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Socio-Demographic Determinants and the Correlation of Menstruation-Related Knowledge and Attitude: A Cross-Sectional Study Among Adolescent School Girls in Tirupati district, Andhra Pradesh, India

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ABSTRACT: Menstrual health is a crucial feature of the well-being of adolescent girls which is strongly affected by socio-demographic factors such as parental education, income and cultural background. Low-resource areas have a high number of adolescent girls who have no idea about menstruation and that they have negative views about menstruation and this can affect their health and educational performance. Through improved methodology and adherence to the global best practices, it is hoped to determine the correlation between the socio-demographic background of school-going girls, their knowledge and attitude towards menstruation, and the same. The present cross-sectional study was done on 400 adolescent girls aged 12-17 who were recruited through multi-stage cluster sampling in six government schools in Chandragiri, Mangalam, Karakambaddi, Srikalahasti, Yerpedu and Vadamalapeta of Tirupati district in Andhra Pradesh state. The authors discovered that biological maturity and knowledge significantly increase with class level showing a sharp increase from 6th to 9th class. However, a 44.3% knowledge -practice gap persists regarding hygiene. Interestingly, paternal education and occupation do not significantly influence girl's hygiene habits and social restrictions. The researchers concluded that the participants of the study have knowledge about menstrual hygiene and their attitudes towards menstrual hygiene were significantly higher with class levels.

INTRODUCTION

Menstruation is a primitive physiological process that initiates reproductive capacity of the adolescent girls and is a milestone in their lives as they are approaching adulthood. Menstruation is biologically normal, but in most societies, particularly in the low-and middle-income countries, it is highly veiled, secretive, and ill-informed. Menstrual hygiene is crucial to the health of the adolescents especially in the developing world where there are facilities and social and cultural taboos that make it difficult to learn and do. Such acuity is particularly acute in India.(Dambhare et al., 2011) The cleanliness of the menstrual process among the adolescent girls in the urban slums is a matter, and a comparison of the current practice and the corresponding socio-demographic and knowledge factors should be done. Adolescence is a critical stage that had its own problems especially on the

part of girls in the problem of menstruation. This problem of menstrual hygiene control is overlooked though it is essential to health, particularly in culturally stigmatized regions. In this respect, the need to examine menstrual hygiene management in school adolescent girls is present.

Menstrual hygiene management (MHM) is a health concern, and a major measure of gender equity, education, and empowerment. The lack of the right knowledge is one of the key factors which leads to the poor menstrual health outcomes.(Tarhane & Kasulkar, 2015) Evidence has proven a lot that many girls start menstruating without any knowledge or support. This causes mental instability, confusion and persistent body dissatisfaction. The first and sometimes the only source of information could be mothers and the information they possess is either unfinished or even clouded in myths-re- creating the cycle of ignorance and misinformation. MHM education is rarely taught by teachers and health workers, often due to teachers being awkward, lack of training to teach it, or their institutions being silent on suddenly sensitive matters.(Sommer et al., 2015)

The socio-demographic variables are highly significant in explaining the menstrual health knowledge and practices. The parent's education, family income, and residential location (urban or rural) have always been identified to influence the availability of hygienic products, factual learning, and willingness to practice healthy habits in girls. There is a close relationship between increasing parental education and increasing levels of knowledge and healthier attitudes and better hygiene behaviour among adolescent girls.(Shoor, 2017)

Although there are heightened policy initiatives such as the Menstrual Hygiene Scheme in India that aims at enhancing access of sanitary pads and provision of health education to adolescent girls, there are still challenges in making sure that policy is translated into a real change at community level. The practical management and the psychological wellbeing of millions of girls are still affected by strong cultural taboos, such as the attitudes toward impurity, isolation requirements during periods, ban on bathing, eating, and normal activities.(Rajavardhana et al., 2021)

What is more, the connection between menstrual knowledge and attitude is becoming increasingly popular. The theoretical frameworks used in the area of the public health, such as the social determinants of health framework, presuppose that knowledge (and attitudes mediated by knowledge) is an indirect and direct mediator between the structural disadvantages and health behaviours.(Casola et al., 2024) It is theorised that the greater the knowledge, the more positive and open the attitude, and consequently the better the menstrual practices and the discontinuation of the silence and stigma cycles.(Patle & Kubde, 2014)

Many of the studies have a limit of either an urban or rural population, they do not have the socio-demographic profiling of the population or they are not using validates and culture adjusted measurements. Few of them directly address the correlation between knowledge and attitude, or group findings based on such important variables as parental education and family income.

