

Financial Adoption and Barriers in Adapting Menstrual Equipment in the Rural Population of Belagavi: A Cross Sectional Study

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Abstract

Background: One of the most important phase in a woman's life is menstruation. Knowledge, attitude, and prevalence of usage of sanitary products among rural women in India are emphasised in the present study. To understand the financial barriers and its correlation with hygiene practices used during the period of menstruation among rural women and to plan future interventions, it is imperative to emphasise on the current practices. **Aim:** To examine the association between socioeconomic factors and demographic and the use of menstrual equipment (for eg; sanitary pads, cloth, menstrual cups etc) among rural women in Belagavi. **Material & Methods:** The study included 277 permanent residents from rural areas of Belagavi district, North Karnataka, aged 14 years and above. Participants who met the eligibility criteria were enrolled after obtaining their informed consent before data collection. **Result:** The results show that education status ($p < 0.05$) and monthly family income ($p < 0.05$) had a significant association with sanitary pad usage, meaning women with higher level of education and higher income tend to use sanitary pads more frequently. Waste disposal method ($p < 0.05$), handwashing facility availability ($p < 0.05$) also showed significant relationships, indicating better hygiene practices and lifestyle factors influence pad usage. On the other hand, socio-economic class, drainage around the house, handwashing behaviour, and awareness of government scheme did not show significant associations. **Conclusion:** To have a greater outreach, the menstrual hygiene management (MHM) programs of the country should be strengthened. Multiple strategies should be used to address awareness on reproductive health and hygienic menstrual practices among rural women. Promoting healthy hygienic menstrual practices in rural communities and increasing affordability and accessibility of sanitary products are essential.

Keywords: Menstruation, Rural population, Sanitary pads, Women, Menstrual Hygiene Management (MHM).

Introduction:

A phase of transition from adolescence to womanhood often occurs via a natural biological process termed menstruation.^[1,2] Reportedly around one-fifth of the world's population of young girls or women of reproductive age are from India. Adopting hygienic menstrual practices due to financial and sociocultural barriers are some of the challenges typically faced by people living in rural communities.^[3] Menstruation is often accompanied by increased social and cultural restrictions that discourage or prevent girls and women from engaging in routine activities, including cooking, participating in religious practices, and bathing.^[3,4]

Restricted mobility, unavailability of clean restrooms and menstrual waste disposal facilities in schools along with the fear or embarrassment associated with menstrual odour and blood stains contribute to increasing rates of dropouts of adolescent girls from school each year in India.^[5] This situation is further aggravated by limited awareness about adolescence and menstruation, poor availability to sanitary products, and WASH facilities, all of which lead to inadequate menstrual

hygiene practices.^[6,7]

Recent studies have explored the knowledge, attitudes, and prevalence of hygienic sanitary products used among rural women in India.^[8] Furthermore, an increasing number of studies have examined the various factors associated with the adoption of hygienic practices among women during menstruation.^[9,10] Educational status, financial conditions, various media platform utilization, and area of residence are some of the factors associated with use of hygienic methods during menstruation which have been identified in some of the recent studies.^[11]

Adolescent girls and women of reproductive age frequently possess insufficient knowledge regarding menstrual hygiene management. Limited awareness of the reproductive system and its physiological functions may result in misconceptions, superstitious beliefs, and adverse reproductive health outcomes.^[12] Further more, financial constraints often prevent them from accessing appropriate and hygienic menstrual products.^[4]

Inadequate hygiene management during menstruation leads to increased levels of stress that can negatively impact the overall physical and mental health of young girls and women.^[2] Ensuring better management in this sector has also been a priority of the concerned health authorities of the country in recent years especially in developing countries like India.^[13]

Social and cultural norms are deeply entwined with menstrual hygiene, which have a potential impact on the accessibility and usage of sanitary products like sanitary pads, menstrual cups etc. In many cultural settings, menstruation is surrounded by stigma, and open discussions on the same are often discouraged. Despite being an environmentally sustainable alternative, menstrual cups have limited acceptance in rural communities due to perceptions of discomfort associated with their intravaginal use and prevailing cultural beliefs and taboos.^[15,16]

The prime need of this study suggests the importance of the financial barriers involved in the life of a woman and the various unnoticed barriers that rural women face related to the subject of menstruation.

