

Socio-Demographic Determinants and their Influence on Menstruation-Related Knowledge and Attitude Among Adolescent School Girls in Tirupati District, Andhra Pradesh, India

C. Vani ^{a*}, Dr.R. Mahendranath Chowdary ^b

^{a*} Professor, Sri Padmavathi Mahila Viswavidyalam, Tirupati, Andhra Pradesh, India.

E-mail: vanispmvv@gmail.com, Orcid: <https://orcid.org/0009-0003-6546-149X>

^b Assistant Professor, The Apollo University, Chittoor, Andhra Pradesh, India.

E-mail: mahendranathmsw@gmail.com, Orcid: <https://orcid.org/0000-0002-2273-5214>

Abstract

Menstrual health is still a significant health issue amongst adolescent girls due to many problems which are caused by lack of awareness, cultural beliefs and lack of good hygiene practices. The current research examines the effect of socio-demographic determinants on knowledge, attitude, and hygiene behavior related to menstruation amongst adolescent girls attending government high schools in the Tirupati District of Andhra Pradesh, India. The quantitative cross-sectional study design was employed with an initial enrollment of 435 adolescent girls, yielding a final analyzed sample size of 400 between 12 to 17 years old from six government high schools. The data collection instrument used was a structured and pre-tested questionnaire addressing socio-demographic variables, menstrual knowledge, attitudes and hygiene behaviors. Results showed that education levels had a significant effect on menstrual health with class levels strongly associated with menstrual status ($\chi^2 = 97.768$, $p < 0.001$), physiology knowledge ($\chi^2 = 33.721$, $p < 0.001$), practices on pain management ($\chi^2 = 30.763$, $p < 0.001$) and number of times pads were changed ($\chi^2 = 25.842$, $p < 0.002$). Though there was a high level of awareness with regard to menstruation since 94.3% of the respondents demonstrated correct knowledge about puberty and 79.3% knew about the physical changes that occur in adolescence, yet a large gap between knowledge and practice was seen as 44.3% felt that pads do not need to be changed during menstruation. Awareness alone was not sufficient to ensure good hygiene practices and thus the need for intervention programmes in schools targeting menstrual health of the adolescent girls is highlighted through the study results.

Keywords: Menstrual Health, Hygiene, Adolescent Girls, Socio-demographic Factors, Knowledge, Attitude, Public Health Intervention.

Introduction

Menstruation is a physiological phenomenon which plays a crucial role in the development of reproductive processes in young women. Nonetheless, even though it is an integral part of female biological processes, menstrual health is still a highly neglected public health issue, especially in developing nations where cultural stigma, lack of awareness, inadequate menstrual hygiene products, and poor hygiene facilities continue to impact the health of young women. The poor management of menstrual health issues may have adverse effects on physical well-being, self-confidence, educational engagement, and the overall quality of life. It is important to understand the determinants of menstrual knowledge, attitudes, and hygiene among young women.

Adolescence is a very important period in which women develop awareness about menstrual health and its practices. Most girls undergo menarche without proper preparation, which leads to anxiety, fears, and resorting to information from other sources that can perpetuate myths and misconceptions. Several studies have found out that parent education, socio-economic status, school settings, and cultural beliefs have an impact on menstrual knowledge and hygiene practices. Despite the efforts of educational campaigns and government policies, knowledge and proper hygiene practices have had a disparity between them. The knowledge-practice gap indicates the importance of exploring socio-demographic characteristics that affect the attitudes and practices towards menstrual health.

In India, problems related to menstrual health are specifically pertinent to teenage girls enrolled in government schools due to economic differences and cultural constraints that might impact access to information and hygienic facilities (Chowdhury & Chowdhury, 2023; Ahmed et al., 2025; Baral & Bista, 2025). Previous studies have largely concentrated on either menstrual knowledge or hygienic practices separately and there is very little research done on the effect of socio-demographic factors along with knowledge and attitude towards behavior in terms of menstrual health (Hasan et al., 2025). Moreover, there is not much literature available about adolescent girls living in semi-urban/rural areas of Andhra Pradesh.

In order to fill the gaps in knowledge and practice, the current study undertakes a cross-sectional study on the effect of sociodemographic profile, menstruation knowledge, attitudes, and practices among school girls in Tirupati District of Andhra Pradesh. The study uses a structured questionnaire, adapted to the cultural setting, on students from six government schools and assesses the effect of demographics on menstrual health outcomes.

1. The study assesses the impact of age, educational grade, parental education, and occupation on menstruation knowledge, attitudes, and hygiene practices of adolescent girls.
2. The study assesses the interplay of menstruation knowledge, attitudes, and hygiene practices while assessing the prevailing knowledge-practice gap.
3. The study presents region-specific findings from school girls of government schools in Tirupati district.
4. The findings could be used to design culturally-sensitive school-based menstrual health programme.

