the increased BMI. There is a need to identify the association between age of menarche and nutrition status.

Key words: Menarche, age, BMI, obesity, anthropometric relationship

Ethical Consideration

The informed consent was taken from parents of all of the research participants and the project was approved by the review board.

List of Abbreviations

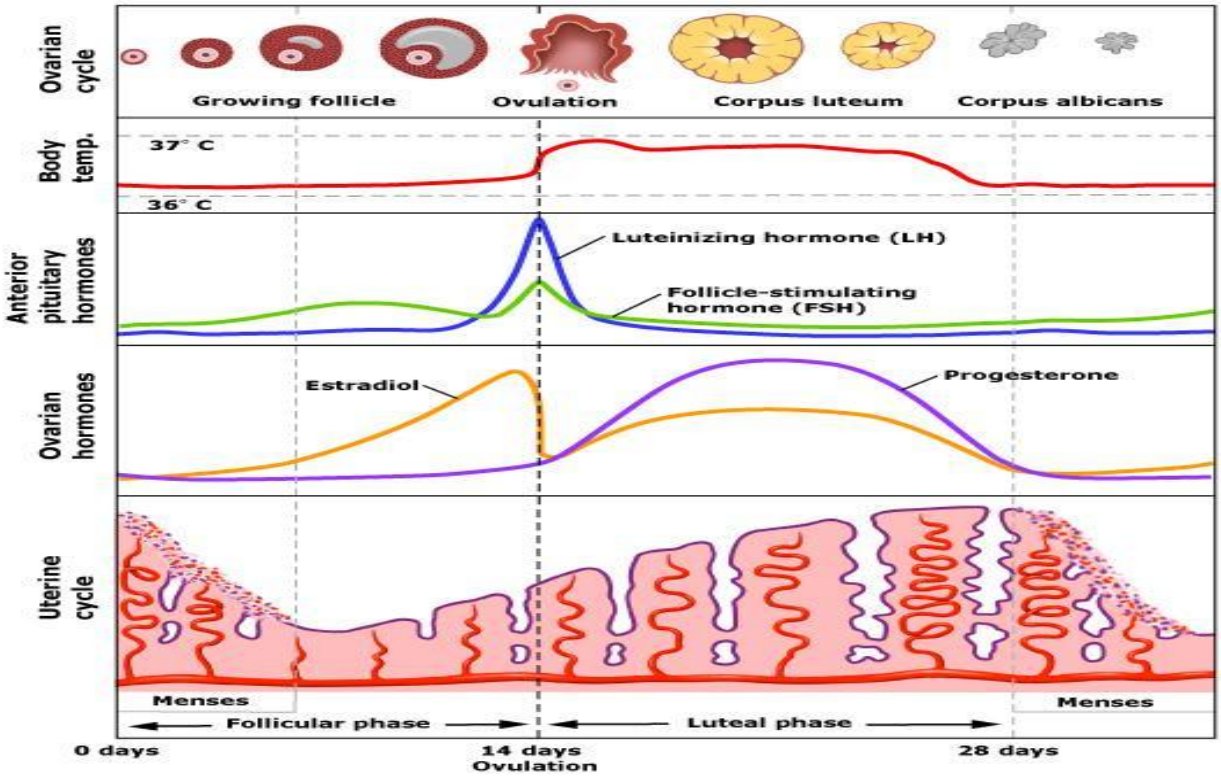
BMI: Body mass Index
GnRH: Gonadotropin-Releasing Hormone

INTRODUCTION

Menarche is the menstrual cycle experienced by the females and it is an important event in the life cycle of a female (Figure 1). It helps in transformation of a girl to a woman [1]. There is no accurate anticipation of the occurrence of Menarche. It is the stage of puberty which is not similar to other teenage changes like the pubic hair growth and development of breast. The condition of Menarche is known to occur earlier among the girls of America and Europe [2]. It is stated that in these regions the condition decreases at the age of approximately four months every decade and it is now stabilized at around 13 years [3]. This is due to the efficient nutrition, health and socioeconomic status. The wealth and industrialization is higher in the urban areas as compared to the rural areas then its impact on the girls living in the urban areas is also higher.

