

Prevalence of Menstrual Problems and Remedial Measures Adopted by Adolescent Girls in a Selected Rural Area of Kuppam, Andhra Pradesh

A Community-Based Descriptive Cross-Sectional Study

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Abstract:

➤ *Background:*

Menstrual health problems, particularly dysmenorrhea and menstrual cycle irregularities, pose substantial physical, academic, and psychosocial challenges to adolescent girls in rural India, where management is often constrained by cultural silence, limited healthcare access, and household economic limitations.

➤ *Objectives:*

This study aimed to assess the prevalence of menstrual problems and menstrual health practices among adolescent girls in a selected rural area of Kuppam, identify the remedial measures adopted for menstrual pain, and evaluate associations between menstrual problems and selected socio-demographic variables.

➤ *Methods:*

A community-based descriptive cross-sectional study was conducted among 89 post-menarcheal adolescent girls aged 10 to 19 years residing in two rural villages (Gonuguru and Vendugampalli) in Kuppam Mandal, Chittoor District, Andhra Pradesh. Data on socio-demographic profiles, baseline menstrual characteristics, symptom burden, self-care remedial practices, and post-remedy outcomes were collected through face-to-face interviews using a validated structured questionnaire. Descriptive statistics and Pearson Chi-Square tests were performed using SPSS Version 23.

➤ *Results:*

The overall prevalence of menstrual problems was 91.0 percent (81 out of 89 girls). Among the 81 symptomatic participants, dysmenorrhea was the predominant morbidity (49.4 percent), followed by irregular menstrual periods (22.2 percent), premenstrual syndrome (17.3 percent), and menorrhagia (11.1 percent). Moderate to severe menstrual pain affected 48.1 percent of symptomatic girls, and 54.3 percent experienced recurring monthly symptoms. Mothers and family members served as the primary source of home remedy guidance (54.3 percent), while only 27.2 percent searched the internet for menstrual health information. Remedial measures adopted included medical consultations (24.7 percent), local heat application using hot water bags (23.5 percent), traditional herbal and kitchen remedies (21.0 percent), behavioral coping such as rest and music (18.5 percent), and over-the-counter analgesics from local medical shops (12.3 percent). Although 88.9 percent achieved satisfactory symptom relief, 8.6 percent experienced adverse side effects, primarily vomiting and heavy bleeding. Bivariate analysis revealed a statistically significant association between monthly family income and the prevalence of menstrual problems (Chi-Square value of 6.250, p value of 0.044), with higher

household income exceeding 20,000 Indian Rupees acting as a protective factor. Additionally, younger age of 15 years or below was significantly associated with menstrual cycle irregularity (Chi-Square value of 4.18, p value of 0.041).

➤ **Conclusion:**

Menstrual morbidity is remarkably high among rural adolescent girls in Kuppam. While traditional non-pharmacological remedies are widely practiced, unsupervised self-medication carries avoidable health risks. Strengthening school-based menstrual health education, regulating adolescent over-the-counter analgesic sales, and establishing accessible Adolescent Friendly Health Clinics are urgently warranted in rural Andhra Pradesh.

Keywords: Adolescent Health; Dysmenorrhea; Menstrual Hygiene; Remedial Measures; Rural Health; Kuppam; Socio-Demographic Factors; India.

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I. INTRODUCTION

Adolescence represents a critical developmental transition between childhood and adulthood, defined by the World Health Organization as the life stage spanning 10 to 19 years of age [1, 2]. During this period, young females undergo rapid somatic growth, neuroendocrine maturation, and psychosocial development, with the onset of menarche serving as the hallmark biological milestone of reproductive capacity [2, 3]. Normal menstruation involves the cyclical shedding of the uterine endometrial lining governed by complex hormonal feedback mechanisms along the hypothalamic-pituitary-ovarian (HPO) axis. However, during the initial post-menarcheal years, functional immaturity of the HPO axis frequently predisposes adolescents to anovulatory cycles, erratic bleeding intervals, and heightened uterine contractility [3, 4].

Globally, although menstruation is a universal physiological phenomenon affecting approximately 1.8 billion women and adolescent girls every month, managing menstrual health with safety and dignity remains a major public health challenge in low- and middle-income countries (LMICs) [1, 2]. India is home to nearly one-fifth of the world's adolescent female population, comprising an estimated 113 million adolescent girls [1]. Recent geospatial and multilevel analyses of the fifth National Family Health Survey (NFHS-5, 2019–2021) indicate that while 76.15% of young Indian women aged 15 to 24 years report using hygienic menstrual protection overall, stark rural-urban and socio-economic disparities persist [1]. Specifically, exclusive use of hygienic period products stands at 89.37% in urban India compared to 72.32% in rural areas, with multivariate decomposition demonstrating that household wealth inequality accounts for 49.25% of the rural-urban gap and educational attainment accounts for 13.41% [1]. Among rural Indian adolescent women aged 15 to 19 years specifically, national data reveal that only 42% exclusively rely on hygienic absorbents throughout their cycles, while the remainder alternate between commercial sanitary pads and reusable cloths depending on household finances and local availability [2].

