



**International Journal of Biology, Pharmacy
and Allied Sciences (IJBPAS)**
'A Bridge Between Laboratory and Reader'

www.ijbpas.com

**COMPARISON OF SOCIO-ECONOMIC FACTORS, EDUCATION AND
PUBERTY HEALTH AMONG DIFFERENT GROUPS OF ADOLESCENT
GIRLS IN MANDYA DISTRICT, INDIA: A DESCRIPTIVE, CROSS-
SECTIONAL COMMUNITY-BASED STUDY**

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Received 19th Jan. 2023; Revised 20th Feb. 2023; Accepted 23rd March 2023; Available online 15th June 2023

<https://doi.org/10.31032/IJBPAS/2023/12.6.1016>

ABSTRACT

Background: Face-to-face interviews were done between June 2022 and October 2022, with girls to administer a survey about physical and mental health, disabilities, nutrition, sexual and reproductive health, gender norms, decision-making, education, and violence.

Objective: To assess the socio economic factors, education and puberty health among different groups of adolescent girls in Mandya District.

Methods: Interviewers visited every home in the several panchayaths in the Mandya District between June 2022 and October 2022. They sought out all girls between the ages of 9 and 19 years. A descriptive analysis was performed along chi-square test to find the association between age of puberty, type of school, frequency of food consumption, physical problems during menstruation and so on.

Results: 1000 females who lived in the research region were interviewed for data. Girls aged 11 to 13 make up 51.30% of the teenage population in the research area. 38.8% of teenage girls had completed their secondary school. 99.2% of the research's adolescent girls are not married.

The majority of girls have trouble getting to school because there aren't enough transit facilities. When compared to being hygienic, girls keep themselves that way by taking regular baths and learning about cleanliness from their mothers.

Conclusions: Our study highlighted a number of goals for improving the health, nutrition, and wellbeing of teenage girls in the Mandya District, which is largely rural, including reducing violence, early marriage, and under nutrition as well as improving mental health and understanding puberty.

Keywords: Adolescent health, mental health, Nutrition, Education, Menstrual hygiene, India

INTRODUCTION

Adolescence is a critical period in human development when a lot of adult patterns are established and significant changes occur. According to the World Health Organization (WHO), adolescence occurs between the ages of 10 and nineteen [1]. In India, there are 253 million adolescents. They make up 21% of the Indian population and more than 1.2 billion people worldwide [4]. Despite tremendous advancements in the field of health, considerable percentages of young people in underdeveloped nations are undernourished. Mortality and morbidity that affect adolescents are primarily caused by preventable cases. Injuries from early in life still have an impact on adolescents, especially girls [3]. An Adolescent girl's health state frequently reflects the combined effects of physical development, the onset of menarche, and a rise in fat and muscle mass, all of which raise their nutritional needs. Adolescent health programmes are already in place, with a particular emphasis on sexual and reproductive health, immunisation, supplements, anaemia

management programmes, and counselling [2]. Adolescence is a period of increased stature growth, following which one reaches their final height. Adolescent females therefore require special attention due to their impact on the present and future generations' health and wellbeing. Adolescent girls make up one tenth of the population of a country, and their status and development have a significant impact on the rest of the population as well as the nation's overall growth and prosperity [6]. 68.3% of Karnataka's population is 18 years of age or older, placing it third among the main states. The Mandya district served as the site of this investigation [10].

Demography of Mandya

A district of Karnataka in India, Mandya had 1,943,187 residents in 2022. (Estimates as per aadhar uidai.gov.in Dec 2020 data). Mandya District had 1,805,769 residents in 2011 according to the Indian census, of which 905,085 were men and 900,684 were women. There are 1,149,649 persons who can read and write, including 638,668 men

and 510,981 women. A total of 871,408 people come from Mandya District; of these, 575,203 men and 296,205 women are employed [10]. A total of 350,990 people depend on agriculture cultivation, of whom 273,975 are male cultivators and 77,015 are female. Men make up 78,180 of the 147,093 persons who work as farm labourers, while women make up 68,913. It is 995:1 in Mandya District. (<https://www.census2011.co.in>)

METHODS

Adolescent females from seven panchayaths in Mandya were the subjects of a cross-sectional analytical study. A sample of 1000 teenage girls in the study population were considered [7]. The sample for the study was easily chosen and included based on how well the inclusion criteria were met. Using a self-developed interview schedule data was gathered. The proper statistical technique used to assess the data that had been collected. At a p-value of 5%, statistical analyses were deemed significant (0.05) [9]. We have considered different age group from 9 to 19 years which is again sub-divided into (9-11), (11-13), (13-15) and above 15 years. Collected data were analysed using proper statistical techniques [5]. For the descriptive analysis, frequencies were calculated. All statistical evaluations were performed in IBM SPSS 22.0 for windows.

