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Exploring the Regional Disparities in Menstrual Hygiene Management among the Female Young Adults in Odisha: A Spatial Analysis on NFHS-5

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Abstract

Background: Despite being an essential part of the health of adolescents and young women, menstrual health and hygiene (MHH) is still poorly understood in India's rural and tribal areas. Using data from the fifth National Family Health Survey (NFHS-5, 2019–21), this study investigates the prevalence and determinants of sanitary menstruation behavior among young women in Odisha between the ages of 15 and 24.

Methods: An analytical sample of 8,591 young women from Odisha drawn for analysis. Using sanitary napkins, locally made napkins, tampons or menstrual cups was described as a hygienic menstruation habit. Using Stata 17 with the proper survey weights, descriptive statistics, chi-square tests, and multivariate logistic regression were carried out. Global Moran's I was used to measure the spatial autocorrelation of district-level MHH rates, and the Getis-Ord Gi* statistic in ArcGIS with Queen contiguity spatial weights was used for hotspot analysis.

Results: In Odisha, 81.53% of young women employed a sanitary technique of menstruation protection. There was a notable district-level difference of 33.38 percentage points, from 60.08% in Nabarangapur to 93.46% in Khordha. District-level MHH rates showed high positive autocorrelation (Global Moran's I = 0.511, z = 5.013, p < 0.001) according to spatial analysis, suggesting a non-random clustering structure. Significant cold spot clusters were found in the southwestern tribal belt, while hot spot clusters were found in the coastal eastern districts, according to hotspot analysis (Getis-Ord Gi*). Education, income index, married status, exposure to TV and newspapers, radio listening, and kind of lavatory were found to be significant factors using multivariate logistic regression.

Conclusions: There are significant regional and socioeconomic disparities in menstrual hygiene habits among young women in Odisha. Particularly in southern and tribal communities, targeted interventions centered on media exposure, education, and sanitary facilities are required.

1. Introduction

According to the report of the latest Census of India (2011), the country’s demographic profile consists of nearly 19% adolescents of the total female population, whose menstrual hygiene management (MHM) is crucial to maintain a healthy and functional life with appropriate developmental outcomes (Kuhlmann et al., 2017). MHM has garnered precise attention from global scientific communities such as UNICEF and WHO (Anton et al., 2021, Roeckel et al., 2019, Chauhan et al., 2021) in the context of achieving the key Sustainable Development Goals including SDG 3 (good health and well-being), SDG 4 (inclusive education), and SDG 5 (gender equality). These initiatives cannot be fully achieved without ensuring safe and dignified menstruation for women of all ages (Geertz et al., 2016, Guterres, 2020), and MHM is increasingly recognised as a public health issue in its own right rather than solely a private hygiene matter (Sommer et al., 2015).

About 82% of young women in Odisha between the ages of 15 and 24 utilize a sanitary form of menstruation protection, according to the IIPS NFHS-5 state report (IIPS and ICF, 2022)

However, national-level studies such as NFHS-5 and subsequent analyses (Singh et al., 2022; Meher and Sahoo, 2023) have largely reported findings at the broad state and district level for Odisha, without capturing intra-state variation. It therefore remains unclear how menstrual hygiene practices differ across Odisha's own districts, highlighting a clear gap for district-specific, spatial analysis despite the presence of several state and central government initiatives, including the Khushi scheme, the menstrual leave program of the Government of Odisha, and the free sanitary napkin distribution program of the Government of India.

Emerging district-level evidence underscores why this gap matters. Odisha presents a compelling case for studying MHM, as findings from Cuttack and Balasore districts show that access to sanitary products and improved sanitation infrastructure alone does not guarantee safe disposal practices, satisfaction with government-supplied products, or hygienic changing behaviour (Nayak et al., 2025; Behera et al., 2024). Tribal-dominated mining districts of Odisha reveal compounding layers of poverty, illiteracy, and sanitation neglect that plausibly deepen menstrual hygiene disadvantage in these communities, reinforcing the need for district-specific investigation of MHM (Sahoo et al., 2026). This disconnect between access and actual practice highlights persistent gaps in policy implementation and behaviour change, underscoring the need for a district-specific investigation into menstrual hygiene management across Odisha. : (1) describe the prevalence of hygienic menstrual practice among young women in Odisha between the ages of 15 and 24; (2) investigate district-level variation across all 30 districts; (3) use a multivariate logistic regression framework to identify sociodemographic, media exposure, and sanitation-related determinants; and (4) use Global Moran's I and Getis-Ord Gi* hotspot analysis to characterise the spatial distribution of district-level MHH rates