There is no difference in the menarche age of girls living in all the industrialized countries. Conversely, there

Figure 1: Female Menstrual Cycle



are higher differences in the mean age of menarche among the different classes of the third world countries. The gap between poor and rich people is higher in the third world countries. There are several factors which affect the menarche age of girls. These factors include exercise, diet, hereditary and, genetic factors, environment, chronic illnesses, level of education, migration and the socio economic status [4]. After the occurrence of menarche, many women have indicated to feel different negative experiences like anxiousness, worry, stress, and embarrassment.

On the other hand, some women have indicated that they feel proud, excited, mature and grown up. The immature pituitary gland and the ovaries can function completely among the females after proper stimulation. Moreover, it is also reported that the hypothalamus does not secrete appropriate quantity of (GnRH) Gonadotropin-Releasing Hormone in childhood. It is considered that process of puberty is initiated by any maturation process which occurs in probably the limbic system of brain. Another theory further claims that the hypothalamus is sensitive to the low concentration of progesterone and estrogen in the childhood and also with the inhibition of GnRH [5].

However, it is not clear that this is related to the decrease in the age of menarche. In addition, the socioeconomic status that is the determinant of age at menarche has also changed in Middle Eastern countries due to the increase in oil revenues. Hence, this study aims to identify the age of onset of menarche among the girls living in Saudi Arabia. This study will further explore the relation of menarche and anthropometric measurements that are represented by weight, body mass index and height.

MATERIAL AND METHODS

This research will follow a Quantitative research design by using a descriptive approach. In this study design, the condition and other related factors are measured at a particular point in time for a defined population. The cross sectional studies are considered to be a snapshot of the characteristics and frequency of a condition of population at a specific point. Moreover, the data can also be used to evaluate the prevalence of conditions in a particular population.

The descriptive approach is mainly employed in those studies which have an aim to portray the specific characteristics of a person, situation or a group [6]. Likewise, in this research, the age of menarche among the girls of Saudi Arabia is focused. In this research, “descriptive” is related with the experiential meaning of age of menarche among the girls of Saudi Arabia. The use of descriptive approach in the process of data collection offers the ability to collect data and provides an apparent picture of phenomenon under investigation [7]. According to Polit and Tatano [8], the employment of numerical data is a quantitative approach that makes use of the logical and systematic measure of objectives along with the diversified and empirical evidences that are based on reality. The quantitative approach is often known

to be linked with the positivist tradition and the reasoning methods are also used for making predictions.

The study was carried out at the city of Riyadh and the selected subjects of the study were female students between the ages of 11 to 15 years. These females were the student of secondary school at Riyadh and the total number of participants was 120. The permission was taken from the school authority and the informed consent was provided to the administration of school. The purpose and aims of the study were communicated to the participants initially. Those students who disagreed for participating in the research were not included.

The menarche age was identified by the help of status quo method. In this method, a girl is asked about her current status. This means that whether she had her first menses at the time of assessment and her birth date. In the Status quo method, the sample should be large and the age range must be from 8 to 16 years old. The menarcheal age is also identified according to the birth date of the participants. Later, the girls were subjected to the digital balance scale to monitor their weight and the scale was positioned at zero after each measurement in order to ensure accuracy.

Girls were also asked to put off their shoes before measuring the weight. The height of patients was also measured in order to identify the body mass index (BMI). The participant was standing and the measurement was taken from the sole to the top of the head by the help of fixed measuring tape. The heel and subscapulae of the participants were kept aligned with the wall and the distance was recorded to be 0.1 cm. The BMI of girls was calculated as the body weight in kilograms divided by the height in square meters. The SPSS (statistical package for social sciences) version 16 was used for the analysis of descriptive results and the data was provided in terms of mean standard deviation.

RESULTS

The total number of participants was 120 and the mean age at menarche of the studied sample was found to be 12.91 ± 1.1 years. The earliest age of menarche was found to be 11 years and the last age of onset of menarche among the girls was reported as 16 years. Table 1 provides the complete details about age of girls at menarche.