The paper is organized into six sections. Section I presents the introduction, research gap, and objectives. Section II discusses the related literature on menstrual knowledge, attitudes, and hygiene practices. Section III explains the methodology, including study design, sampling, data collection, and analysis. Section IV presents the results and statistical findings. Section V discusses the findings, practical implications, and recommendations. Section VI concludes the study with key findings and future research directions.

Literature Review

Health issues related to menstruation and menstrual hygiene management among young adolescent girls have become more important due to their association with public health issues in developing nations owing to factors such as social taboo, unawareness and lack of menstrual materials that affect health behaviors of girls. Early researches have also suggested that menstrual issues have been associated with various myths and cultural barriers, along with poor preparation of girls before menarche. Damhare et al., (2012) assessed age at menarche and menstrual patterns of adolescent girls in central India and stated the significance of early menstrual education to prepare girls well and overcome anxiety related to menstruation. Similarly, Jarrah & Kamel, (2012) found that negative attitudes of school-going girls towards menstruation were significantly related to their lack of knowledge and culture-based perception.

Various researches have been done regarding the relation between menstrual knowledge, attitude, and hygiene practices among adolescent girls. Patle & Kubde, (2014) did a comparative study on rural and urban adolescents and

discovered a lot of difference in menstrual hygiene practices owing to differences in knowledge, availability, and social surroundings. Shoor, (2017) found that educational experience had a major effect on menstrual knowledge and hygienic practices among school girls. This shows that health education can help promote menstrual attitude positively. Rajavardhana et al., (2021) proved that knowledge deficiencies and cultural beliefs still play a role in menstrual hygiene practices among adolescent girls.

Factors like socio-demographics have been found out to be important determinants of the outcomes of menstrual health. Malhotra et al., (2016) studied adolescent girls from Uttar Pradesh and found out that the level of education of their parents, their domestic environment, and availability of sanitation facilities had an effect on their knowledge and practices regarding menstrual hygiene. Likewise, Mansoor et al., (2021) found out that age, education, and socio-economic background of women were important predictors of their knowledge about menstruation. Nimbhorkar et al., (2023) conducted a comparative study between urban and rural adolescent girls from Central India and found out that the variations in awareness, perceptions, and practices about menstrual health were dependent upon socio-economic and geographic differences.

It is not only India where challenges regarding menstrual health exist, but such problems are also common in other countries around the globe especially those which belong to low- and middle-income groups. According to Sommer et al., (2015), a comparison between menstruation and schooling experiences of girls in Tanzania, Ghana, Cambodia, and Ethiopia showed that the absence of adequate facilities for menstruation adversely impacts attendance and psychological state. In an attempt to determine the association between knowledge about menstruation and attitude towards it in reproductive-aged females in Bangladesh, Siddique et al., (2023) found that greater knowledge was associated with better hygienic practices. Similarly, Fernando & Jayawardana, (2022) have found that menstruation hygiene practice of adolescent girls in Sri Lanka was significantly affected by education at schools and socio-cultural factors.

The recent literature has extended the scope of research regarding menstrual literacy through studies related to behavioural determinants and prediction strategies. Yasmin et al., (2026) assessed the level of knowledge, attitude, and practices regarding menstruation in Bangladeshi women and adolescent females and found persistent deficits in menstrual literacy despite an improvement in the availability of information. Dutta & Mishra, (2025) noted that knowledge, attitude, and practice all together contribute towards menstrual health literacy for rural populations. Babbar & Garikipati, (2023) have studied the effect of socio-demographic characteristics on disposable and sustainable menstrual products usage in India and stated the importance of education, economy, and awareness in menstrual product selection.

Various advanced analytical methods have recently been used to study menstrual literacy and hygiene practices. According to (Hassan et al., 2025), tree-based machine learning methods were used to predict the menstrual literacy of female university students in Bangladesh, thereby indicating the effectiveness of predictive models in identifying predictors of menstrual literacy. Kasali et al., (2026) explored the determinants of menstrual hygiene knowledge among adolescent girls in Nigeria, and pointed out the significance of educating adolescent girls about menstrual hygiene practices through various interventions. Research works conducted on some specific vulnerable groups have also become available; for instance, Maky et al., (2025) studied the menstrual health knowledge of deaf and mute adolescent girls, stressing the need for a menstrual education strategy for such groups.