2. Methods

2.1. *Data sources and population*

This study is a secondary analysis of the NFHS-5 (2019–21) Individual Recode (IR) dataset for Odisha. NFHS-5 is a nationally representative household survey conducted by the International Institute for Population Sciences (IIPS), Mumbai, under the Ministry of Health and Family Welfare, Government of India (IIPS and ICF, 2022; IIPS and ICF, 2021). The survey used a stratified two-stage cluster sampling design, ensuring representation across urban and rural areas and all districts of Odisha. The study population comprised 8,591 women aged 15–24 years residing in Odisha at the time of the survey

2.2. *Outcomes Variables*

The primary outcome variable was hygienic menstrual practice (Binary: 1 = hygienic, 0 = non-hygienic). Following the IIPS/NFHS-5 definition (IIPS & ICF, 2022), a woman was classified as using a hygienic method if she reported using any of the following: (a) sanitary napkins (s260c), (b) locally prepared

napkins (s260b), (c) tampons (s260d), or (d) menstrual cups (s260e). Women using only cloth (s260a) were classified as non-hygienic. This operational definition is consistent with prior national-level MHH studies using NFHS data (Singh et al., 2022; Meher and Sahoo, 2023).

2.3. *Explanatory Variables*

Independent variables were selected based on prior literature and theoretical frameworks of MHH determinants. These included: (i) sociodemographic characteristics age group (15–19, 20–24), place of residence (urban/rural), highest educational level (no education, primary, secondary, higher), wealth index quintile (poorest to richest), caste/social group (SC, ST, OBC, Others), and marital status (never married, married, widowed/divorced/separated); (ii) media exposure TV watching frequency, newspaper/magazine reading frequency, radio listening frequency, and cinema attendance; and (iii) household sanitation toilet facility type (flush, pit, others, no facility). Wealth index quintiles were constructed by IIPS using principal component analysis of household assets, consistent with standard NFHS methodology (IIPS and ICF, 2022)

2.4. *Statistical analysis*

A descriptive analysis was conducted to examine the distribution of the study population across all predictor variables. Chi-square tests (design-based F-statistics using svy: tab) were used to assess bivariate associations between each predictor and the outcome variable. Subsequently, a multivariate binary logistic regression model (svy: logistic) was fitted to identify independent determinants of hygienic menstrual practice, adjusting for all covariates simultaneously. Survey weights (v005/1,000,000) were applied using Stata's svyset command, with PSU (v021) and strata (v022) specified to account for the complex survey design. Results are presented as odds ratios (ORs) with 95% confidence intervals (CIs). All analyses were performed using Stata 17. Significance was set at $p < 0.05$. To examine the spatial dimension of district-level MHH disparities, two complementary spatial statistical analyses were conducted using ArcGIS Pro. First, Global Moran's I was computed to test whether the spatial distribution of district-level MHH rates across Odisha's 30 districts was clustered, dispersed, or random. Moran's, I range from − 1 (perfect dispersion) to + 1 (perfect clustering), with statistical significance assessed via z-score and permutation-based p-value. Second, hotspot analysis using the Getis-Ord Gi* statistic was performed to identify statistically significant spatial clusters of high MHH rates (hot spots) and low MHH rates (cold spots) at district level. Results were classified at 90%, 95%, and 99% confidence levels. Queen contiguity was used to define spatial neighborhood relationships for both analyses.