Consent

The local village governing structures gave their consent for each community to participate after we explained the study's objectives and methodology (Panchayath and headmen). The interviewers notified all teenagers and any parents or husbands that the study will ask questions about health, nutrition, as well as potentially more delicate themes like alcohol and cigarettes, sentiments and fears about growing up, about safety, or about experiences at school and at home.

Confidentiality

Data collectors required to be bilingual in Kannada and English in order to protect the privacy of interview subjects. They were not, however, allowed to come from the areas where the interviews were being conducted. In accordance with WHO ethical and safety standards for research on domestic violence against women, we always asked questions about violence in a private setting without any observers and within the confines of a larger survey [9].

RESULT

Comparison of socio economic characteristics of the adolescent girls

In the study area 413 (41.30%) of adolescent girls belong to 9-11 years and most of them belong to K R Pet panchayath. 513 (51.3%) of adolescent girls belong to 11-13 years the overall. and around 388 According to the castes, OBC Uppara caste had the most number of adolescent girls (38.8%) of

adolescent girls had finished their secondary education.

In **Figure 1**, Age 9-11 is represented as 1, age 11-13 is represented as 2, 3 denotes 13-15, 4 represents above 15 years.

In **Figure 2**, illiterate is represented as 1, primary education (0-7) is represented as 2, 3 denotes secondary education (8-10), 4 represents PU education, 5 represents degree.

In **Figure 3**, Married is represented as 1, unmarried is represented as 2, in the study area 992 of adolescent girls are unmarried and only 8 of them are married.

In **Figure 4** Age 9-11 is represented as 1, age 11-13 is represented as 2, 3 denotes 13-15, 4 represents above 15 years in the checkbox, 1,2,3,4 in X axis represents

stomach ache, heavy flow, tiredness and dizziness respectively.

According to the above **Table 2** Pearson Chi-square statistic, ($\chi^2=97.90, 13.87, 76.44, 125.67$) and $p<0.001$ which indicates that there is very high chance that the observed data would be consistent with the null hypothesis that relationship exists, there is a strong connection between the age at which adolescent girls reach puberty and their physical problems during their menstrual periods, hospital visits, feelings of insecurity around boys, and how often they eat. The sanitary napkin provided by the school is negatively associated with the type of schools, the girls attended. ($\chi^2=3.97, p=0.46$).

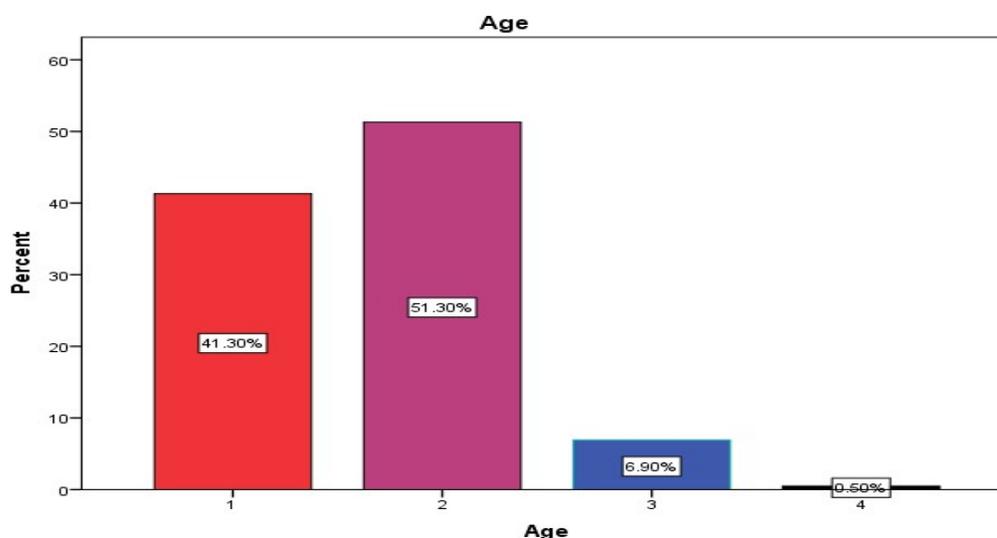


Figure 1: Bar Chart showing the adolescent girls age distribution in the study Area