Therefore, in the current study the correlation of use of various kinds of hygienic methods adopted during period of menstruation in the rural population is studied. Financial impact that occurs in the life of rural menstruating women and the barriers that they undergo on a daily basis related to adaptation of healthy menstrual practices is majorly emphasised in the present study.

Material & Methods

Source of Data: A rural village in Belagavi a district of North Karnataka

Study Design: Cross Sectional Study

Study Duration: October 2025- April 2026

Sample Size: The percentage of participants using Sanitary pads was 52.7 in the study conducted by Bhavana Saini et al.^[17]

$$n = \frac{Z_{\alpha/2}^2 \cdot p \cdot q}{d^2}$$

$Z_{\alpha/2}$ = standard normal value for a given confidence level (e.g., 1.96 for 95% confidence)

p = estimated proportion (in this case, 0.527)

q = 1-p = 0.473

d = absolute error (e.g., 0.06)

n = 276.96 $\approx$ 277 (rounding off to 300)

α = false positive error

Sampling technique: Simple Random Sampling.

Inclusion Criteria: Participants must be permanent residents of rural Belagavi, North Karnataka. Participants must be aged 14 years or older. Participants must be able to communicate in the Kannada language (local language) or English.

Exclusion Criteria: Participants who are unable to communicate in Kannada language (local language) or English. Participants with severe medical conditions that may impact their ability to participate (eg. severe mental illness, terminal illness) were excluded.

Data collection procedure: Data were collected using a structured and pretested questionnaire that included items on demographic characteristics, socioeconomic status, and menstrual hygiene-related variables. Households were selected through a systematic random sampling method, and informed consent was obtained from each participant prior to the commencement of data collection.

Data processing and analysis/statistical analysis: The collection data was entered and analysed in SPSS Version 26.

Results:

The study participants' mean age was 36.83 years, with a standard deviation of 14.34, suggesting that the women's ages varied widely. With a standard deviation of 2.82 and an average of 5.56 family members, the household size variation was considerable.

37.5% of the women were part of mixed families, whilst 55.6% of the women lived in nuclear households. Class I comprised a greater proportion of the women (32.9%) according to the Modified BG Prasad classification, while the lesser socioeconomic classes had increasingly fewer participants. The most common degree of education attained was secondary schooling (37.2%), followed by higher secondary (21.3%), and illiteracy (16.2%).

There are a variety of waste management strategies in the community, as seen by the nearly half of the women who reported door-to-door rubbish collection (49.8%), open dumping (37.2%), and burning (12.6%). The majority (75.1%) had drainage systems surrounding their residences. With 68.2% of people always having soap available and another 29.2% having it occasionally, access to handwashing with soap was generally good. With 87.7% of individuals washing their hands before eating and after defecating, the majority of participants followed good hand hygiene practices. While alcohol consumption was comparatively low at 10.1%, 14.4% of women reported using tobacco. The most prevalent dietary patterns were mixed diets (64.3%). 50.5% of people were fully aware of government health programs, whereas 21.7% were just slightly aware. A small percentage depended on self-medication, traditional healers, or quacks, while over half favored government hospitals (54.9%), followed by private clinics (34.7%) in terms of health seeking behaviour.

According to the socioeconomic distribution, Class I accounted for the largest percentage of participants (32.9%), followed by Class III (26%) and Class II (18.8%). Only 6.5% of the population belonged to Class V, the lowest socioeconomic level, whereas a lower percentage of women (15.9%) belonged to Class IV.

According to the participants' educational profile, the most frequent level of education was secondary schooling (37.2%), followed by higher secondary education (21.3%). Just 1.4% of the women had achieved post-graduation, compared to roughly 13.7% who had finished their education. 16.2% of them were illiterate, and 10.1% had only completed primary school.

Door-to-door pickup accounts for 49.8% of household garbage disposal. Nonetheless, 37.2% of households continued to engage in open dumping. Just 0.4% of families reported employing a septic tank system, compared to 12.6% that burned their garbage.

According to the above results, half of the participants (50.5%) were completely familiar with important government health programs including Janani Suraksha Yojana and Ayushman Bharat. 21.7% more people were only slightly aware. Nevertheless, 27.8% of the ladies said they were completely unaware of these programs.