3. Results

3.1. *Background characteristics and Bivariate analysis*

Table 1 presents the background characteristics of the study population and the prevalence of hygienic menstrual practice by each characteristic. Overall, 81.53% of young women in Odisha used a hygienic

method of menstrual protection. All sociodemographic and media exposure variables showed statistically significant associations with hygienic practice ($p < 0.001$). A higher proportion of younger women (15–19 years: 85.54%) used hygienic methods compared to older women (20–24 years: 78.06%), with a statistically significant difference (chi-square = 79.41, $p < 0.001$). Urban women had substantially higher hygienic practice (91.65%) than rural women (79.46%). Hygienic practice increased steeply with education from 41.30% among women with no education to 95.60% among those with higher education. A clear wealth gradient was observed, ranging from 67.25% in the poorest quintile to 98.34% in the richest quintile. The Scheduled Tribe women had the lowest hygienic practices (68.98%), compared to 92.76% among women from the 'Others' category. Never-married women (86.25%) had higher rates than married women (73.68%). TV, newspaper, and cinema attendance were all positively associated with hygienic practice. Women with flush or pit toilets had higher rates (86–87%) compared to those with no facility (72.73%), underscoring the role of basic sanitation access highlighted by WHO (WHO, n.d.).

Table 1
Background Characteristics and Prevalence of Hygienic Menstrual Practice among Young Women (15–24 years) in Odisha, NFHS-5 (2019–21)

Variable	n	%	Hygienic (%)	F-statistic (p-value)
Age Group				F = 79.41 (p < 0.001)
15–19 years	4,024	46.84	85.54	
20–24 years	4,567	53.16	78.06	
Place of Residence				F = 58.93 (p < 0.001)
Urban	1,153	13.42	91.65	
Rural	7,438	86.58	79.46	
Education Level				F = 296.27 (p < 0.001)
No education	701	8.16	41.30	
Primary	586	6.82	52.51	
Secondary	6,154	71.63	85.32	
Higher	1,150	13.39	95.60	
Wealth Index				F = 113.11 (p < 0.001)
Poorest	3,263	37.98	67.25	
Poorer	2,417	28.13	83.40	
Middle	1,541	17.94	92.34	
Richer	904	10.52	93.33	
Richest	466	5.42	98.34	
Caste / Social Group				F = 59.38 (p < 0.001)
Scheduled Caste (SC)	1,888	22.31	82.41	
Scheduled Tribe (ST)	2,583	30.52	68.98	
OBC	2,896	34.22	85.48	

Note: Subgroup totals for Caste/Social Group (n = 8,464) and Toilet Facility (n = 8,354) are lower than the overall sample (N = 8,591) due to missing/not-stated responses for these variables, which were excluded from the corresponding rows.

Variable	n	%	Hygienic (%)	F-statistic (p-value)
Others	1,097	12.96	92.76	
Marital Status				F = 46.79 (p < 0.001)
Never married	5,388	62.72	86.25	
Married	3,144	36.60	73.68	
Widowed/Divorced/Sep.	59	0.69	69.49	
TV Watching Frequency				F = 125.78 (p < 0.001)
Not at all	1,731	20.15	65.58	
Less than once/week	1,705	19.85	78.31	
At least once/week	5,155	60.00	87.53	
Newspaper Reading				F = 153.15 (p < 0.001)
Not at all	5,640	65.65	75.12	
Less than once/week	2,132	24.82	92.04	
At least once/week	819	9.53	95.10	
Cinema Attendance				F = 10.69 (p = 0.001)
No	8,155	94.92	81.09	
Yes	436	5.08	88.34	
Toilet Facility				F = 57.73 (p < 0.001)
Flush	4,517	52.58	86.14	
Pit	708	8.24	87.21	
Others	57	0.66	59.92	
No facility	3,072	35.76	72.73	
Total	8,591	100.00	81.53	—

Note: Subgroup totals for Caste/Social Group (n = 8,464) and Toilet Facility (n = 8,354) are lower than the overall sample (N = 8,591) due to missing/not-stated responses for these variables, which were excluded from the corresponding rows.

3.2. *District-level variations*

Table 2 presents hygienic menstrual practice rates across all 30 districts of Odisha. Substantial geographical variation was observed. The highest rates were found in Khordha (93.46%), Jagatsinghapur (92.82%), and Puri (92.68%) all districts in coastal and central Odisha. The lowest rates were in Nabarangapur (60.08%), Rayagada (63.51%), and Malkangiri (64.68%) all located in the southern tribal belt. The overall range of disparity was 33.38 percentage points (Nabarangapur to Khordha), and the district variation was statistically significant (Design-based $F = 8.12$, $p < 0.001$). The choropleth map shows that the north-south regions, with coastal eastern districts comes under the “Good” to “Excellent” condition and southern tribal districts predominantly are in the “Very Poor” category. Global Moran’s I analysis confirmed that the observed spatial pattern of district-level MHH rates was strongly non-random and positively clustered (Moran’s $I = 0.511$, z-score = 5.013, $p < 0.001$).