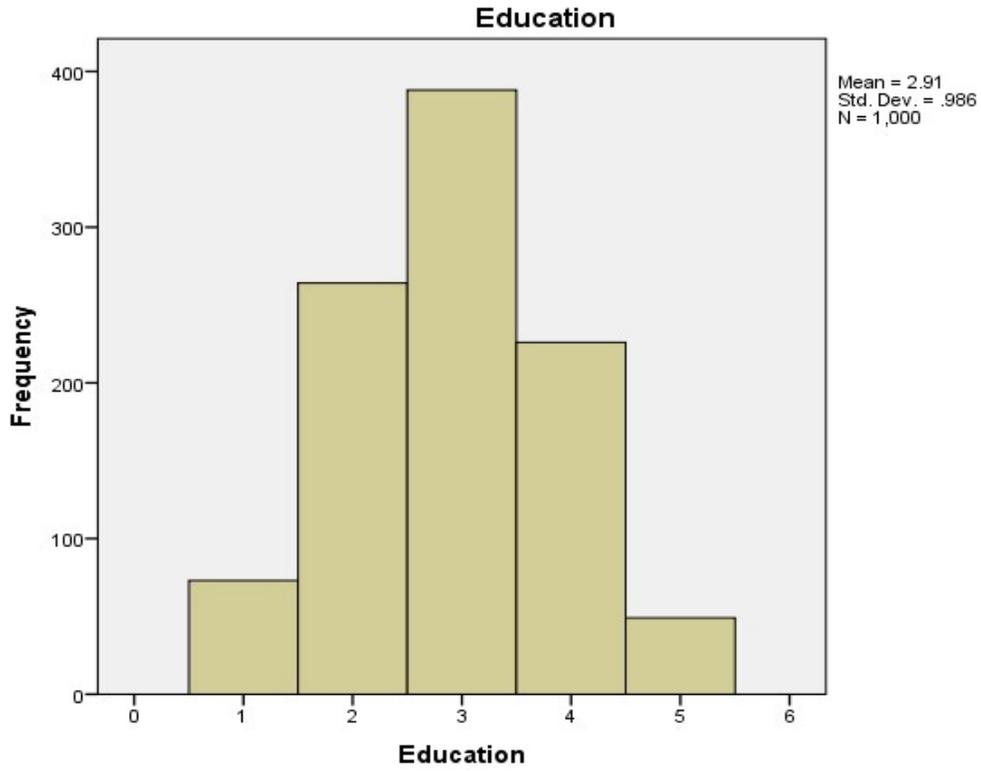


Figure 2: Histogram showing the adolescent girl's parent's education in the study Area

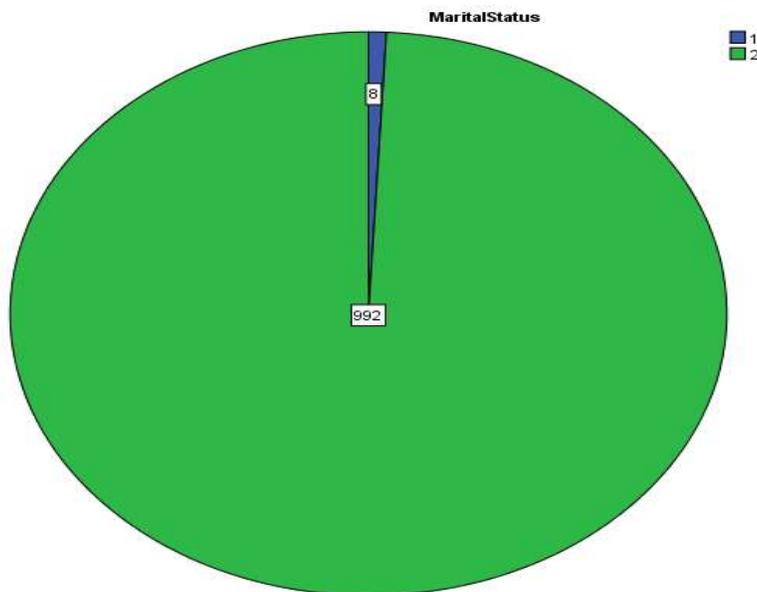


Figure 3: Pie chart showing the adolescent girl's marital status in the study Area