DISCUSSION

Puberty is related to the physiological changes included in the sexual maturation of a child. The process of puberty also involves those physiological changes which are associated with the maturity of a child at sexual level. A female becomes able to reproduce with the sexual maturation. Adolescence is the transitional stage among the development of adulthood and childhood [9]. The physical and sexual maturation causes the increased level of psychological growth. The period of adolescence is known as the teenage period and it mainly overlaps the puberty period but its boundaries are not defined completely. The female secondary characteristics are the behavioral and physical aspects that identify the presence of sexual maturity but they are not the part of the reproductive system. This is in relation with the primary sexual characteristics of the sexual organs that are important for the process of reproduction including testicles and ovaries [10].

The sequential pattern of growth of the adolescent includes; the beginning of growth spurt, breast development budding stage, formation of non pigmented pubic hair, appearance of downy axillary hairs, rounding of hips, increase in size of vagina, labia, and clitoris. The onset of menarche takes place with the completion of pubic hair development and maturity of breasts [11]. There are various studies that have been conducted on the American families and enough attention has not been paid to the different regions. There is lack of awareness regarding the contributing factors of the menarcheal age. However, the results of this study have shown that BMI plays an important role in the difference of the age of menarche. Kulie et al [12] has mentioned that the reason of initial onset of menstrual cycle can be obesity among girls. Those girls who have an excessive BMI have an increased prevalence of pubic indications early as compared to those girls who have normal BMI. This present research has shown that the age of menarche of more than two thirds of the girls was found to be between 11 to 12 years old.

There is statistically significant difference between BMI categories. These categories are related to the appearance of the secondary sexual characteristics. The present study has further identified that the mean age of menarche was reported as 12.9167 with a standard deviation of 1.47576 (Table 2). These findings are found to be similar with several researches as it is stated [13] that the mean age of menarche is 12.4 years old and the prevalence of menarche is 24.3% before the age of 12 years. It has been reported by Wronka [14] that there is an inverse correlation between the age of menarche and the values of BMI. Similarly, Novotny et al. [15] has claimed that the breast density of female adolescents is in negative association with the fattening of body and it is positively associated with the menarche. There is a significant difference between the categories of BMI, menstrual regularity, and age of menarche. However, Souza et al. [16] has mentioned that obesity can cause dysfunction of the menstrual cycle. The highest BMI in this study was found to be 29 (Table 3) and the mean was found to be 26.7500 (Table 4).

The identification of the age of menarche is very important because the age of menarche is a significant point of initiation of reproduction. According to Wronka and Iwona [14], the average age of menarche facilitates in the judging the risk of miscarriage and unsuccessful pregnancy. This can also be a proposed basis for planning of public health regarding sex education. The onset

Table 1: Age at Menarche

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	11.00	28	23.3	23.3	23.3
	12.00	26	21.7	21.7	45.0
	13.00	19	15.8	15.8	60.8
	14.00	22	18.3	18.3	79.2
	15.00	25	20.8	20.8	100.0
	Total	120	100.0	100.0	

Table 2: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Age at Menarche	120	11.00	15.00	12.9167	1.47576

Table 3: Age of Menarche related to BMI

BMI Ranges		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	25.00	35	29.2	29.2	29.2
	26.00	21	17.5	17.5	46.7
	27.00	19	15.8	15.8	62.5
	28.00	29	24.2	24.2	86.7
	29.00	16	13.3	13.3	100.0
	Total	120	100.0	100.0	

Table 4: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Age of Menarche related to BMI	120	25.00	29.00	26.7500	1.43925

of menarche age is earlier these days as compared to the past times. This can be mainly due to the better health and improved nutrition. It has further been suggested that the initiation of growth and menarche takes place at the specific body weight and the specific percentage of body fat. On the other hand, some of the studies indicate that BMI does not affect menarche age [11].