Latest qualitative studies have helped gain more understanding about the personal experience and social influences on menstrual well-being. Casola et al., (2024) studied menstrual well-being experiences in Philadelphia and uncovered some themes such as stigma, access and the significance of the surrounding environment. Ahmad et al., (2021) evaluated knowledge and practice of menstrual hygiene among college-going females in North India and found that while the level of knowledge was increasing, there was still inconsistency in practice of hygiene practices.

Inference from Literature

Most research conducted over the past years indicates that the menstrual knowledge, attitudes, and practices among adolescent girls depend upon socio-demographic determinants (age, grade, educational level, occupation of parents), cultural beliefs, availability of menstrual products, and health literacy. Greater knowledge leads to better attitudes and practices towards menstruation. However, there is considerable gap between knowledge and practice as a result of several sociological determinants, myths, and resource constraints. The majority of studies that have been previously conducted have been focused on one factor at a time (knowledge or practice), and very few of them have investigated the impact of socio-demographic determinants, knowledge, attitudes, and practice together. There is also an absence of literature regarding the investigation of socio-demographic determinants, knowledge, attitudes, and practices

related to menstruation among school going adolescent girls in semi-urban/rural India. This study will fill this research gap.

Research Methodology and Study Design

The design of the research conducted in this case is that of a quantitative descriptive cross-sectional study design that helped to find out the socio-demographic factors of knowledge and attitude on the subject of menstruation amongst school girls of the Tirupati District of Andhra Pradesh, India. The cross-sectional design helped to understand the knowledge, attitude and other social demographic factors in one go.

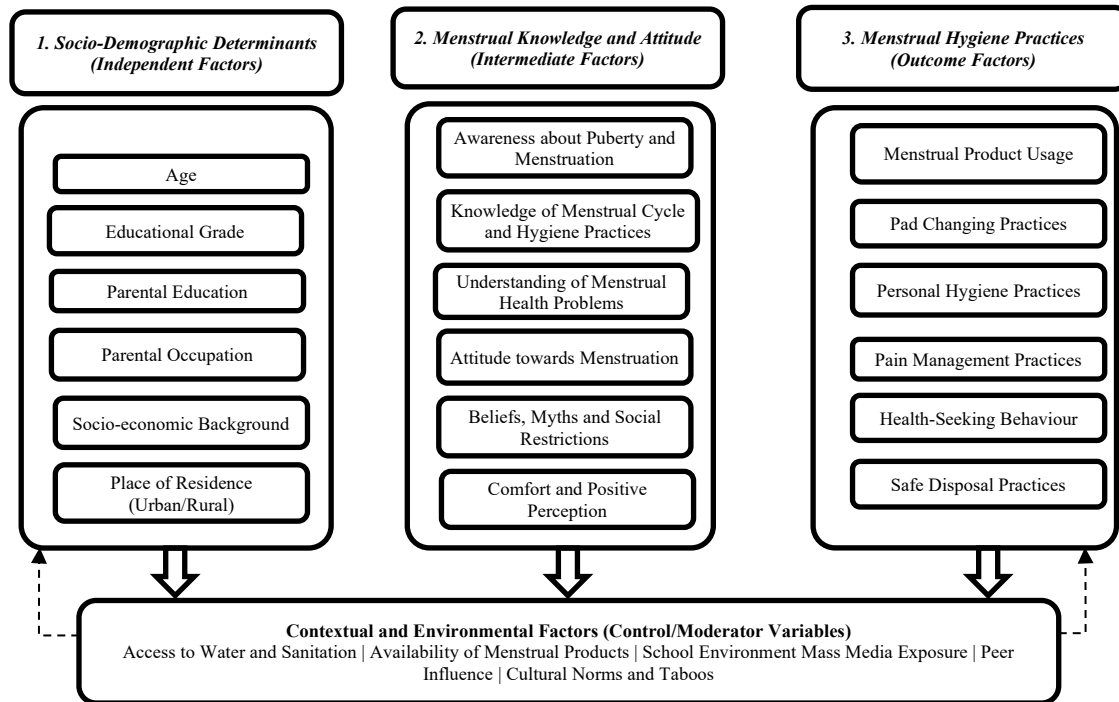


Fig. 1: Conceptual Framework of Socio-Demographic Determinants Influencing Menstrual Knowledge, Attitude, and Hygiene Practices

The schematic diagram in fig. 1 shows the proposed causal link between the socio-demographic variables, menstrual awareness and attitudes and hygiene practices in young women. It demonstrates that how different variables like age, educational level, education level of parents and occupation have an impact on menstrual awareness and attitudes, and how this impacts menstrual hygiene practices, such as use of menstrual products, change in pads, pain management and seeking healthcare services.