Hotspot analysis further showed two distinct spatial clusters. A statistically significant cold spot cluster (low MHH, $p < 0.01$, 99% confidence) was identified surrounding the southwestern tribal districts of Nabarangapur, Malkangiri, Koraput, Rayagada, Nuapada, and Kalahandi, with adjacent districts (including Nuapada and Balangir) forming the 95% confidence cold spot periphery. In contrast, a significant hot spot cluster (high MHH, $p < 0.01$, 99% confidence) was identified in the coastal eastern belt, covering Puri, Khordha, Jagatsinghapur, and Kendrapara, with Ganjam and Cuttack forming the 90–95% confidence hot spot fringe.

Table 2
District-Level Prevalence of Hygienic Menstrual Practice among Young Women (15–24 years) in Odisha, NFHS-5 (2019–21)

District	Sample Size (n)	Hygienic Practice (%)
Khordha	265	**93.46**
Jagatsinghapur	233	**92.82**
Puri	254	92.68
Nayagarh	266	89.64
Jharsuguda	251	89.05
Cuttack	228	88.73
Sundargarh	256	87.74
Bhadrak	280	86.85
Anugul	309	86.45
Sambalpur	233	86.10
Kendrapara	229	85.56
Baleshwar	235	85.12
Dhenkanal	245	84.93
Bargarh	266	84.58
Jajapur	276	83.41
Ganjam	317	83.06
Balangir	332	82.38
Baudh	305	79.76
Kendujhar	308	79.60
Debagarh	261	79.44
Subarnapur	334	79.10
Mayurbhanj	290	76.23
Gajapati	295	75.82
Note: Overall range of disparity = 33.38 percentage points (Nabarangapur to Khordha). Survey weights applied. Districts sorted by descending hygienic practice rate.		
*Note: All chi-square tests are design-based F-statistics from svy: tab. Survey weights applied. p < 0.001, ** p < 0.01, * p < 0.05.*		

District	Sample Size (n)	Hygienic Practice (%)
Kandhamal	315	75.34
Kalahandi	332	70.50
Koraput	355	67.16
Nuapada	333	64.98
Malkangiri	358	64.68
Rayagada	264	63.51
Nabarangapur	366	**60.08**

Note: Overall range of disparity = 33.38 percentage points (Nabarangapur to Khordha). Survey weights applied. Districts sorted by descending hygienic practice rate.

*Note: All chi-square tests are design-based F-statistics from svy: tab. Survey weights applied. p < 0.001, ** p < 0.01, * p < 0.05.*

3.3. *Multivariable logistics Regression*

Table 3 shows the results of the multivariate binary logistic regression model. The model fit 8,244 data points (after listwise elimination of missing values) with an overall F (27, 1105) = 30.02, p < 0.001, suggesting a strong fit. Women aged 20–24 were less likely to use sanitary procedures than those aged 15–19 (OR = 0.65, 95% CI: 0.55–0.78, p < 0.001). Differences between rural and urban were not significant. After correction, the odds ratio was not statistically significant (OR = 0.82, p = 0.208), indicating that education and income play a considerable role in explaining rural disadvantages. Education was the biggest predictor, with women with secondary education having 3.3 times higher chances (OR = 3.29, p < 0.001) and those with further education having 7.0 times higher odds (OR = 7.05, p < 0.001) than women with no education. All wealth quintiles had considerably greater chances than the poorest, with the richest quintile having 8.1 times the odds (OR = 8.11, p < 0.001). Married women had a 25% reduced risk compared to unmarried women (OR = 0.75, p = 0.002). Watching television at least once a week was associated with a 36% greater risk (OR = 1.36, p = 0.003). Newspaper reading was highly related to less than once a week (OR = 1.77, p < 0.001) and at least once a week (OR = 2.02, p < 0.001). Listening to the radio less than once per week increased the risks by 58% (OR = 1.58, p = 0.017). Toilet facility: Using a pit toilet was related with 43% greater chances than flush toilet users (OR = 1.43, p = 0.024). Caste was not statistically significant in the adjusted model, indicating that its bivariate influence is substantially confounded by education and income.