Beyond hygiene management barriers, adolescent girls bear a heavy clinical burden of menstrual morbidities, including primary dysmenorrhea, irregular menstrual cycles, premenstrual syndrome (PMS), and menorrhagia [3, 4]. Primary dysmenorrhea—defined as painful, spasmodic lower abdominal cramping occurring just before or during menses in the absence of macroscopic pelvic pathology—is the most prevalent gynecological complaint among young women [4]. Its pathogenesis is driven by progesterone withdrawal at the end of the luteal phase, which triggers lysosomal membrane destabilization in sloughing endometrial cells and activates phospholipase A2 to generate arachidonic acid [4, 15]. Subsequent metabolism via the cyclooxygenase (COX) pathway produces elevated intrauterine concentrations of prostaglandin F2-alpha (PGF2 α) and prostaglandin E2 (PGE2), inducing intense, dysrhythmic myometrial contractions, spiral arteriole vasoconstriction, uterine ischemia, and peripheral nociceptor sensitization [4, 15]. A 2025 systematic review and meta-analysis encompassing 29 Indian studies and 15,374 female students estimated the pooled national prevalence of dysmenorrhea at 65% (95% CI: 58%–72%), with individual regional cohorts reporting prevalence rates ranging from 56.5% to 84.2% [3]. Similarly, epidemiological investigations across Madhya Pradesh, Maharashtra, and Andhra Pradesh have documented dysmenorrhea rates between 65.0% and 79.67%, closely linked to systemic symptoms such as lethargy, nausea, vomiting, headache, emotional instability, and loss of classroom concentration [5–7, 13].

In rural Andhra Pradesh, sociocultural silence, restrictive taboos, and structural healthcare barriers further compound menstrual distress [5, 6, 8–11]. Community-based studies in Chittoor, Tirupati, Kadapa, Nandyal, Visakhapatnam, and Guntur districts show that despite expanded sanitary pad access through state-sponsored school distribution initiatives, substantial gaps persist in menstrual literacy, safe absorbent changing frequency, and professional healthcare utilization [5, 6, 8–11]. For instance, previous research among hostel-dwelling adolescent girls in Kuppam Mandal found that although 78.5% used sanitary pads, 43.0% changed their absorbent only once daily, 82.9% washed external genitalia with water alone, and 52.2% faced

religious and social restrictions during menses [8]. Furthermore, studies in Nandyal and rural Visakhapatnam demonstrated that 51.6% to 60.0% of rural schoolgirls lacked scientific awareness regarding the anatomical source of menstrual blood prior to menarche, while 31.0% experienced severe embarrassment when purchasing sanitary pads [9, 10].

When confronted with debilitating menstrual pain, rural adolescent girls rarely seek formal clinical evaluation, viewing dysmenorrhea as an inevitable female burden or fearing that allopathic analgesics may impair future fertility [6, 12, 14]. Consequently, most rural adolescents rely on intergenerational self-care practices suggested by their mothers, including topical heat application, herbal decoctions (such as ginger, fenugreek, and turmeric), dietary modifications, and rest, while a subset resorts to unsupervised over-the-counter (OTC) analgesic consumption from local pharmacies [6, 12, 14, 15]. Guided conceptually by Dorothea Orem's Self-Care Deficit Nursing Theory, evaluating how rural adolescent girls perceive menstrual morbidities and select remedial coping strategies is essential for designing responsive community health nursing interventions. Therefore, the present study was undertaken to assess the prevalence of menstrual problems and menstrual health practices among adolescent girls in selected rural villages of Kuppam Mandal, Andhra Pradesh, identify the pharmacological and non-pharmacological remedial measures adopted for symptom relief, and determine the association between menstrual problem prevalence and selected socio-demographic variables.

II. MATERIALS AND METHODS

➤ Research Approach and Study Design

A quantitative research approach utilizing a community-based descriptive cross-sectional survey design was employed to assess the point prevalence of menstrual problems, baseline hygiene and dietary practices, and self-care remedial measures among rural adolescent girls. Data collection was conducted over a two-week operational window from January 2, 2026, to January 16, 2026, in the natural residential environment of the participants without experimental manipulation.

➤ Study Setting and Target Population

The study was conducted in two selected rural villages—Gonuguru and Vendugampalli—located in Kuppam Mandal, Chittoor District, Andhra Pradesh, India. Kuppam Mandal is a predominantly agrarian, tri-junction border region adjoining Tamil Nadu and Karnataka, characterized by rural socio-economic constraints and limited specialized adolescent gynecological services. The target population comprised post-menarcheal adolescent girls aged 10 to 19 years who were permanent residents of the selected villages.