Study Setting

The experiment was conducted at six high schools in the Tirupati District, which included both rural as well as semi-urban areas, thus depicting socio-economic and cultural heterogeneity in southern Andhra Pradesh (Table 1). The schools were chosen such that they would reflect the diversity in terms of geography by covering schools from locations like Chandragiri, Mangalam, Karakambaddi, Srikalahasti, Yerpedu and Vadamalapeta.

Table 1: Distribution of Participants by School Location and Class Representing the Initial Screening Pool (N = 435)

Location	6 th class	7 th class	8 th class	9 th class	Total
Yerpedu	20	10	21	33	84
Srikalahasti	0	36	25	37	98
Chandragiri	28	48	9	1	86
Karakambaddi	9	11	18	14	52
Vadamalapeta	0	2	0	48	50
Mangalam	0	15	19	32	66
Total	57	102	93	165	435

Population

The initial pool of students consisting of 435 females was recruited for this study (see table 1 below). The population for this study included female students ranging in ages between 12-17 years and attained menarche, who were enrolled in classes 6 to 9 in the selected schools. The multi-stage cluster sampling procedure was utilized considering stratification as a means of representation in terms of age, class, and schools. The sample size was calculated based on the sample size formula used in cross-sectional survey research, assuming prevalence of 50 (maximum sample size), confidence interval of 95%, and margin of error of 5%.

After excluding participants for absence, incompleteness of the questionnaire, and failure to satisfy the inclusion criteria ($n=35$), the final sample of valid analyzed participants was $N=400$ (as seen from tables 2, 3, and 4). From the initial 435 girls, 35 had to be excluded owing to their being absent, completion of the questionnaire incorrectly, or failure to satisfy the inclusion criteria. The analyzed sample size of 400 is larger than the minimum required to have a power of 80% and confidence level of 95% for detection of the medium effect size despite accounting for 10% non-responders.

Sampling Method

Six high schools were randomly selected from the list of such high schools provided by the government. The participants were divided into grades at each school. Simple random sampling or systematic sampling was done in each of these grades, considering the presence of the class list. Examples of some of the exclusion criteria were participants who had difficulty in completing the survey due to any cognitive or linguistic limitation; participants who were absent on the day of data collection; and those who would not provide informed consent.

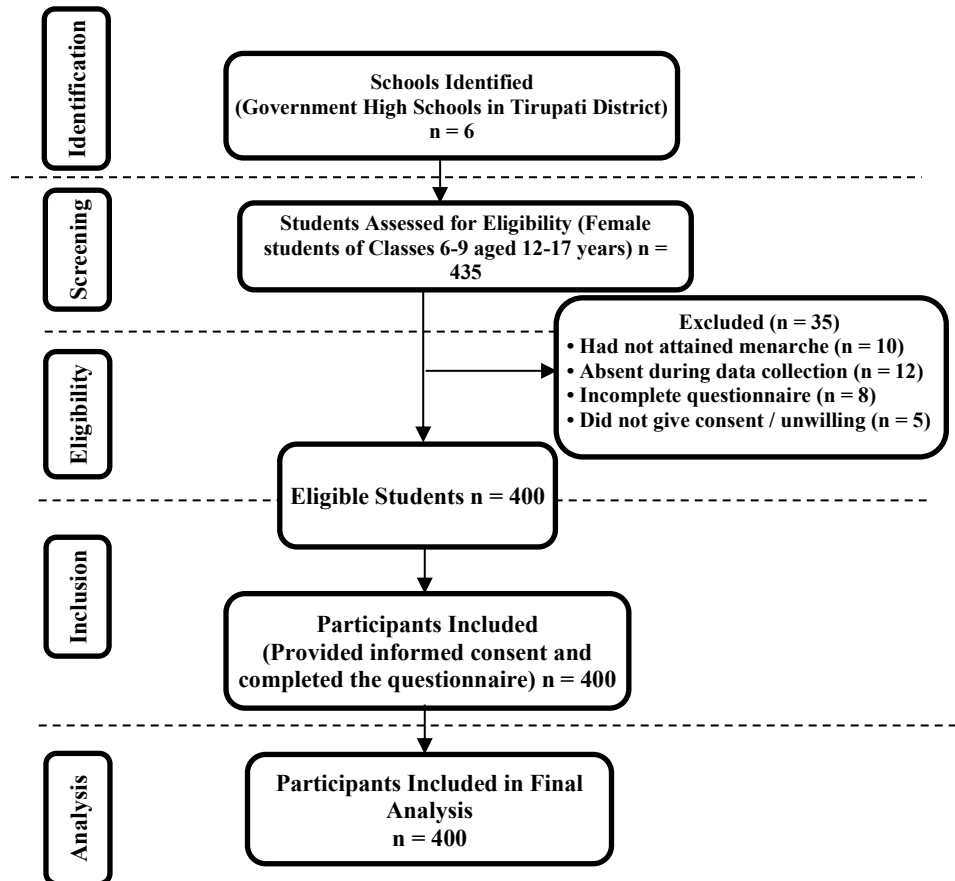


Fig. 2: STROBE Flow Diagram of Participant Recruitment and Selection Process

Fig. 2 shows the systematic recruitment and selection of study participants according to STROBE. This figure shows how six government schools were chosen, how 435 adolescents girls were screened, whether they met the selection criteria or not, how 35 participants were excluded, and how 400 participants were included in the statistical analysis of the study.