Table 3
Multivariate Binary Logistic Regression Determinants of Hygienic Menstrual Practice, Odisha, NFHS-5 (2019–21)

Variable	Odds Ratio	95% CI	p-value
Age Group (ref: 15–19 years)			
20–24 years	0.653	0.550–0.776	**< 0.001**
Place of Residence (ref: Urban)			
Rural	0.816	0.595–1.120	0.208
Education Level (ref: No education)			
Primary	1.103	0.822–1.481	0.512
Secondary	3.291	2.633–4.113	**< 0.001**
Higher	7.049	4.602–10.797	**< 0.001**
Wealth Index (ref: Poorest)			
Poorer	1.669	1.377–2.022	**< 0.001**
Middle	3.025	2.287–4.002	**< 0.001**
Richer	2.970	1.979–4.455	**< 0.001**
Richest	8.113	3.294–19.980	**< 0.001**
Caste (ref: SC)			
Scheduled Tribe	0.902	0.717–1.134	0.377
OBC	0.908	0.731–1.127	0.382
Others	1.293	0.923–1.813	0.136
Marital Status (ref: Never married)			
Married	0.754	0.629–0.903	**0.002**
Widowed/Divorced	—	—	Ns
TV Watching (ref: Not at all)			
Less than once/week	1.052	0.834–1.327	0.668
At least once/week	1.362	1.112–1.669	**0.003**
Newspaper Reading (ref: Not at all)			
Less than once/week	1.766	1.445–2.159	**< 0.001**
At least once/week	2.022	1.392–2.936	**< 0.001**

Variable	Odds Ratio	95% CI	p-value
Age Group (ref: 15–19 years)			
Radio Listening (ref: Not at all)			
Less than once/week	1.584	1.085–2.313	**0.017**
At least once/week	0.679	0.349–1.323	0.255
Toilet Facility (ref: Flush)			
Pit	1.428	1.048–1.946	**0.024**
Others	0.534	0.242–1.180	0.121
No facility	0.956	0.810–1.127	0.591

Note: OR = Odds Ratio; CI = Confidence Interval. Survey-weighted logistic regression (svy: logistic). N = 8,244. F(27,1105) = 30.02, p < 0.001. p < 0.001, p < 0.01, * p < 0.05. Reference categories shown in italic

4. Discussion

This study examined the determinants and spatial distribution of hygienic menstrual health practices among young women (15–24 years) in Odisha using NFHS-5 data. Two key findings emerged. First, socioeconomic factors, particularly education and household wealth, emerged as the strongest predictors of hygienic practice, with women who had higher education and those from the wealthiest households substantially more likely to adopt hygienic methods, while caste and rural-urban residence showed no independent association once other factors were controlled. Second, hygienic practice was not randomly distributed across the state: prevalence ranged from 60.08% in Nabarangpur to 93.46% in Khordha, and spatial autocorrelation analysis confirmed that this variation reflects genuine geographic clustering (Moran's I = 0.51, p < 0.001) rather than chance (Singh et al., 2022).

Education emerged as the strongest predictor (AOR ≈ 7), matching the range of odds ratios (3–9) reported across multiple studies (Chauhan et al., 2021; Roy et al., 2021; Anand et al., 2015; Vishwakarma et al., 2021; Singh et al., 2022), including a multilevel nuance the present single-level analysis omits that individual- and community-level education effects operate independently (Singh et al., 2022). A regional parallel from Nepal reinforces the limits of a purely knowledge-based interpretation: despite fair-to-good menstrual hygiene knowledge among most school adolescents, only 40% translated this into good hygienic practice, with persistent taboos and restrictive practices surrounding menstruation, which have similarly been documented among low-income urban communities in India (Thakur et al., 2014), and inadequate school WASH facilities identified as the main gap between knowing and doing (Yadav et al., 2018), suggesting education's association with hygienic practice here likely also proxies for reduced stigma and household bargaining power. Wealth showed a similarly strong gradient (67.25% to 98.34%, AOR = 8.11, p < 0.001), consistent with comparable gradients from Uttar Pradesh and Bihar (Chauhan et