The variability in the age of menarche shows that there is no specific age or size that can be expected among the girls to experience menarche. Therefore, the nutritional status, genetics and weather are the factors which affect the onset of menarche. Moreover, the differences in the appearance of puberty are also different throughout the world. Apart from the extensive research regarding the age of menarche, it has been identified that there is no normal range for the age of menarche and its influencing factors [12]. The mean age at menarche in this study was 12.9167. This is similar with the strong evidences of downward secular trend related to the age of menarche in USA, Europe, China and Japan as well during the last century. This mean age is also less than the mean age of menarche reported in Africa.

The country of Saudi Arabia is present in the Arabian Peninsula and it has the warmest climate in the world. It further has very low rainfall at an average each year. The recent estimation for the month of March of year 2014 has shown that the population of Saudi Arabia has grown to 29.65 million. Riyadh is the capital of kingdom of Saudi Arabia and there are approximately 7 million people who are living there. The ratio of Bedouins has been reported to be 20% and they generally belong to the Mediterranean region. Mostly, Arabs belong to the Caucasian race like Europeans. The population of Saudi Arabia is mostly Sunni Muslims with a few shia's. Jeddah is a modern city located in the west of Saudi Arabia near the red sea.

The weather of this region is mainly humid and warm in summers and it is moderate in the winters with a little rainfall. The Asir mountain range is also present in the country which is 7000 feet above the sea level. This is the only area in the country where adequate rainfall occurs [15]. According to the economic condition, this region produces about 15% of the total oil produced by the world. The country got economic stability from the year 1970 and it has a foreign exchange position. The major emphasis is placed on education in Saudi Arabia. There are more than twenty universities in Saudi Arabia and more than 50 colleges.

The number of male and female students in the universities is also increasing. There are several primary and secondary schools and the health services system is also advanced. The health services system got advancement after the year 1960 because it was the part of socioeconomic life. The main reason behind the expansion of different areas in the region was the increase in oil revenue of the country and the improvement in transport, education, urbanization and communication of Bedouin settlement and an increase in the health care [16]. The decrease in menarchal age in this study can be due to the socioeconomic status of Riyadh and improvement in the living conditions.

CONCLUSION

It can be concluded that the menarche is the initiation of menstrual cycle experienced by the female. It is an important event in the reproductive cycle of a female. This cycle facilitates in transformation of a girl to a woman. The age of menarche cannot be identified accurately and it is different in different people. The factors that contribute to this difference include socioeconomic status, climate, nutrition, BMI, weight and height of a girl. This research employs a quantitative descriptive design and the normal methods of measurement are used for the identification of height and weight. The status of menarche in this research was analyzed by the help of status quo method. Hence, the research findings portrayed that the mean age of menarche is 12.91 ± 1.1 years with the mean BMI as 26.7500.

IMPLICATIONS

It is also implicated for future studies that the association between age of menarche and nutrition status should also be identified. In addition, it is necessary to identify the prevalence of pubertal early milestones among non-obese children.

SUMMARY

The menarche is the menstrual cycle present among females and it is an important stage of the female life cycle. This phase facilitates in the transformation of a girl to a woman. There is no precise age of the occurrence of menarche. This is a stage of puberty which is differentiated by several changes like growth of pubic hair and breast formation. This research have used the quantitative design and by the help of descriptive approach.

The data in this research has been analyzed by the help of SPSS version 16 for the descriptive analysis of results. The overall number of participants is 120 and the mean age of menarche in the studied sample has been reported as 12.91 ± 1.1 years. The mean BMI of the participants has been reported as 26.7500. The results of study have shown that the initial age of menarche is 11 years and the last age of the onset of menarche is 16 years.

The puberty is associated with the alteration in the sexual maturation of the child. The puberty process includes physiological changes which are related with the child maturity at the sexual level. A female is known to become reproducing by the help of sexual maturation. The adolescence is known to be the transitional stage among the childhood and adulthood development. The sexual and physical maturation causes an increase in the psychological growth levels.

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Conflict of Interest

The author of the study has declared that there was no conflict of interest regarding this research project.

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