Inclusion Criteria

Participants who were selected were those females between the ages of 12 and 17 years, studying in classes 6 to 9 in the chosen government schools, and having achieved menarche. It was important to select individuals within this age group since adolescence is a very important stage for the development of awareness regarding menstruation, attitudes towards menstruation, and hygienic practices during the same.

Exclusion Criteria

Those participants who had not reached menarche age were excluded from the study because they would not be able to answer the question about their menstrual experience. Those participants who were absent on the day of conducting the survey were excluded from the study in order to make sure that all surveys were administered in a uniform manner. Those participants who had problems with language or cognition, which prevented them from comprehending the survey questions, were excluded.

Instrumentation and Validation

The structured pretested questionnaire was used to collect the data, which was well-developed based on existing validated measures (WHO Adolescent Health questionnaires and menstrual knowledge survey forms). The questionnaire was subdivided into four sections, which were socio-demographic data, menstruation-related knowledge, attitudes toward menstruation, and hygiene practices. Internal reliability of the questionnaire was measured using Cronbach's alpha, which showed acceptable values of 0.82 and 0.79 for knowledge and attitude scales respectively.

Data Collection Procedures

Data collection took place from the date range 25.10.2024 – 05.11.2025. Face to face administration of questionnaires was carried out by experienced female researchers in a private classroom setting to make the administration as straightforward and comfortable as possible. They were reassured of confidentiality and their right to freely enter into the study and leave at any moment without facing any form of repercussions. The process lasted around 30 minutes on average. All the questions were made clear where necessary without leading the subject. Objective data such as school attendance and academic performance were also obtained.

Data Quality Control

A control measure for the data was set up in order to detect and correct any inconsistencies. In order to achieve data integrity and prevent errors in entering or transcribing the data, SPSS version 26.0 included logic and range check routines.

Variables

Independent variables are: age, grade, parent education level, occupation. The variables that will affect the dependent variable: Score in menstruation-related knowledge (composite variable constructed from answers about puberty, menstrual cycle and hygienic practices). Attitude towards menstruation (scale-based questions measuring the levels of comfort and positive attitude). WASH facilities access, absorbent used and main information sources are covariates.

Statistical Analysis

Statistical analyses were conducted using SPSS Version 26.0 software. Mean, standard deviation, frequency, and percentage were the descriptive statistics adopted to measure participants' characteristics, knowledge, attitude, and practices. To test the reliability (reliability score ≥ 0.70) of the psychometric scales, Cronbach's Alpha Coefficient was determined. Correlation was carried out through bivariate analysis (chi-square or t-test depending on the situation) in order to establish a relationship between outcomes and socio-demographic factors. Logistic regression analysis was not performed; associations were examined using chi-square tests and odds ratios with 95% confidence intervals. The linear correlation was measured by ranking correlation using Spearman. A listwise deletion technique was applied in order to deal with the cases of missing values in incomplete survey forms or those containing non-solvable missing values for crucial variables. This lowered the analyzed sample size from N=435 to N=400. Moreover, the phrase "44.3% knowledge-practice gap" was practically determined and calculated as the proportion of the valid sample (n=177 out of N=400) that has core theoretical knowledge as they were able to correctly identify optimal puberty age ranges but stated explicitly that sanitary pads "are not needed" or do not need changing during menstruation period. Statistical significance was set at $p < 0.05$

Ethical Considerations

Ethical clearance was given by the Institutional Review Board of SRI PADMAVATI MAHILA VISVAVIDYALAYAM [IEC-MUTH/002RP/24- 10-2025].

Results

Socio-Demographic Respondents Characteristics Age Distribution

Age ranged between 12 and 17 years (Table 2). Age 14 years had the highest percentage of 32 % of the sample population. This is followed by age 12 years with 28.5 and age 13 years with 24.8. Age 15 years comprised 13.3% of the sample, while ages 16 and 17 comprised 0.8% each of the sample. This suggests that early and mid-adolescents form a majority of the total sample 85.3%.