➤ Sample Size Determination and Sampling Criteria

Sample size estimation was performed using Cochran's single-proportion formula, $n = (Z^2 \times P \times (1 - P)) / d^2$, at a 95% confidence level ($Z = 1.96$) with an anticipated

menstrual disorder parameter and a 10% adjustment for potential non-response, yielding a minimum required sample size of 79 participants. Using a non-probability convenient sampling technique during house-to-house community visits across Gonuguru and Vendugampalli, a final total of 89 eligible adolescent girls who completed the full structured interview were included in the statistical analysis.

Adolescent girls were included if they: (1) were within the chronological age bracket of 10 to 19 years, (2) had attained menarche, (3) resided permanently in the selected rural villages of Kuppam Mandal, and (4) provided written informed consent or parental consent with adolescent assent. Girls who had not attained menarche, had previously diagnosed organic pelvic pathologies (such as endometriosis, uterine fibroids, or pelvic inflammatory disease), or were undergoing systemic hormonal therapy were excluded.

➤ Data Collection Instrument, Validity, and Reliability

Data were gathered using a structured, two-section interview schedule developed from clinical literature and validated by subject matter experts in Community Health Nursing, Community Medicine, and Biostatistics:

- Section A (Socio-Demographic Proforma): This section captured nine baseline socio-economic and demographic parameters: chronological age category (≤ 15 years vs. > 15 years), marital status, educational status, current occupation, parental occupation, religious affiliation, village of residence (Gonuguru vs. Vendugampalli), family structure (nuclear vs. joint), and monthly household income ($\leq$ Rs. 10,000; Rs. 10,001–20,000; and $>$ Rs. 20,000).
- Section B (Structured Menstrual Health and Remedial Measures Questionnaire): This section comprised structured items evaluating baseline menstrual characteristics (age at menarche, duration of menstrual flow, and monthly cycle regularity), presence and specific classification of menstrual problems (dysmenorrhea, irregular periods, premenstrual syndrome, and menorrhagia), subjective menstrual pain severity rated on a 0 to 10 numerical rating scale (0 = no pain, 1–3 = mild pain, 4–5 = moderate pain, and 6–10 = severe pain), frequency of symptom recurrence, daily water intake and dietary modifications during menses, primary sources of home remedy guidance, internet health-seeking behavior, specific remedial measures adopted, post-remedy relief status, and self-reported adverse side effects.

Instrument reliability was pre-tested in a pilot sample outside the main study villages using the split-half method and Cronbach's alpha, yielding a reliability coefficient of $r = 0.71$, confirming satisfactory internal consistency.

➤ Ethical Considerations and Data Collection Procedure

Formal ethical approval was obtained from the Institutional Research Committee (IRC) and the Institutional Human Ethics Committee (IHEC) of PES Institute of Medical Sciences and Research (PESIMSR), Kuppam,

Andhra Pradesh (Proposal No.: PESIMSR/HEC/193-25; Approval Date: December 30, 2025), alongside administrative permission from local Panchayat authorities. Prior to data collection, participants and their parents or legal guardians were briefed on the study objectives, voluntary participation, and right to withdraw. Written informed consent (and parental consent with minor assent for participants under 18 years of age) was secured in accordance with the Declaration of Helsinki. Data were collected through private, face-to-face interviews lasting 20 to 30 minutes per participant, and anonymity was safeguarded using numerical participant codes.

➤ Statistical Analysis

Completed questionnaires from all 89 participants were verified, coded into Microsoft Excel, and analyzed using IBM SPSS Statistics for Windows, Version 23.0. Descriptive statistics (frequencies and percentages) were computed to summarize socio-demographic profiles, menstrual characteristics, symptom prevalence, and remedial practices. Inferential bivariate analysis was conducted using the Pearson Chi-Square (χ^2) test to evaluate associations between socio-demographic variables and menstrual problem prevalence, with statistical significance established at $p < 0.05$.

III. RESULTS

➤ Socio-Demographic Characteristics of Study Participants

A total of 89 post-menarcheal adolescent girls participated in the study. As detailed in Table 1, the sample

was balanced across adolescent developmental stages, with 43 girls (48.30%) aged 15 years or younger (early adolescence) and 46 girls (51.70%) aged above 15 years (late adolescence). The vast majority of participants were unmarried (85.40%, $n = 76$), whereas 14.60% ($n = 13$) were married. Regarding educational attainment, 61.80% ($n = 55$) were enrolled in high school and 31.50% ($n = 28$) attended intermediate college, while 4.50% ($n = 4$) were in middle school and 2.20% ($n = 2$) were illiterate. Consequently, 92.10% ($n = 82$) of the cohort were full-time students.