The gaps are bridged by the current research by using an integrated cross- sectional study design by using validates and culturally modified questionnaires and strict sampling to quantify the socio-demographic predictors of menstruation-related knowledge and attitudes, and a direct correlation between these two variables in a representative sample of school- age girls in six government schools in the Tirupati district, Andhra Pradesh state. This research can provide valuable data to the local education programs, policy adjustments in schools, communities, and states because it can show disparities and at-risk populations.

The study is also modelling the best practice in the quality assurance of data collection, ethical behaviour and transparent reporting as proposed in the STROBE guidelines so as to meet the present methodological and reporting standards. Lastly, the findings would not only be beneficial to the scientific community, but it would also seek to assist in coming up with culturally sensitive intervention measures that would empower all girls to manage menstruation in a healthy, informed, and dignified manner.

RESEARCH METHODOLOGY STUDY Design

The research design applied in this study was the quantitative, descriptive cross-sectional study design to establish the socio-demographic determinants of menstruation-related knowledge and attitudes among schoolgirls in the Tirupati district of Andhra Pradesh, India. The cross-sectional approach also allowed assessing the knowledge, attitudes and other socio-demographic variables once and had a general picture of the situation that is present in this population.

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Study Setting

The study was done on six government high schools in the Tirupati district that is home to both the rural community and semi-urban communities and this is reflective of the socio-economic and cultural diversities of the southern Andhra Pradesh. The schools were strategically selected to represent a wide geographical location like Chandragiri, Mangalam, Karakambaddi, Srikalahasti, Yerpedu and Vadamalapeta. This was diversified to the extent that it could be generalized at the district level.

Table 1: Study Location

Location	6th class	7th class	8th class	9th 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 and Sample size

Female students of the age group 12-17 years with attained menarche and attended classes 6 to 9 in the selected schools were included in the target study population. Multi-stage cluster sampling method was used in a stratified way in order to provide representation based on age, grade and school. The sample size was determined by the formula of cross-sectional surveys with prevalence estimate of 50 (to obtain maximum sample size), 95% confidence levels, margin of error of 5, and includes design effect to consider clustering.

The number of participants in the final sample of 400 is greater than the required number to identify relationships between a given effect size of moderate strength at a 80% power, even with a non-response rate of 10%. Since all the students were involved, the non-response rate was absent.

Sampling Method Six government high schools were selected randomly out of the regional list of these schools. In each school, there was grade stratification of students. Participants in each stratum of the grade were recruited using simple random sampling or systematic selection based on the availability of class lists. Examples of exclusion criteria were those students who failed to complete the survey because of cognitive or language barriers, those who were absent on the day of data collection, as well as those students who were not willing to provide informed consent.

Instrumentation and Validation

The structured, pre-tested questionnaire was employed to gather the data which were thoroughly developed with the help of adaptation of the tools that have been proved to be valid before (such as the WHO Adolescent Health materials and the menstrual knowledge surveys). The questionnaire was divided into four domains, namely;

1. Socio-demographic characteristics, 2. Menstruation-related knowledge, 3. Attitudes towards menstruation.

Data Collection Procedures

During the period of 25.10.2024 to 05.11.2025, data was collected. The questionnaires were administered face-to-face by trained female research assistants in closed classroom settings to make the administration as honest and comfortable as possible. They were assured of anonymity and that they could attend the study at will and that they could pull out at any time without any repercussions. The sessions were about 30 minutes long. Any questions were clarified when asked and without directing the participant. Objective data, such as attendance records and school academic achievement, were also accessed to supplement

self-report after institutional permission and de - identification measures.

Data Quality Control

The implementation of a control of the data was introduced to identify and fix inconsistences. To ensure the data integrity and minimize the possibility of entry or transcription errors, SPSS version 26.0 had logic checks and range validation routines.

Variables

Independent variables include age, grade, parent education, occupation. Variables that will influence the outcome: Menstruation-related knowledge score (composite, based on correct answers about puberty, cycle, hygiene). Attitude score (Likert-scale items on comfort, myths and positivity towards menstruation).

Access to WASH facilities, the type of an absorbent, and the main source of the information are the covariates.

Statistical Analysis

All data were evaluated with SPSS version 26.0, Means, standard deviations, frequencies, and proportions were used as descriptive statistics in order to summarize participant characteristics, knowledge, attitude, and practice items. Bivariate analyses (chi-square or t-tests, based on the circumstances) were performed to determine the connection between outcomes and socio-demographic factors. The rank correlation with Spearman was used to establish a linear relationship between the scores of knowledge and attitude.