Table 2: Age Distribution of Participants for the Final Valid Analyzed Subset (N = 400)

Age (Years)	Frequency	Percentage (%) of Valid
12	114	28.5
13	99	24.8
14	128	32.0
15	53	13.1
16	3	0.8
17	3	0.8
Total	400	100.0

Valid responses = 400. Non-responses = 35 (8.05% of the total number, N = 435). Percentages are computed using the valid response number unless otherwise specified. The data is mainly distributed among children of school-going age with emphasis on middle adolescents.

Education Distribution of Classes

The academic status of the respondents (Table 3) had the highest percentage (37.9) at the 9th class implying that the majority of children are concentrated in the higher elementary / middle school. The percentage of 7th class was 27.6, 8th was 21.4, and 6th was 13.1.

Table 3: Distribution of Participants by Class for the Final Valid Analyzed Subset (N = 400)

Class	Frequency	Percentage (%) of Valid
6 th	57	13.1
7 th	120	27.6
8 th	93	21.4
9 th	165	37.9
Total	400	100.0

Valid answers = 400. Non-responses = 35 (8.05% of the overall sample, N = 435). Percentage values are computed using valid answers unless specified otherwise. The above distribution corresponds to the age distribution, which shows that most of the subjects were from grade 7 to 9.

Educational Qualification of Father

Table 4 depicts that most of fathers (61.0%) were with 10th grade education. A less proportion (19.0) had a lower education of less than 10th grade. Only 12.5% and 7.5% attended intermediate or junior college and undergraduate respectively. This shows a low degree of formal education achievement among in this population.

Table 4: Educational Qualification of Fathers for the Final Valid Analyzed Subset (N = 400)

Educational level	Frequency	Percentage (%) of Valid
Below 10 th class	76	19.0%
10 th class	244	61.0%
Intermediate/Junior college	50	12.5%
Undergraduate	30	7.5%
Total	400	100.0

Valid responses = 400. Non-responses = 35 (8.05% of the total sample size, N=435). Percentages are calculated using valid responses unless otherwise specified. High level of secondary education implies limited experience of higher education, thus constraining parents' willingness to educate their children.

Father's Occupation

Fathers were primarily manual laborers with a majority of them (56.8) being laborers. The ownership of grocery stores constituted 22.0, mutton shop working constituted 14.8, and lorry and auto drivers constituted 6.5 (Table 5).

This form of employment is indicative of an informal economy that is labor intensive and is characteristics of the lower socioeconomic status group.

Table 5: Occupation of Fathers (N = 400)

Occupation	Frequency (n)	Percentage (%) of Valid
Labour	227	56.8%
Grocery shop	88	22.0%
Mutton shop	59	14.8%
Lorry/Auto driver	26	6.5%
Total	400	100.0

Valid responses = 400, Non-responses = 35 (8.05% of the entire sample size, N=435). Unless otherwise stated, percentages have been derived from valid responses. The occupation profile is likely to impact family income and availability of health and education facilities.

Menstruation and Adolescent health knowledge About Puberty

The majority of the respondents (94.3%) gave the right age at which girls should enter puberty (age should be at 9-10 years) (Table 6). Only a small minority (3.8%) choose None of the above, and few 5-10 years (1.5%), 3-9 years (0.5%).

Table 6: Knowledge of the Ideal Age for girls to Start Puberty (N = 400)

Response	Frequency	Percentage (%) of Valid
9-10 years	377	94.3%
5-10 years	6	1.5%
3-9 years	2	0.5%
None of the above	15	3.8%
Total	400	100.0

Valid respondents = 400. Non-respondents = 35 (8.05% of the total sample, N = 435). Percentages are based on valid responses unless specified otherwise. This high awareness suggests effective educational exposure regarding female puberty age norms.

Physical Changes Awareness in Adolescence

Most of the respondents (79.3) identified all mentioned changes in physiology in adolescence stage such as chest/breast enlargement, pubic hair development, and face acne (Table 7). In isolation, 8.8 % reported acne, 7.5 % reported breast/chest enlargement and 4.4 % reported hair growth.

Table 7: Awareness of Physical Changes During Adolescence (N = 400)

Response	Frequency	Percentage (%) of Valid
All listed changes	317	79.3%
Acne on the face	35	8.8%
Enlargement of chest/breast	30	7.5%
Growth of hair in Reproductive parts	18	4.4%
Total	400	100.0

Valid responses = 400. Non-responses = 35 (8.05% of the total sample size, N = 435). Percentages have been calculated on the basis of valid responses unless specified. This represents overall knowledge accuracy regarding the stages of adolescent development.