Agricultural farming was the predominant parental occupation (60.70%, $n = 54$), followed by skilled labor (28.10%, $n = 25$), professional employment (5.60%, $n = 5$), and unemployment (5.60%, $n = 5$). Most participants identified as Hindu (76.40%, $n = 68$), followed by Muslim (12.40%, $n = 11$) and Christian (11.20%, $n = 10$). Geographically, 60.70% ($n = 54$) resided in Gonuguru village and 39.30% ($n = 35$) resided in Vendugampalli village. Nuclear families accounted for 61.80% ($n = 55$) of households, while 38.20% ($n = 34$) lived in joint families. Economically, nearly two-thirds of the girls (65.20%, $n = 58$) belonged to families earning Rs. 10,001 to Rs. 20,000 per month, 29.20% ($n = 26$) lived on a monthly family income of Rs. 10,000 or less, and only 5.60% ($n = 5$) belonged to households earning more than Rs. 20,000 per month (Table 1).

Table 1 Frequency and Percentage Distribution of Socio-Demographic Variables of Adolescent Girls (N = 89)

Socio-Demographic Parameter	Frequency (F)	Percentage (%)
Age Category		
≤ 15 Years (Early Adolescence)	43	48.30%
> 15 Years (Late Adolescence)	46	51.70%
Marital Status		
Married	13	14.60%
Unmarried	76	85.40%
Educational Status		
Illiterate	2	2.20%
Middle School	4	4.50%
High School	55	61.80%
Intermediate College	28	31.50%
Participant Occupation		
Homemaker	4	4.50%
Student	82	92.10%
Other Occupation	3	3.40%
Parental Occupation		
Farmer (Agriculture)	54	60.70%
Skilled Worker	25	28.10%
Professional	5	5.60%
Unemployed	5	5.60%
Religion		
Christian	10	11.20%
Hindu	68	76.40%
Muslim	11	12.40%

Socio-Demographic Parameter	Frequency (F)	Percentage (%)
Village of Residence		
Gonuguru	54	60.70%
Vendugampalli	35	39.30%
Family Type		
Joint Family	34	38.20%
Nuclear Family	55	61.80%
Monthly Family Income (INR)		
≤ Rs. 10,000	26	29.20%
Rs. 10,001 – Rs. 20,000	58	65.20%
> Rs. 20,000	5	5.60%

- *Note: INR = Indian Rupees.*

➤ *Baseline Menstrual Characteristics and Overall Problem Prevalence*

Table 2 summarizes the baseline menstrual profile of the 89 participants. More than two-thirds of the girls (68.50%, n = 61) attained menarche at or before 13 years of age, whereas 31.50% (n = 28) reached menarche after age 13. Normal menstrual flow duration of 5 days or less was

reported by 71.90% (n = 64), while 28.10% (n = 25) experienced prolonged bleeding exceeding 5 days per cycle. Overall, 80.90% (n = 72) reported regular monthly menstrual cycles and 19.10% (n = 17) reported irregular cycle intervals. Crucially, 91.00% (n = 81) of the surveyed rural adolescent girls reported experiencing one or more active menstrual problems, whereas only 9.00% (n = 8) experienced completely symptom-free menstruation (Table 2).

Table 2 Frequency and Percentage Distribution of Baseline Menstrual Variables of Adolescent Girls (N = 89)

Menstrual Characteristic Variable	Frequency (F)	Percentage (%)
Age at Menarche		
≤ 13 Years	61	68.50%
> 13 Years	28	31.50%
Menstrual Flow Duration		
≤ 5 Days	64	71.90%
> 5 Days	25	28.10%
Monthly Cycle Pattern		
Regular Cycle	72	80.90%
Irregular Cycle	17	19.10%
Presence of Menstrual Problems		
No (Asymptomatic / Trouble-Free)	8	9.00%
Yes (Experiencing Menstrual Problems)	81	91.00%

- *Note: Total sample analyzed N = 89.*

➤ *Clinical Spectrum, Pain Severity, and Recurrence of Menstrual Problems*

Among the 81 symptomatic adolescent girls, Table 3 delineates the distribution of specific menstrual morbidities, subjective pain intensity, and symptom recurrence. Dysmenorrhea (painful menstruation) was the primary clinical complaint, affecting nearly half of the symptomatic cohort (49.40%, n = 40). Irregular periods constituted the second most frequent disorder (22.20%, n = 18), followed by premenstrual syndrome (17.30%, n = 14) and menorrhagia or heavy menstrual bleeding (11.10%, n = 9).

