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**Research Article**

# A Comparative Study of Biopsychosocial Factors Influencing the Anthropometric Parameters of Adolescent Girls in a Rural and Urban Area of India

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**Abstract:** Adolescence is a period characterized by the physical, psychological, and social changes in the individual. This is an age that has an important bearing on the future growth and development of the girls, both physically and psychologically. This was a community-based, descriptive, cross-sectional study conducted among adolescent girls in the age group of 10-19 years, residing in a rural (village) and urban (slum) areas of Maharashtra, India. The mean age of the total study population was 16.9±1.75 years. More number of girls residing in the urban area attained menarche at a younger age compared to the girls from rural area. Girls in urban areas were comparatively better cared for during this phase of life, compared to those who were from rural area. This study reveals that during adolescence, the care received by the girls is far from being satisfactory among a large proportion of the adolescent girls while ignorance, many false perceptions, certain unsafe practices regarding menstruation and reluctance of the mother to educate her child are also quite common among them.
**Keywords:** Adolescence, Girls, Biopsychosocial, Rural, Urban

## INTRODUCTION

Adolescence is a period characterized by the physical, psychological, and social changes in the individual. It is that period between childhood and adulthood, which is marked by increased basal metabolic activities plus endogenous processes like hormonal secretions, along with their influence on the various organ systems (WHO 2001). WHO has defined adolescence as the age range of 10 – 19 years. Adolescent girls constitute about one-fifth of the total female population in the world [1]. In India, this group accounts for a little more than one-fifth of the population (21.4%) [1]. Menstruation is an important aspect of the reproductive cycle of females that starts when girls are in this age group. It is a phenomenon that is unique to the females [2]. This is a phenomenon that has an important bearing on the growth and development of the girls, both physically and psychologically [3]. Amongst various studies conducted, many have revealed a huge gap in the knowledge, attitude and practices of the girls, e.g., an inadequate knowledge (40.6%) and practices (12.9%) regarding menstrual hygiene and diet, during this period [1-3]. Also, the attitude of the family members, in many cases, is not found to be supportive towards the young girls [4-6]. All this affects their immediate growth as well as the future development too [5-7]. Anthropometry is one way of making this observation [8, 9].

Adolescent health is an important aspect of healthcare, recognized worldwide [8, 9]. But in India, like many other countries, this is an issue which is insufficiently acknowledged and so far, has not received the adequate attention [10, 11]. Several small scale studies have been undertaken with the objective of determining the prevailing knowledge and experiences about this phase of the life cycle, among adolescent schools girls in rural and urban settings [6, 12]. Similar issues were found in both the rural and urban areas that were selected for our study, when a pilot study was conducted there. It was felt that we could make a difference in the perception and practices of the population in both the areas, with respect to adolescence, by educating them and improving their awareness. Hence, the present study was undertaken to compare the biopsychosocial factors influencing the anthropometric parameters of adolescent girls in a rural and urban area of district Pune in Maharashtra. It was a community-based, descriptive, cross-sectional study conducted among adolescent girls in the age group of

10-19 years, residing in a rural (village) and urban (slum) area of district Pune of Maharashtra.

**Aim & Objective**

The present study was undertaken with the aim to study and compare the biopsychosocial factors influencing the anthropometric parameters of adolescent girls in a rural and urban area of India.

## MATERIAL AND METHODS

**Ethics Statement:**

This study complies with the guidelines of the 1964 Declaration of Helsinki. Informed consent of all the participants was taken and their anonymity was maintained. No photographs of the subjects were taken during the study.

**Participants**

The present study was a community-based, descriptive, cross-sectional study conducted among adolescent girls in the age group of 10-19 years, residing in this rural (village) and urban (slum) areas of Maharashtra, India. All the adolescent girls in the age group of 10-19 years, residing in the rural and urban field practice areas of a medical college during the period of the study were included. Data collected from the study subjects consisted of their personal particulars and anthropometric measurements, after taking informed consent.

**Definition and Details of Measurements of Study Variables**

**Age**

The age was recorded to the nearest completed year (6 months and above being rounded off to the next year and less than six months to the previous year) as per the official records of the school/ birth certificate.

**Educational Status of the Subject**

Record of the educational status of the girl was restricted to the class in which she was studying at the time of data collection or the last class passed (in case of drop-outs).