Menstrual Hygiene Practices

Almost half (47.8%) indicated that menstrual pads need to be changed 3 times in a day and (44.3%) said that pads do not need to be changed (Table 8). Only a low percentage (6.5%) changed pads twice or once (1.4%) every day.

Table 8: Frequency of Changing Sanitary Pads During Menstruation (N = 400)

Frequency of Changing Pads	Frequency	Percentage (%) of Valid
3 times/day	191	47.8%
Not required	177	44.3%
2 times/day	26	6.5%
1 time/day	6	1.4%
Total	400	100.0

Valid responses =400. Non-responses =35 (8.05 of the total sample, N = 435). Percentages are made out of valid responses unless otherwise. This discrepancy contributes to the 44.3% knowledge–practice gap observed in this study.

Management of Menstrual Pain

Nearly half (49.2%) stated consulting a doctor in case of severe menstrual pain, 20.9% took a number of actions (rest, reducing work stress, consulting a doctor), 19.5% had chosen rest only, and 10.3% reduced work stress only (Table 9).

Table 9: Actions Taken by Respondents During Menstrual Pain (N = 400)

Action	Frequency	Percentage (%) of Valid
Consult doctor during severe pain	197	49.3%
All listed measures	84	21.0%
Rest only	78	19.5%
Reduce work stress	41	10.2%
Total	400	100.0

Valid responses =400. Non-responses =35 (8.05 of the total sample, N = 435). Percentages are made out of valid responses unless otherwise. This means awareness of reasonable knowledge of proper health behaviour but also scope of better education of pain management.

**Table 10: Association Between Socio-demographic Factors and Menstrual-related Variables
(Chi-square Tests, N = 400)**

Independent Variable	Dependent Variable	Chi-Square (χ^2)	Degrees of Freedom (df)	p-value	Odds Ratio (OR) [95% CI]	Significance
Class Level	Menstrual Status	97.768	3	$p < 0.001$	2.45 [1.89 – 3.12]	Highly Significant
Class Level	Physiological Knowledge	33.721	3	$p < 0.001$	1.92 [1.45 – 2.54]	Highly Significant
Class Level	Pain Management	30.763	3	$p < 0.001$	1.78 [1.31 – 2.41]	Highly Significant
Class Level	Pad Change Frequency	25.842	3	$p = 0.002$	1.65 [1.20 – 2.28]	Significant
Father's Job	Social Restrictions	10.861	3	$p = 0.285$	1.12 [0.85 – 1.48]	Not Significant
Father's Education	Marriage Age Views	3.566	3	$p = 0.735$	0.95 [0.70 – 1.29]	Not Significant

Knowledge and Attitude significantly improved as girls progressed to higher classes ($p < 0.001$). However, a 44.3% knowledge -practice gap persists regarding hygiene. Socioeconomic status did not significantly influence these outcomes ($p > 0.05$). All reported effect estimates are odds ratios from chi-square analyses; no multivariable regression models were fitted in this study in table 10.