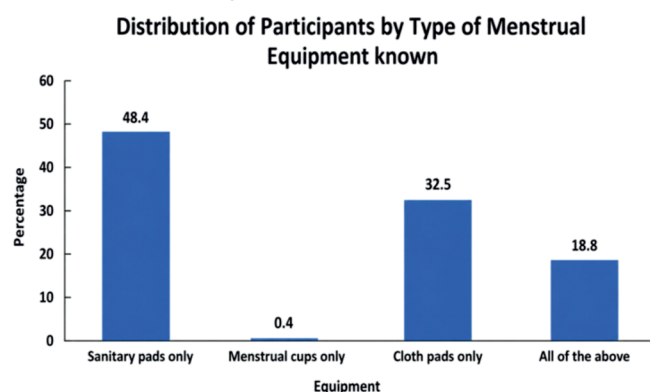


Fig-1: Distribution of Participants by Type of Menstrual Equipment known

The results show that sanitary pads are the most widely known menstrual product, with nearly half of the participants only knowing about them (48.4%). Only roughly 32.5% of people were aware of cotton pads, but only 0.4% were aware of menstruation cups. Furthermore, 18.8% of the ladies knew about every kind of menstrual equipment. (Graph 1)

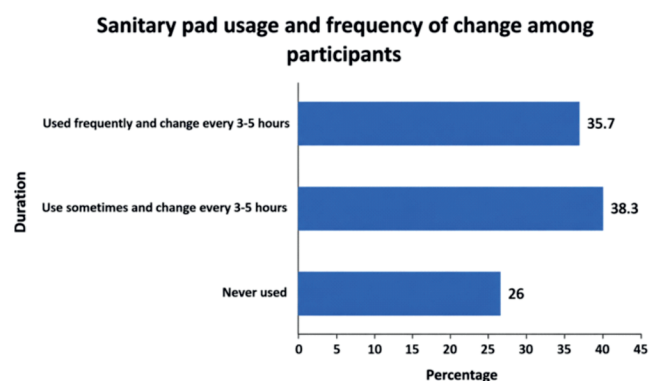


Fig-2: Sanitary pad usage and frequency of change among participants

According to the data, 26% of the women had never used sanitary pads, suggesting that a sizable section of the population had limited adoption. 35.7% of respondents reported using sanitary pads regularly with the same recommended changing interval, whereas 38.3% reported using them occasionally and changing them every three to five hours. (Graph 2)

Table 1: Association of Age and Type of Family with Menstrual equipment adoption

Association	Mean	Std. Deviation	p-value
Age	36.8339	14.33633	0.000*
Type of Family	5.556	2.81583	0.439

*p-value obtained by One way ANOVA test

The results show that age has a statistically significant relationship with the adoption of menstruation equipment ($p = 0.000$), indicating that variations in age groups have a substantial impact on the kind or probability of menstrual equipment that participants use. The kind of family, however, does not exhibit a statistically significant correlation ($p = 0.439$), indicating that a woman's choice of menstrual equipment is not significantly influenced by whether she lives in a nuclear, joint, or extended family. (Table 1)

Table 2: Association of Type of Family with Sanitary Pad Usage patterns(n=277).

Association	Do you use sanitary pads often and what is duration of use?			Chi-Square (p-value)
	Never used	Use sometimes and change every 3-5 hours	Used frequently and change every 3-5 hours	
Type of Family				
Nuclear	41 (26.6)	49 (31.8)	64 (41.6)	13.444 (<0.05) *
Joint	24 (23.1)	53 (51)	27 (26)	
Extended	5 (38.5)	3 (23.1)	5 (38.5)	
Broken	2 (33.3)	1 (16.7)	3 (50)	

*p-value obtained by Chi-Square test

Family type showed a significant association ($p < 0.05$). Women from nuclear families reported more frequent sanitary pads usage as in comparison to those from joint, extended, or broken families, suggesting the influence of family structure on consistent use. (Table 2)

Table 3: Associations between Sociodemographic factors and Sanitary Pad Usage(n=277).