Evaluation of subjective pain severity on the 0–10 numerical rating scale revealed that 43.20% (n = 35) experienced mild pain (scores 1–3), 37.00% (n = 30) endured moderate pain (scores 4–5), and 11.10% (n = 9) suffered severe, debilitating pain (scores 6–10), while 8.60% (n = 7, whose primary complaints were non-painful cycle irregularity or flow changes) reported a pain score of 0. Thus, 48.10% (n = 39) of symptomatic girls experienced moderate-to-severe menstrual pain. Furthermore, over half of the symptomatic girls (54.30%, n = 44) endured these menstrual problems every single month, while 35.80% (n = 29) experienced them rarely, 8.60% (n = 7) once every 3 months, and 1.20% (n = 1) once every 6 months (Table 3).

Table 3 Frequency and Percentage Distribution of Menstrual Problems, Pain Severity, and Recurrence Among Symptomatic Girls (n = 81)

Menstrual Morbidity Parameter	Frequency (F)	Percentage (%)
Specific Menstrual Problem Identified (n = 81)		
Dysmenorrhea (Painful Periods)	40	49.40%
Irregular Periods	18	22.20%
Premenstrual Syndrome (PMS)	14	17.30%
Menorrhagia (Heavy Menstrual Bleeding)	9	11.10%

Reported Menstrual Pain Severity (0–10 Numeric Scale, n = 81)		
Grade 0 (No Pain)	7	8.60%
Grades 1–3 (Mild Pain)	35	43.20%
Grades 4–5 (Moderate Pain)	30	37.00%
Grades 6–10 (Severe Pain)	9	11.10%
Frequency of Menstrual Problem Recurrence (n = 81)		
Every Month	44	54.30%
Rarely	29	35.80%
Once in 3 Months	7	8.60%
Once in 6 Months	1	1.20%

- *Note: Evaluated Among the n = 81 Adolescent Girls Reporting Active Menstrual Problems.*

➤ *General Health Habits and Informational Support Sources*

Table 4 presents the hydration habits, dietary modifications, and guidance channels utilized by the study participants during menstruation. Across the total sample (N = 89), daily water intake during menses was suboptimal for slightly over half of the cohort: 14.60% (n = 13) consumed only 1–2 glasses per day and 36.00% (n = 32) consumed 3–4 glasses per day, whereas 34.80% (n = 31) drank 5–6 glasses and 14.60% (n = 13) consumed more than 6 glasses daily. Regarding nutrition, 62.90% (n = 56) made no dietary adjustments during menstruation, 30.30% (n = 27) actively

modified their diet, and 6.70% (n = 6) made occasional dietary changes.

Among the 81 symptomatic girls seeking symptom relief, mothers and immediate family members were the predominant advisers for home remedies (54.30%, n = 44), followed by friends and peers (18.50%, n = 15), healthcare providers (17.30%, n = 14), and other community sources (9.90%, n = 8). Digital health-seeking was low: 72.80% (n = 59) did not search the internet for menstrual health information, while 27.20% (n = 22) accessed online information. Among internet users (n = 22), 59.10% (n = 13) used Google or online search databases and 40.90% (n = 9) relied on social media platforms (Table 4).

Table 4 Frequency and Percentage Distribution of General Health Habits and Guidance Sources of Adolescent Girls

Health Habit and Information Source Variable	Frequency (F)	Percentage (%)
Daily Water Intake During Menstruation (N = 89)		
1–2 Glasses per Day	13	14.60%
3–4 Glasses per Day	32	36.00%
5–6 Glasses per Day	31	34.80%
More than 6 Glasses per Day	13	14.60%
Dietary Changes Made During Menstruation (N = 89)		
No Dietary Changes	56	62.90%
Sometimes	6	6.70%
Yes (Active Dietary Modification)	27	30.30%
Primary Adviser Suggesting Home Remedies (n = 81)		
Family / Mother	44	54.30%
Friends / Peers	15	18.50%
Healthcare Providers	14	17.30%
Others	8	9.90%
Internet Search for Menstrual Problem Information (n = 81)		
No (Does Not Search Internet)	59	72.80%
Yes (Searches Internet)	22	27.20%
Primary Internet Source Utilized (n = 22)		
Online Search Databases / Google	13	59.10%
Social Media Platforms	9	40.90%

- *Note: Hydration and dietary habits assessed for N = 89; remedy guidance and internet search assessed for symptomatic girls (n = 81).*

➤ *Remedial Measures Adopted, Relief Status, and Adverse Effects*

As shown in Table 5, the 81 symptomatic adolescent girls utilized a diverse spectrum of pharmacological and non-pharmacological remedial measures. Overall, 63.00%

(n = 51) relied exclusively on non-pharmacological home or behavioral strategies without consulting a physician or purchasing medication. Specifically, 24.70% (n = 20) consulted a medical doctor, 23.50% (n = 19) applied local heat therapy (hot water bags or warm compresses to the lower abdomen), 21.00% (n = 17) consumed traditional herbal and kitchen home remedies (such as ginger decoctions, fenugreek seeds, and turmeric preparations), 18.50% (n = 15) used behavioral coping measures (bed rest,

sleep, or listening to music), and 12.30% (n = 10) self-medicated with over-the-counter (OTC) analgesics purchased directly from local chemist shops.