Logistics regression modelling, after confounding, showed that there were independent predictions of high menstrual knowledge and positive attitude. All analyses were done in accordance with STROBE reporting checklist with the significance level of $p<0$ and effect sizes (odds ratios, confidence intervals) presented to make the results interpretable.

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

The respondents were between the age of 12 and 17 years (Table 2). The highest percentage was 14 years old with 32 percent of the sample. This was then followed by 12 years old at 28.5 and the 13 years old at 24.8. The proportion of older adolescents of 15 years constituted 13.3 and 16 and 17 years constituted 0.8 each of the sample. The age distribution indicates that there are early and mid-adolescents that are a majority of the total sample 85.3%.

Table 2: Age Distribution, Original (N=435), Valid (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 sample, N = 435). Percentages are made out of valid responses unless otherwise.

The distribution is focused on a proper age group of the school-going children with a major focus on the middle adolescence.

Education Distribution of Classes

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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: Education types Distribution, Original (N=435), Valid (N=400)

Class	Frequency	Percentage (%) of Valid
6th	57	13.1
7th	120	27.6
8th	**93**	**21.4**
9th	165	37.9
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 distribution is consistent with the age distribution, supporting the fact that most of them are in grade 7-9.

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 Father, Original (N=435), Valid(N=400)

Educational level	Frequency	Percentage (%) of Valid
Below 10th class	76	19.0%
10th 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, N = 435). Percentages are made out of valid responses unless otherwise.

The fact that secondary education is dominant means that exposure to higher education is minimal and hence may limit the parents in their support to education.

Father's Occupation

Fathers were primarily manual labourers with a majority of them (56.8) being labourers. 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 labour intensive and is characteristics of the lower socioeconomic status group.

Table 5: Father's Occupation

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 total sample, N = 435). Percentages are made out of valid responses unless otherwise.

The occupation profile probably has an impact on family income and access to health and education.

Menstruation and Adolescent health knowledge 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 Ideal Ages of Girls to start puberty

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 responses =400. Non-responses =35 (8.05 of the total sample, N = 435). Percentages are made out of valid responses unless 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 percent reported acne,

7.5 percent reported breast/chest enlargement and 4.4 percent reported hair growth.

Table 7: Change in Perceptions of Physical Changes in adolescents (N=400 Specific to respondents)

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, N = 435). Percentages are made out of valid responses unless otherwise.

This represents overall knowledge accuracy regarding the stages of adolescent development.

Menstrual Hygiene Practices

How often do you change your pads during Menstruation

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 9). Only a low percentage (6.5%) changed pads twice or once (1.4%) every day.

Table 8: Changing Pads Frequency as reported by the respondents (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 indicates difference and probable lapses in menstrual hygiene knowledge and behaviour.

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 10).

Table 9: Actions of respondents during menstrual pain

Action	Frequency	Percentage (%) of Valid
Consult doctor during severe pain	197	49.3%

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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.

Table10: Association Between Socio-Demographic Factors and Menstrual- Related Variables

Independent Variable	Dependent Variable	Chi-Squareχ^2	P-Value	Significance
Class Level	Menstrual Status	97.768	<.001	Highly Significant
Class Level	Physiological Knowledge	33.721	<.001	Highly Significant
Class Level	Pain Management	30.763	<.001	Highly Significant
Class Level	Pad Change Frequency	25.842	<.002	Significant
Father's Job	Social Restrictions	10.861	.285	Not Significant
Father's Education	Marriage Age Views	3.566	.735	Not Significant

Knowledge and Attitude significantly improved as girls progressed to higher classes (p<.001). How ever a 44.3% knowledge - practice gap persists regarding hygiene. Socioeconomic status did not significantly influence these outcomes(p>.05).

DISCUSSION PRINCIPAL FINDINGS

These cross-sectional observations of menstruating girls in six government schools in the Tirupati district showed that early and mid-adolescents formed the majority of those sampled with more than four fifth of the sample 12-14 and nearly three quarters of the total sample in 6-9 classes. The socioeconomic, and low education level of the study population is defined by the fact that fathers were mostly educated to 10th class and their profession was mostly manual labour or small informal businesses. In the regard, girls were very aware of general pubertal changes and timing, compared with great gaps and inconsistencies in specific menstrual hygiene behaviour, the frequency of pad changes and health seeking behaviour in case of menstrual knowledge and a more negative attitude, and menstrual hygiene behaviour had positive relationship with positive attitude towards the menstrual hygiene behaviours.