Socio demographic factors	Do you use sanitary pads often and what is duration of use?			Chi-Square (p-value)
	Never used	Use sometimes and change every 3-5 hours	Used frequently and change every 3-5 hours	
Education status				
Illiterate	24 (53.3)	16 (35.6)	5 (11.1)	56.664 (<0.05) *
Primary school (Class 1-5)	13 (46.4)	8 (28.6)	7 (25)	
Secondary school (Class 6-10)	25 (24.3)	49 (47.6)	29 (28.2)	

Higher Secondary (Class 11-12)	4 (6.8)	20 (33.9)	35 (59.3)	
Graduation	6 (15.8)	12 (31.6)	20 (52.6)	
Post-Graduation	0 (0)	1 (25)	3 (75)	
Socio-economic status (Modified BG Prasad classification 2026)				
Class I	21 (23.1)	32 (35.2)	38 (41.8)	4.829 (0.776)
Class II	16 (30.8)	17 (32.7)	19 (36.5)	
Class III	18 (25)	29 (40.3)	25 (34.7)	
Class IV	12 (27.3)	19 (43.2)	13 (29.5)	
Class V	5 (27.8)	9 (50)	4 (22.2)	
Waste disposal method				
Burning waste	9 (25.7)	10 (28.6)	16 (45.7)	14.538 (<0.05) *
Door to door collection	26 (18.8)	56 (40.6)	56 (40.6)	
Open dumping	37 (35.9)	40 (38.8)	26 (25.2)	
Septic tank	0 (0)	0 (0)	1 (100)	
Drainage facility around house				
Yes	48 (23.1)	81 (38.9)	79 (38)	6.256 (0.181)
No	24 (35.3)	25 (36.8)	19 (27.9)	
Sewage tank	0 (0)	0 (0)	1 (100)	
Handwashing Facility with Soap at Home				
Always available	36 (19)	68 (36)	85 (45)	26.983 (<0.05) *
Sometimes available	33 (40.7)	34 (42)	14 (17.3)	
Not Available	3 (42.9)	4 (57.1)	0 (0)	
Do you wash hands before eating and after defecation?				
Yes	60 (24.7)	94 (38.7)	89 (36.6)	5.417 (0.247)
No	10 (45.5)	6 (27.3)	6 (27.3)	
Sometimes	2 (16.7)	6 (50)	4 (33.3)	
Dietary habits				
Vegetarian	13 (22)	28 (47.5)	18 (30.5)	11.525 (<0.05) *
Mixed	49 (27.5)	56 (31.5)	73 (41)	
Non-Vegetarian	10 (25)	22 (55)	8 (20)	
Awareness about Government Health Schemes (Ayushman Bharat, Janani Suraksha Yojana, etc.)				
Aware	34 (24.3)	48 (34.3)	58 (41.4)	4.915

*p-value obtained by Chi-Square test

The findings indicate that the use of sanitary pads is significantly correlated with education status ($p < 0.05$), indicating that women with higher levels of education are more likely to use sanitary pads. Waste disposal method ($p < 0.05$), handwashing facility availability ($p < 0.05$), and dietary habits ($p < 0.05$) also show significant relationships, indicating better hygiene practices and lifestyle factors influence pad usage. On the other hand, religion ($p = 0.339$), socio-economic class ($p = 0.776$), drainage around the house ($p = 0.181$), handwashing behaviour ($p = 0.247$), and awareness of government schemes ($p = 0.296$) do not show significant associations. This means these factors do not significantly affect the frequency of sanitary pad use. (Table 3)

Discussion

Despite various government schemes to promote menstrual hygiene in rural areas through subsidized sanitary napkins, data from the most recent round of the National Family Health Survey (NFHS-6) indicate that the use of hygienic methods during menstruation among women aged 15-24 years has improved nationally from 77.6% (NFHS-5) to 79.2% (NFHS-6), a

significant rural-urban gap in adoption persists across India.^[24] NFHS-6 data further confirm wide inter-state and intra-district variations in hygienic menstrual practices, with rural and socio-economically disadvantaged populations continuing to show lower uptake despite incremental progress.^[24] The review of previous literature also reveals that sub-national geographical disparities in the use of hygienic methods among adolescent women in rural India have remained insufficiently addressed.^[14]