| Table 1: Socio-Demographic Profile Of Adolescents Girls In The Study Area | | |
|---|--------|-------------|
| Background characteristics | Sample | Percentages |
| EDUCATION | | |
| Illiterate | 73 | 7.3 |
| Primary | 264 | 26.4 |
| Secondary | 388 | 38.8 |
| Pu | 226 | 22.6 |
| Degree | 49 | 4.9 |
| TYPE OF HOUSE | | |
| Hut | 42 | 4.2 |
| Asbestos Sheeted | 325 | 32.5 |
| Rcc | 55 | 5.5 |
| Tiled | 578 | 57.8 |
| ACRES OF LAND | | |
| below 1-1 | 565 | 56.5 |
| 01-02 | 278 | 27.8 |
| 02-03 | 94 | 9.4 |
| 03-04 | 41 | 4.1 |
| 04-05 | 22 | 2.2 |
| CASTE | | |
| SC | 245 | 24.5 |
| Ediga | 20 | 2 |
| Ganiga | 6 | 0.6 |
| Acharaya | 16 | 1.6 |
| Kshaowrika | 2 | 0.2 |
| Nayanaja Kshthriya | 1 | 0.1 |
| ST | 62 | 6.2 |
| Obc-Uppara | 556 | 55.6 |
| 111a-Kuruba | 45 | 4.5 |
| 111b-Lingayath | 39 | 3.9 |
| Kumbara | 2 | 0.2 |
| Madivala Shetty | 6 | 0.6 |

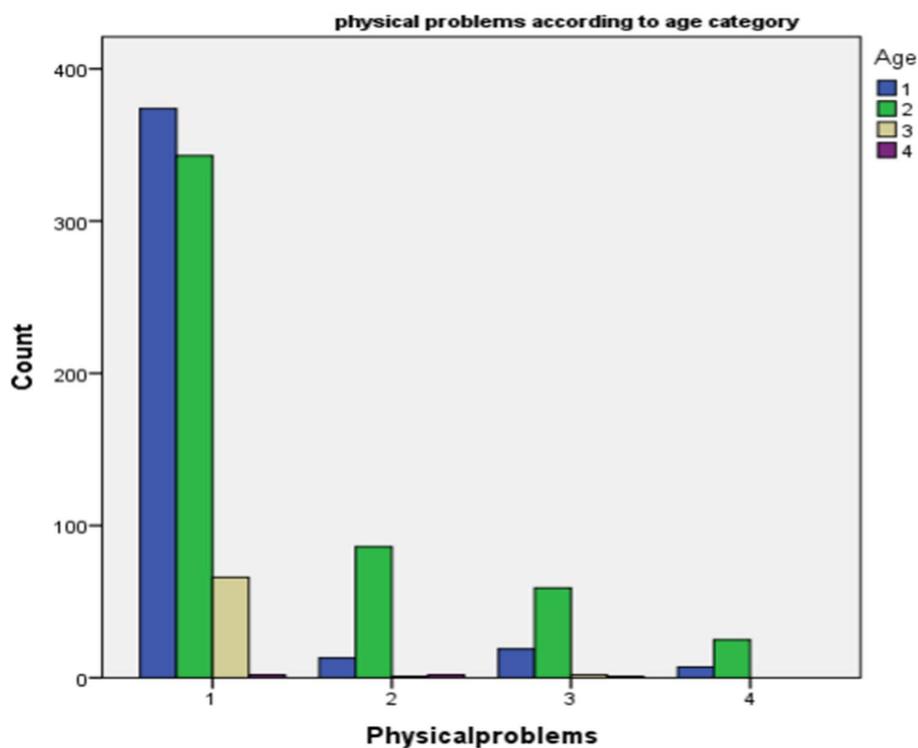


Figure 4: Multiple bar chart indicating adolescent girl’s age and physical problems

Table 2: Association Between Two Variables Using Chi Square Statistics (Cross Tabulation)

| | Pearson Chi-Square value | Asymp. Sig. (2-sided) |
|---|--------------------------|-----------------------|
| Type of school * Napkins provided by school | 3.97 | 0.460 |
| Age of puberty *physical problems during menstruation | 97.900 ^a | 0.000 |
| Age of puberty * Visit to hospital | 13.874 ^a | 0.003 |
| Age of puberty * insecurity | 76.447 ^a | 0.000 |
| Frequency of consumption * Physical problems | 125.677 ^a | 0.000 |