**Anthropometric Measurements**

The anthropometric measurements that were recorded during the conduct of the study were [5]:

a) Weight
b) Height
c) Body Mass Index (BMI)
d) Waist Circumference (WC)
e) Hip Circumference (HC)
f) Waist – hip ratio (WHR)

**Weight**

Body weight was measured to the nearest half kilogram using a portable weighing machine, which was standardized periodically during the study.

**Height**

Height was recorded with the subject standing against a portable anthropometric rod that was positioned against the wall and was recorded to the nearest 0.1 cm.

**Body Mass Index**

The BMI was calculated as per guidelines given by the WHO as follows:

$$BMI = \text{Weight (in Kgs)} / \text{Height}^2 \text{ (in meters)}$$

Using the above equation, BMI was calculated until the second decimal value [13].

**Waist Circumference (WC)**

WC was recorded by asking the subject to stand comfortably with the weight evenly distributed on both feet and the feet about 25 – 30 cm apart. The measurement was taken midway between the inferior margin of the last rib and the crest of the ilium, in a horizontal plane. The circumference was measured at the end of normal expiration to the nearest 0.1 cm[14].

**Hip Circumference (HC)**

HC was recorded by asking the subject to stand erect with arms at the sides and feet together. With the tape measure around the buttocks in a horizontal plane, the hip circumference was then recorded to the nearest 0.1 cm [14].

**Waist – hip ratio (WHR)**

The WHR is a derived index and was calculated as [14]:

$$\frac{\text{Waist Circumference}}{\text{Hip Circumference}}$$

Using the above equation, WHR was calculated until the second decimal value.

**Questionnaire**

A pre-tested, validated questionnaire was administered by the investigators. Informed consent was taken from the respondents and their parents/ guardians for the study. Anonymity was maintained throughout.

**Data Analysis**

Data was collected, compiled and analysed thereafter, using appropriate statistical software, keeping in view the aims and objectives of the study.

## RESULTS

On completion of the study and analysis of the results, the following observations were made:

The mean age of the total study population was 16.9±1.75 years while the mean anthropometric measurements like, mean height, mean weight, mean WC and mean HC were as shown in table 1.

On studying the distribution of study population by religion, it was observed that a little over two-third (76.66%) of the girls in the urban area came from Hindu families while Muslims constituted a little less than one-third. No family of any other religion was residing in this study population. Results in the rural population were also quite similar as shown in table 2.

Distribution of study population by type of family (table 3) showed a predominance of three generation families in urban area (53.33%), while in the rural area, there were more number of joint families (36.66%).

On studying the distribution of study population by age at attainment of menarche (table 4), it was observed that majority of the girls attained menarche at 12 to 13 years of age – whether they were from rural or urban area. However, more number of girls residing in the urban area attained menarche at a younger age compared to the girls from rural area.

It was interesting to note (table - 5) that almost one third of the urban girls stated that did not enter the kitchen during their periods, while two thirds of the rural girls did. This was because the latter have comparatively less time and resources to indulge in this practice of keeping away from the kitchen chores during menstruation.

A variety of restrictions are imposed on the girls during menstruation. The common ones found in this study were as shown in table 6.

**Table 1: Description of the age profile & anthropometric measurements of the study population**

| Parameter | Mean | SD |
|---|---|---|
| Age | 16.9 | 1.759 |
| Height | 149.3 | 8.154 |
| Weight | 44.8 | 8.086 |
| WC | 31.3 | 2.822 |
| HC | 34.8 | 2.646 |

**Table 2: Distribution of study population by religion**

| Religion | Frequency | | Total (60) |
|---|---|---|---|
| | Urban (30) | Rural (30) | |
| Hindu | 23(76.66) | 22(73.33) | 45 (75.0) |
| Muslim | 7(23.33) | 8(26.66) | 15 (25.0) |
| Total | 30 (100.0) | 30 (100.0) | 60 (100.0) |

Note: Numbers in parenthesis correspond to the respective percentages.

**Table 3: Distribution of study population by type of family**

| Type of Family | Frequency | | Total (N=60) |
|---|---|---|---|
| | Urban (N=30) | Rural (N=30) | |
| Nuclear | 8 (26.66) | 8 (26.66) | 16 (26.66) |
| Joint | 6 (0.20) | 16 (53.33) | 22 (36.66) |
| Three Generation | 16 (53.33) | 6 (0.20) | 22 (36.66) |
| Total | 30 (100.0) | 30 (100.0) | 60 (100.0) |

Note: Numbers in parenthesis correspond to the respective percentages.