In this cross-sectional study among rural women in Belagavi, only about one-third practised optimal menstrual hygiene, defined as regular sanitary pad use with a recommended change interval of 3-5 hours.^[1] A significant proportion of women had never used sanitary pads, indicating persistent gaps in access, affordability, and awareness, despite efforts by the national and state government to promote menstrual hygiene.^[10] Similar patterns have been reported in rural settings across India, where cultural norms, financial constraints and inadequate infrastructure affect the choice of using appropriate hygienic menstrual practices.^[3]

Age is an important factor associated with the use of menstrual equipment. Older women used sanitary pads more compared to younger women, more likely due to greater autonomy, accumulated experience over time and reduced hesitation in discussing menstrual needs.^[12] As compared to younger women, who often experience limited decision-making power and face stricter social restrictions, this is more likely to contribute to their lower adoption of hygienic methods.^[13]

Family type also influenced menstrual practices adopted by women. Women in nuclear families demonstrated more consistent use of sanitary pads compared to those living in joint or extended families.^[4] A likely explanation is that joint families often enforce stricter behavioural norms, provide less personal privacy and limit women's control over their own spending. These factors, taken together, hinder sustained use of disposable menstrual products.^[18]

Education is a significant determinant of menstrual hygiene. Women with secondary education or higher exhibit substantially better hygienic practices than those who are illiterate or have only primary education.^[5] Education thus increases awareness, confidence and the ability to make informed health decisions and its influence on menstrual behaviour has been consistently been documented in Indian research.^[8]

Financial constraints play a significant role in shaping menstrual practices. There exists a clear association between monthly family income and frequency of sanitary pad usage, with women from higher-income households reporting more frequent use.^[9] In contrast, lower-income households often prioritize essential expenditures such as food and education, resulting in limited money for recurring menstrual product

costs.^[19] As a result, economically disadvantaged women tend to use pads less frequently or continue to use cloth despite being aware of its limitations.^[20]

Dietary habits also proved to be a significant factor associated with pad use, though this also reflects the underlying cultural and socio-economic differences rather than its direct association.^[4] In certain communities, food-related restrictions during menstruation often occur alongside traditional hygiene practices, thereby influencing the menstrual product a woman chooses and how she uses it.^[18]

Awareness of government schemes was not associated with pad use. This gap suggests that knowledge alone is insufficient for adoption without reliable product availability and confidence in the quality of the schemes.^[11] Evaluations of menstrual-hygiene programmes in India have similarly shown that irregular supply and poor distribution reduce their effectiveness.^[22]

Awareness of menstrual cups and reusable pads was strikingly low, with only 0.4% knowing about menstrual cups.^[15] Although environmentally sustainable and cost-effective over time, such products face cultural resistance and require targeted counselling for acceptability.^[23] Increasing access to reusable options may reduce long-term financial burden while addressing waste-management challenges.^[16]

By including adult women across a wide age range, it provides a broader understanding of menstrual behaviours beyond school-based samples.^[1] The use of a composite outcome-product use and correct frequency of change-offers a more meaningful measure of menstrual hygiene than "ever-use" indicators.^[10] Inclusion of household environmental factors contributes to a more comprehensive understanding of the context shaping menstrual behaviour.^[7] The focus on financial constraints aligns with growing literature on menstrual poverty as an important public-health concern.^[19]

Several limitations should be considered. Self-reported menstrual practices may be subject to recall or social-desirability bias. The study's focus on selected rural villages in Belagavi limits the generalisability of findings to other regions or urban populations. Additionally, other variables such as decision-making autonomy, exact menstrual expenditure and stock-outs in government supply chains were not assessed, which restricted a deeper and more comprehensive analysis of the determinants.

Conclusion

Menstrual hygiene practices among rural women come down largely to education, income and whether basic infrastructure like handwashing facilities and proper waste disposal is in place. Women with more education and better financial resources are more likely to use sanitary pads consistently.

But the gaps in awareness and proper access are still existing until proper systems are set in place. So, we need to strengthen the already existing menstrual hygiene management programs, widening educational opportunities, making sanitary products more affordable and building awareness, starting at the community level itself and all of this is to support and promote safer menstrual practices and better health outcomes for every woman in the community.

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