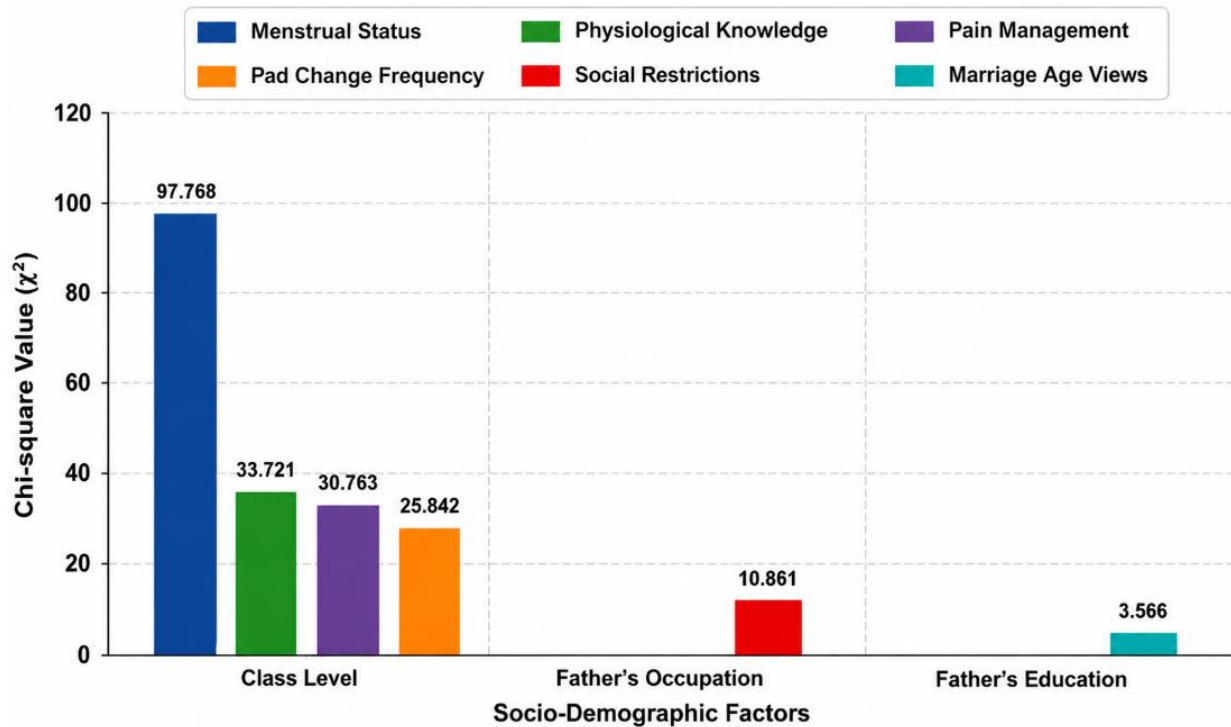


Fig. 3: Chi-Square Association Between Socio-Demographic Factors and Menstrual Health Indicators

Fig. 3 shows the chi-square statistics that indicate the strength of the relationship between the socio-demographic variables and the measures of menstrual health. The class level is the most highly associated variable for various measures related to menstruation, followed by significant contributions made by the occupation and education of the father.

Discussion

In the present study, the association between socio-demographic variables, menstrual knowledge, attitude, and hygiene practices among adolescent school-going girls from Tirupati district, Andhra Pradesh has been studied. It can be concluded from the results that education is an important factor for improving knowledge and practices about menstrual health. Class level has shown a strong relationship with menstrual status, physiological knowledge, management of menstrual pain, and practices of changing pads ($p < 0.001$).

While almost all respondents have shown good knowledge about menstrual health, there is a huge difference between the knowledge and practice of the girls regarding menstrual hygiene. While 94.3% have good knowledge about puberty and 79.3% have knowledge about physical changes in adolescence, only 47.8% have followed good practices of changing pads, and 44.3% considered changing of pads not necessary. This implies that the presence of good knowledge does not necessarily lead to healthy practices.

Furthermore, the study reveals that there was no statistically significant relationship between socio-economic features like occupation and education of the parents and some menstrual related outcomes. Nevertheless, these variables can affect access to information and communication and family support. Therefore, school-based interventions can be a powerful mechanism for providing equal menstrual health education for girls of diverse backgrounds.

In practical terms, there is a need for schools to conduct menstrual health education campaigns prior to menarche, provide teachers with the necessary knowledge of handling menstrual problems, and ensure the provision of adequate sanitation facilities and affordable menstrual hygiene products. This would aid in bridging the gap between knowledge and practice seen in this study. In future research, it would be interesting to conduct studies on the effects of such interventions using longitudinal designs with larger populations. For future research, it will be useful to assess the impact of the intervention programs using longitudinal research designs as well as larger populations in various geographic and socio-economic environments.

Conclusion

The results of this study emphasize the vital importance of socio-demographic factors in the influence on menstruation knowledge, attitudes, and hygienic behaviors of adolescent schoolgirls in the Tirupati District of Andhra Pradesh. It should be noted that such educational factors as the class level have an essential impact on menstrual knowledge, physiological knowledge, practices of coping with menstrual pains and hygienic practices. The significant correlation between the class level and menstrual health outcomes shows that education has a crucial importance in improving adolescents' knowledge and attitude towards menstruation. In spite of the high level of menstrual knowledge (94.3% of girls could define the proper age of puberty and 79.3% of girls knew the major physical transformations during adolescence), the results of the study revealed the existence of the big discrepancy between knowledge and practice of menstrual hygiene. The data showing that 44.3% of girls did not consider the necessity of pad changing prove that knowledge-based interventions cannot bring desired outcomes in the sphere of menstrual hygiene management. The results further indicate that while parental education and occupation were not found to be associated with specific menstrual characteristics, the social and family environment could play a continued role in providing support for communication and obtaining menstrual health information. Hence, menstrual health promotion strategies based on schools appear to be the appropriate strategy for reaching a wide range of adolescent girls belonging to different socio-economic strata. Future research into menstrual health promotion should involve the integration of menstrual education into curriculum, teacher and health professional participation, improvement of sanitation facilities, and access to low-cost menstrual products. Future longitudinal and intervention-based research using large and diverse samples is recommended to measure the impact of educational interventions over time. In conclusion, the present study highlights region-specific data in favor of culturally-sensitive menstrual health interventions for adolescents.

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