**Table 4: Distribution of study population by age at attainment of menarche**

| Age (in Years) | Frequency | | Total (N=60) |
|---|---|---|---|
| | Urban (N=30) | Rural (N=30) | |
| <12 | 6 (20) | 1 (3.33) | 7 (11.66) |
| ≥12 to <14 | 22 (73.33) | 17 (56.66) | 39 (65) |
| ≥14 to <16 | 2 (6.66) | 10 (33.33) | 12 (20) |
| >16 | 0 | 2 (6.66) | 2 (3.33) |
| Total | 30 (100.0) | 30 (100.0) | 60 (100.0) |

Note: Numbers in parenthesis correspond to the respective percentages

**TABLE: 5 Distribution of study population by practise of not-entering the kitchen during menstruation**

| Entering Kitchen & Cooking Food During Periods | Frequency | | Total (N=60) |
|---|---|---|---|
| | Urban (N=30) | Rural (N=30) | |
| No | 11(36.66) | 3(10.0) | 14(23.3) |
| Yes | 19(63.33) | 27(90.0) | 46(76.7) |
| Total | 30 (100.0) | 30 (100.0) | 60 (100.0) |

Note: Numbers in parenthesis correspond to the respective percentages.

**Table 6: Distribution of study population by restrictions during menstruation**

| Restrictions During Menstruation | Frequency | | |
|---|---|---|---|
| | Urban (N=30) | Rural (N=30) | Total (N=60) |
| Sour Food | 11(36.66) | 7(23.33) | 18(30.0) |
| Rice, Curd, Cucumber | 16(53.33) | 21(70.0) | 37(61.7) |
| Visiting Temples | 3(10.0) | 2(6.66) | 5(8.3) |
| Total | 30 (100.0) | 30 (100.0) | 60 (100.0) |

Note: Numbers in parenthesis correspond to the respective percentages.

## DISCUSSION

In our study, on studying the distribution of study population by religion, it was observed that a little over two-third (76.66%) of the girls in the urban area came from Hindu families while Muslims constituted a little less than one-third. On studying the distribution of study population by age at attainment of menarche it was observed that majority of the girls attained menarche at 12 to 13 years of age – whether they were from rural or urban area. However, more number of girls residing in the urban area attained menarche at a younger age compared to the girls from rural area. In another study, the age of menarche of girls ranged from 11 to 15 years and maximum numbers of girls were between 13 and 14 years of age [15]. In another study, the maximum number of girls (72.77%) has attained menarche in the age ranged between 12-14 years [16, 17]. Therefore, we see that the results of our study are comparable to that of the others.

Distribution of study population by type of family in our study (table 3), showed a predominance of three generation families in urban area (53.33%), while in the rural area, there were more number of joint families (36.66%). In a similar study, the family structure showed 72.2 per cent (n=195) in the urban and 73.6 per cent (n= 206) from rural areas lived in nuclear family [18]. This is important in most Indian families, since we know that the young girls seek advice at home from the elder ladies in the household. Hence, the presence as well the awareness of the elder ladies is an important influencing factor. A variety of restrictions are imposed on the girls during menstruation. The common ones found in this study were – not being allowed to go to a place of worship, not allowed to cook or serve food, not allowed to eat and sleep with the rest of the family. This affects the nutritional status, general health, growth and development of the girls. In a similar study, 78.99 per cent girls were not allowed to attend religious occasions; 22.97 per cent and 20.63 per cent girls respectively were restricted from doing routine household work and playing [16].

## CONCLUSION

The present study was a cross-sectional descriptive study aimed at comparing the biopsychosocial factors influencing the anthropometric parameters of adolescent girls in a rural and urban area of India. Although, the sample size limits the strength of the study, yet some important conclusions can, nevertheless, be drawn form it. On the whole, the girls coming from urban areas have better parameters compared to the rural girls, there are lot of misconceptions and superstitions associated with this age as well as the physiological process of menstruation in both the communities. The educational and the economic status of the family has an important role to play in this matter. This study reveals that during adolescence, the care received by the girls is far from being satisfactory among a large proportion of adolescent girls while ignorance, many false perceptions, certain unsafe practices regarding menstruation and the reluctance of the mothers to educate their daughters are also very common among them. Thus, the above findings reinforce the need to offer better diet, encourage safe as well as hygienic practices among girls and bring them out of the traditional beliefs, misconceptions and the restrictions that are imposed on them. Creating awareness amongst the girls and their family members, especially the elder ladies in the household, is indicated for better growth and development of these young girls, in this formative phase of their lives.

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