Table 3: Ordinal Logistic Regression Estimates On Educational Background Of Adolescent Girls In The Study Area

| Parameter | B | Std. Error | Exp(B) | 95% Wald Confidence Interval for Exp(B) | |
|-------------------------------|--------|------------|--------|---|-------|
| | | | | Lower | Upper |
| Physical problems | .326 | .1547 | 1.385 | 1.023 | 1.876 |
| Distance to school | -.549 | .1313 | .578 | .447 | .747 |
| Understand ability of subject | -1.431 | .6630 | .239 | .065 | .877 |
| Hurdles to school | 1.405 | .2099 | 4.077 | 2.702 | 6.153 |
| Insecurity | -.052 | .3631 | .950 | .466 | 1.935 |
| Embarrassment | -.119 | .4209 | .887 | .389 | 2.025 |

When the dependent variable's values are represented by ordered categories, we can use ordinal logistic regression. When a variable is treated as ordered categorical, the underlying assumption is that response categories simply reflect a relative ordering (in terms of or >) on that variable and that differences in adjacent ranks do not convey equivalence in terms of the amount of a characteristic as would be the case had the variable been measured with greater precision (i.e., taking on a metric quality). Ordinal logistic regression models come in a variety of forms (Brkner & Vuorre, 2019).

The Proportional Odds (PO) model, also known as the cumulative logit model, is the most widely used type of model.

The classic parameterization of the PO

$$\ln\left(\frac{\Pr(y \leq j)}{\Pr(y > j)}\right) = \ln(odds(y \leq j)) = \theta_j + \beta_1 X_1 + \dots + \beta_k X_k,$$

where θ refers to a threshold/cut-point on the latent continuous variable y^* and β_k refers to regression coefficient for predictor k . As with binary logistic regression, PO logistic regression does not model probabilities directly as a function of the predictors but rather models probabilities indirectly through a transformation of probabilities

into logits (or rather cumulative logits). The natural log of the cumulative odds of a case falling at or below category j [i.e., $\ln(\text{odds}(y \leq j))$] is referred to as the cumulative logit [i.e. logit ($y \leq j$)].

The categorical or continuous nature of the predictor affects how the odds ratio should be interpreted. If the odds ratio is greater than 1, it means that as the predictor gets stronger, the event is more likely to happen. If the odds ratio is less than 1, it means that as the predictor gets stronger, the likelihood of the event happening decreases.

Interpretation of odds ratios:

The odds ratio (OR=1.38, OR=4.07) for physical difficulties and barriers to education is displayed in column exp (B): The multiplicative change in odds of falling into a higher category (i.e., more confidence) for the dropout rates is how the odds ratio is typically understood. In light of this, we can conclude that the chances were altered by a factor of 1.38 for school distance. The fact that this figure is more than 1 shows that the dropout rates are favourably impacted by the distance to school.

(OR=.578, .239, .950, and .887): According to the odds ratio, understanding the subject, insecurity, and public embarrassment are less likely to be the causes of dropouts.

DISCUSSION

Our study is the most recent, comprehensive investigation of adolescent health among

Indian rural communities in the Mandya district of Karnataka, India. Our research fills a significant vacuum in the research literature, especially for girls between the ages of 9 and 19, by presenting data for both younger and older females.

In the study area (41.30%) of adolescent girls belong to 11-13 years and most of them belong to K R Pet panchayath i.e. 508 (26.99%) of the overall. According to the caste OBC caste had the most number of adolescent girls i.e. 556(55.6%) and around 388 i.e. (38.8%) of adolescent girls had finished their secondary education. 992(99.20%) of the adolescent girls in the research are single. There is also a positive association between the frequency of food intake and Physical problem during menstruation.

In terms of Socio-economic, education and health factors, older girls' health profiles differed significantly from younger girls', pointing to the need for more sophisticated intervention strategies. Although most girls attend school, we noticed that many are dropped out due to death of the parents and poverty. Both younger and older girls experienced violence, including emotional and physical abuse at the hands of parents and other relatives.

In the population of the study, 855 (85.50%) adolescent girls use sanitary napkins, and 100(10%) use cloth during their menstrual cycle. These circumstances call for social

work involvement through raising knowledge of sex education and menstrual hygiene.

CONCLUSION

The study finds that there are significant areas for adolescent girls' health, nutrition, and wellbeing that need to be improved. The majority of the participants are from rural areas. The adolescent girls in this instance are between the ages of 11 and 13, and they have learned about the menstrual cycle from their mother. Parents that believe that girls should study urge their children to get an education. Teenage ladies are having trouble travelling since there aren't enough bus facilities, as we have noticed from our study. Even while national government programmes to improve adolescent health often cover the main health issues in this population, local assessments of priorities and modifications to programme content are necessary to ensure that programmes are applicable and effective.

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