Post-remedy evaluation indicated that 88.90% (n = 72) achieved satisfactory symptom relief, whereas 11.10% (n = 9) experienced persistent, unalleviated distress. While

91.40% (n = 74) reported no adverse reactions, 8.60% (n = 7) experienced unwanted side effects, particularly among unsupervised analgesic users. Among the 7 girls reporting adverse effects, vomiting was the most frequent complaint (42.90%, n = 3), followed by heavy menstrual bleeding (28.60%, n = 2), headache (14.30%, n = 1), and temporary absence of bleeding (14.30%, n = 1) (Table 5).

Table 5 Frequency and Percentage Distribution of Remedial Measures Adopted, Relief Status, and Adverse Side Effects (n = 81)

Remedial Measure and Clinical Outcome Parameter	Frequency (F)	Percentage (%)
Remedial Measures Adopted for Menstrual Problems (n = 81)		
Consult Medical Doctor	20	24.70%
Local Heat Application (Hot Water Bag)	19	23.50%
Traditional Herbal and Kitchen Home Remedies	17	21.00%
Behavioral Coping Methods (Rest, Music, Sleep)	15	18.50%
Over-the-Counter (OTC) Drugs from Medical Shops	10	12.30%
Symptom Relief Status Post-Remedy (n = 81)		
Yes (Obtained Satisfactory Relief)	72	88.90%
No (Did Not Obtain Relief)	9	11.10%
Experience of Adverse Side Effects (n = 81)		
No Side Effects Experienced	74	91.40%
Yes (Experienced Adverse Side Effects)	7	8.60%
Specific Type of Side Effects Reported (n = 7)		
Vomiting	3	42.90%
Heavy Menstrual Bleeding	2	28.60%
Headache	1	14.30%
Temporary Absence of Bleeding	1	14.30%

• *Note: Assessed Among Symptomatic Participants Adopting Remedial Measures (n = 81); Side Effect Breakdown Based on n = 7 Affected Girls.*

➤ Association Between Menstrual Problems and Socio-Demographic Variables

Inferential analysis using the Pearson Chi-Square (χ^2) test was performed to examine the association between selected socio-demographic variables and the overall prevalence of menstrual problems among the 89 participants (Table 6). Monthly family income demonstrated a statistically significant association with menstrual problem prevalence ($\chi^2 = 6.250$, df = 2, p = 0.044). Specifically, menstrual problems affected 92.30% (24/26) of girls from households earning $\leq$ Rs. 10,000 per month and 93.10% (54/58) of girls from households earning Rs. 10,001–20,000 per month, compared to 60.00% (3/5) of girls from households earning $>$ Rs. 20,000 per month, indicating that

higher household income serves as a protective factor against menstrual morbidity.

Conversely, overall menstrual problem prevalence did not differ significantly across chronological age categories (90.70% in ≤ 15 years vs. 91.30% in > 15 years; $\chi^2 = 0.010$, df = 1, p = 0.920), village of residence (88.90% in Gonuguru vs. 94.30% in Vendugampalli; $\chi^2 = 0.756$, df = 1, p = 0.385), or family structure (90.90% in nuclear families vs. 91.20% in joint families; $\chi^2 = 0.002$, df = 1, p = 0.967) (Table 6). However, specific sub-analysis of menstrual cycle regularity revealed a statistically significant association between younger chronological age (≤ 15 years) and irregular menstrual cycles ($\chi^2 = 4.18$, df = 1, p = 0.041), with early adolescents exhibiting a substantially higher rate of cycle irregularity (27.9%) than late adolescents aged > 15 years (10.9%).

Table 6 Association Between Prevalence of Menstrual Problems and Selected Socio-Demographic Variables (N = 89)

Demographic Variable	Problems: Yes F (%)	Problems: No F (%)	Chi-Square (χ^2)	p-value
Age Category (df = 1)				
≤ 15 Years (n = 43)	39 (90.7%)	4 (9.3%)	0.010	p = 0.920 (NS)
> 15 Years (n = 46)	42 (91.3%)	4 (8.7%)		
Village of Residence (df = 1)				
Gonuguru (n = 54)	48 (88.9%)	6 (11.1%)	0.756	p = 0.385 (NS)
Vendugampalli (n = 35)	33 (94.3%)	2 (5.7%)		
Family Type (df = 1)				
Nuclear Family (n = 55)	50 (90.9%)	5 (9.1%)	0.002	p = 0.967 (NS)
Joint Family (n = 34)	31 (91.2%)	3 (8.8%)		