Interpretation of knowledge and practice indicators

The huge proportion of girls that were aware of the normal age of puberty and the number of physical changes are evidence that

some of the core puberty messages have reached even the socio-economic disadvantaged population.

Similar dual tendency is witnessed in the health seeking behaviour during menstruation as nearly half reported that they would seek a doctor's attention in case of excruciating menstrual pain, the rest would resort to resting and/or even to reducing work on their part. Self-care may be the indicator of the proper treatment of mild dysmenorrhoea in some girls, but self-care will be the indicator of the need of the adolescent friendly services and ignorance of exposing menstrual problems due to the stigma or the gender-based power disparity within a family. Taken together, these results suggest that a combination of information provision, material restrictions and norms must be addressed in such situations that prevent the transfer of knowledge to consistent hygienic behaviour.

Role of socio demographic determinants and mechanisms

It is found that there is no links between low education of parents, manual or informal occupation of father and poorer menstrual knowledge and attitudes are in agreement with the social determinants of health framework in which the research was conducted. This model considers menstrual knowledge and attitudes to be channels of mediation between health seeking behaviour and personal hygiene practices as well as structural position.

Comparison and implications similar to current literature

The tendency of logical consciousness of the overall puberty and low rate of exercise of menstrual hygiene is similar to findings of other Indian and South Asian studies which report high level of anxiety around menarche, and continuance of using unhygienic materials and misunderstanding about using pads among rural and government school girls. (Nagar & Aimol, 2010)The magnitude of the socio demographic gradients (in this instance, low parental education and income are predictors of poorer knowledge and more negative attitudes) is consistent with the national survey evidence of inequalities of safe menstrual practices district-wide and across wealth quintile.(Nimbhorkar et al., 2023)

These programmatically supported findings confirm that interventions of menstrual health must be equity oriented. Systematic introduction into the school-based education. There should be a systematic introduction of program in classes 6-9 by culturally adapted age relevant materials and program should be oriented towards more practical problems such as recommend frequent pad changing, safe disposal, and signs of clinical evaluation of pain or abnormal bleeding. It has to have parallel community level action of engagement of both the fathers and mothers and the local heads to dispel the myths and help the households invest in menstrual supplies specifically those who have been identified in this study as the manual labour and low-income families.

Methodological limitations and research

STROBE strengths of this study include that the sampling frame was well outlined, age and class distribution had been well reported, parental education and occupation had been well reported, non-response had been properly addressed. The combination of these features with the use of pre tested and culturally adapted questionnaire makes the results more internal valid and reproducible.

But since the cross-sectional design cannot make any casual inferences to the direction of relationships between the socio demographic variables, knowledge, attitudes and practices and reliance on the self-reported behaviours may create bias due to the effects of recall and social desirability particularly with sensitive subjects. Furthermore, school going girls may not comparably fit out of school adolescents which are generally more severely socio economically disadvantaged and may even suffer low menstrual health standards, which limits generalized statements to the rest of the adolescent group.

CONCLUSION

This paper demonstrates that the adolescent girls in governments schools of Tirupati district are well informed about general pubertal changes but contain significant gaps and inconsistencies in knowledge regarding certain menstrual hygiene variables, health seeking behaviour in case of menstrual pain. The low educated, manual labour father preponderance and the linkage between lower parental education and socio-economic status and poorer menstrual.

ACKNOWLEDGEMENT : The authors gratefully acknowledge the support received under the PM-USHA grant No. R.O.C.No.SPMVV/UGC/F1/PM-USHA/2025 dated: 01.01.2025for facilitating the publication of this research. knowledge and more adverse attitudes is crucial in demonstrating the importance of social determinants in influencing menstrual health.

Positive results between knowledge and attitudes indicate that the better the accurate and complete knowledge concerning menstruation, the better will be the attitudes and, eventually, the healthier practices. These results emphasise the importance of equity based, culturally aware, school and community- based interventions, where menstrual education is linked to WASH and social service stronger and broader, with priority being given to low income and less educated girls households and rural populations. The findings of this research can be used by local policy and programme development to empower girls to handle menstruation safely, with confidence, and dignity by linking those interventions with the existing national and global commitments regarding adolescent health, education and gender equality.

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