Monthly Family Income (df = 2)				
≤ Rs. 10,000 (n = 26)	24 (92.3%)	2 (7.7%)	6.250	p = 0.044* (S)
Rs. 10,001 – 20,000 (n = 58)	54 (93.1%)	4 (6.9%)		
> Rs. 20,000 (n = 5)	3 (60.0%)	2 (40.0%)		

- *Note: *Statistically Significant at $p < 0.05$; S = Significant; NS = Not Significant. Sub-Analysis for Age ≤ 15 Years vs. Menstrual Cycle Irregularity: $\chi^2 = 4.18$, $df = 1$, $p = 0.041^*$ (Significant).*

IV. DISCUSSION

➤ Socio-Demographic Profile and Rural Vulnerabilities

The present study examined the prevalence of menstrual problems and self-care remedial practices among 89 post-menarcheal adolescent girls residing in Gonuguru and Vendugampalli villages of Kuppam Mandal, Andhra Pradesh. The demographic distribution was nearly evenly split between early adolescents aged ≤ 15 years (48.30%) and late adolescents aged > 15 years (51.70%), with 68.50% attaining menarche at or before 13 years of age. This menarcheal timing closely mirrors regional epidemiological studies in Andhra Pradesh, including Udayar et al. [8] in Kuppam social welfare hostels (where the modal age at menarche was 13 years), Reddy et al. [9] in rural Nandyal, and Murthy et al. [10] among tribal adolescents in Visakhapatnam (mean menarcheal age of 12–13 years). Notably, while 92.10% of our participants were students enrolled predominantly in high school and intermediate education, 14.60% were already married, reflecting persistent early marriage norms in rural agrarian pockets where 60.70% of fathers are farmers and 94.40% of households earn Rs. 20,000 or less per month.

➤ Prevalence and Clinical Spectrum of Menstrual Morbidities

A striking finding of our investigation is that 91.00% (81/89) of rural adolescent girls experienced at least one active menstrual problem. Among symptomatic participants, dysmenorrhea was the leading complaint (49.40%), followed by irregular menstrual cycles (22.20%), premenstrual syndrome (17.30%), and menorrhagia (11.10%). Furthermore, 48.10% of symptomatic girls reported moderate-to-severe pain (grades 4–10) and 54.30% experienced menstrual problems every month. These findings are highly consistent with regional and national evidence. In Tirupati town, Deekala et al. [5] documented a 67.7% prevalence of dysmenorrhea among government high school girls, demonstrating that menstrual distress scores were strongly predicted by pain severity, cycle length, and socio-economic status. Similarly, Kumbhar et al. [6] reported a 65.0% dysmenorrhea prevalence in Kadapa district (61.2% in rural girls and 68.4% in urban girls), where 47.9% of dysmenorrheic girls suffered sickness absenteeism from school. At the national level, the 2025 meta-analysis by Samal et al. [3] across 15,374 Indian students established a pooled dysmenorrhea prevalence of 65% (with a 59% pooled prevalence in the 10–19-year adolescent subgroup), while Agarwal and Agarwal [7] reported a 71.96%–79.67% dysmenorrhea rate in Gwalior with 33.95% experiencing monthly pain accompanied by

lethargy, depression, and inability to concentrate. In rural Kuppam, the high cumulative morbidity (91.00%) reflects the convergence of early menarche, widespread rural adolescent undernutrition and anemia, inadequate hydration (50.60% drinking ≤ 4 glasses of water daily), and physical household labor.

➤ Health Information Sources, Remedial Measures, and Self-Medication Risks

In our cohort, mothers and family members served as the primary source of guidance for home remedies for 54.30% of symptomatic girls, whereas only 17.30% received advice from healthcare providers and 72.80% never searched the internet for menstrual health information. This heavy reliance on maternal advice aligns with findings from rural Visakhapatnam [10, 11], Nandyal [9], and AIIMS Mangalagiri [12], where Sreeja et al. [12] observed that 57.3% of women and teens could not openly discuss menstrual issues outside the family due to societal taboos. When mothers themselves hold traditional misconceptions or lack formal health literacy, intergenerational transmission of suboptimal hygiene practices and dietary restrictions persists [9, 10, 13].

To manage menstrual pain and associated symptoms, 63.00% of symptomatic girls in Kuppam relied solely on non-pharmacological coping strategies, including local heat application with hot water bags (23.50%), herbal and kitchen remedies such as ginger, fenugreek, and turmeric decoctions (21.00%), and behavioral rest or music (18.50%), while 24.70% consulted a physician and 12.30% purchased OTC analgesics from chemist shops. This pattern closely parallels Kumbhar et al. [6] in Kadapa, where 73.1% of rural adolescent girls relied on non-pharmacological self-help measures such as hot water fomentation and fenugreek consumption compared to 55.2% of urban girls. Recent international studies by Gindaba et al. [14] and Boakye et al. [15] similarly confirmed that 79.1%–80.1% of dysmenorrheic high school students prioritize non-pharmacological modalities—especially warm hydration, ginger tea, sleep, and heat therapy—because they perceive dysmenorrhea as a normal physiological process or fear analgesic side effects. Clinically, topical heat therapy induces local vasodilation, improves myometrial perfusion, and reduces ischemic muscle spasms, while ginger (*Zingiber officinale*) and turmeric (*Curcuma longa*) exhibit natural cyclooxygenase-inhibitory and anti-inflammatory properties [4, 14, 16]. However, the fact that 12.30% of girls in our study practiced unsupervised OTC self-medication and 8.60% experienced adverse effects—predominantly vomiting (42.90% of adverse events) and heavy bleeding (28.60%)—highlights a critical patient safety concern. As emphasized by Itani et al. [4] and Choonara et al. [16], unguided intake of NSAIDs without meal buffering or appropriate dosing predisposes adolescents to acute

gastrointestinal mucosal irritation, nausea, vomiting, and altered hemostasis.

➤ *Socio-Economic and Biological Determinants of Menstrual Morbidity*

Bivariate Chi-Square analysis demonstrated that monthly family income was significantly associated with the prevalence of menstrual problems ($\chi^2 = 6.250$, $p = 0.044$), with girls from households earning $> \text{Rs. } 20,000$ per month experiencing significantly lower morbidity (60.00%) than those in the $\text{Rs. } 10,001\text{--}20,000$ (93.10%) and $\leq \text{Rs. } 10,000$ (92.30%) brackets. This finding is strongly corroborated by national NFHS-5 analyses by Biswas et al. [1] and Singh et al. [2], who demonstrated that household wealth is the single largest determinant of menstrual health disparities in rural India, with adolescents in the richest wealth quintile having nearly four-fold higher odds (AOR = 3.98, 95% CI: 3.69–4.30) of exclusive hygienic product use compared to the poorest quintile. Higher household income enables consistent access to micronutrient-rich diets, private household sanitation, clean water, quality sanitary absorbents, and timely medical consultation, thereby mitigating anemia, urogenital infections, and severe pelvic distress [1, 2, 5]. Additionally, our sub-analysis revealed a statistically significant association between younger adolescent age (≤ 15 years) and menstrual cycle irregularity ($\chi^2 = 4.18$, $p = 0.041$). Physiologically, this reflects incomplete maturation of positive estrogen feedback on the anterior pituitary and anovulatory cycling during the first 1 to 3 years following menarche [3, 4].

➤ *Study Limitations and Public Health Implications*

This study has certain limitations that should be considered when interpreting the findings. First, the investigation was conducted across two selected rural villages in Kuppam Mandal with a sample size of 89 participants recruited via convenient sampling, which may limit generalizability to urban adolescent populations. Second, menstrual pain intensity and flow characteristics were assessed through self-report, which may be subject to recall variation. Nevertheless, the findings carry direct clinical and policy implications for community health nursing. In alignment with recent quasi-experimental evidence by Soni et al. [17], who demonstrated that a structured 30-minute school-based menstrual health education intervention increased rural schoolgirls' menstrual knowledge by 57.4% and menstrual literacy by 188.7% ($p < 0.001$), primary health centers (PHCs) and rural high schools in Kuppam should institutionalize regular, visual menstrual education workshops involving both adolescent girls and their mothers.

V. CONCLUSION

This community-based cross-sectional study reveals a high burden of menstrual problems (91.00%) among rural adolescent girls in Kuppam Mandal, Andhra Pradesh, with dysmenorrhea (49.40%) and irregular menstrual cycles (22.20%) representing the leading morbidities. Nearly half (48.10%) of symptomatic girls suffer moderate-to-severe menstrual pain, and 54.30% endure recurring monthly

distress. While 88.90% achieve symptom relief through medical consultations (24.70%), local heat therapy (23.50%), herbal home remedies (21.00%), behavioral rest (18.50%), and OTC analgesics (12.30%), unsupervised self-medication contributes to preventable adverse side effects in 8.60% of girls. Lower monthly family income ($\leq \text{Rs. } 20,000$; $p = 0.044$) significantly increases overall menstrual morbidity, while younger adolescent age (≤ 15 years; $p = 0.041$) is significantly associated with menstrual cycle irregularity. Strengthening school-based menstrual health education, educating mothers through village health outreach, regulating unsupervised adolescent OTC analgesic sales, ensuring uninterrupted sanitary pad distribution under state schemes, and establishing accessible Adolescent Friendly Health Clinics (AFHCs) under the Rashtriya Kishor Swasthya Karyakram (RKSK) are essential to safeguard the reproductive health and academic potential of rural adolescent girls.

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