al., 2021), unmarried women nationally (Anand, Unisa & Singh, 2015), and NFHS-4 data (Ram et al., 2020), with cost of sanitary products repeatedly identified as the underlying mechanism (MacRae et al., 2019; Garg, Goyal & Gupta, 2012; Dasgupta & Sarkar, 2008). Rural residence (79.46% vs. 91.65%) and Scheduled Tribe status (68.98% vs. 92.76%) were both significant at the bivariate level but lost significance after adjustment here, whereas (Roy et al., 2021) found both remained independently significant using NFHS-4 data a difference that may reflect genuine improvement in Odisha's rural and tribal access to wealth, education, and sanitation between survey rounds rather than a methodological discrepancy. This disadvantage may also be compounded by seasonal vulnerability: Odisha's southwestern tribal belt is flood- and monsoon-prone, and evidence from flood-affected Bangladesh shows that already-fragile WASH infrastructure collapses further during such events, forcing women onto unhygienic materials even where baseline access otherwise exists (Al-Mamun et al., 2025), suggesting a compounding rather than static disadvantage in these districts. Married women also had significantly lower odds of hygienic practice than never-married women, a pattern qualitative research in rural Odisha helps explain: recently married women described new mobility restrictions in their husbands' households, needing permission or accompaniment simply to fetch water or bathe, leaving them "dependent on others" for basic menstrual management (MacRae et al., 2019) direct support for marriage constraining practice through reduced autonomy rather than marital status itself. Radio listening also showed a similar trend in the study of Trivedy & Khatun (2026), likely reflecting radio's declining relevance among younger populations relative to TV and newspapers, both of which remained positive predictors (OR = 1.362 and 2.02, respectively).

In tribal-dominated mining districts of Odisha, poverty, illiteracy, and poor sanitation infrastructure compound one another, which might be due to the marginalisation of the Scheduled Tribe women in context of education and wealth (Sahoo et al., 2026). A study highlighted that even where latrines were present, rural Odisha women largely avoided using them and preferred secrecy elsewhere due to social norms treating latrines as unclean (MacRae et al., 2019). This research is echoed by district-level evidence that Cuttack women were dissatisfied with government-supplied pads and disposed of them unsafely despite the state's Khushi scheme (Nayak et al., 2025), while high sanitation coverage in Balasore still didn't stop many women from changing materials in their bedroom rather than the toilet (Behera et al., 2024). This suggests toilet type may partly capture broader privacy norms rather than plumbing itself. Odisha's own policy response includes the Khushi scheme, which provides free and subsidized sanitary napkins to schoolgirls and rural women, and a recently approved menstrual leave policy for government employees yet the implementation gaps above mirror a broader pattern across Indian states, where schemes like Karnataka's Shuchi have been abruptly discontinued despite court directives, leaving girls without free products or functional school toilets. This suggests Odisha's clustered disadvantage reflects a gap between scheme design and on-the-ground delivery as much as an absence of policy.

The attenuation of caste and rural effects after adjustment is arguably the most important finding here, as it shifts the policy narrative away from identity-based targeting toward access-based intervention the real levers appear to be affordability, education, and sanitation infrastructure, unevenly distributed across

caste and residence rather than caused by them. At the same time, persistent district-level clustering after adjustment suggests Odisha still has place-specific gaps in market access, health-system reach, or seasonal resilience that individual-level policy alone will not close, justifying a two-track approach combining subsidized access and education with targeted, disaster-resilient infrastructure investment in cold-spot districts. Quantitative measures of "hygienic practice" may also understate the barriers women face; qualitative work from this state shows needs extending to privacy, pain management, and freedom from restrictive social norms (MacRae et al., 2019), dimensions a survey-based definition cannot capture.

5. Conclusion

This study mainly highlights that there are several socioeconomic and geographic factors that influence young women's sanitary menstruation practices in Odisha. After accounting for caste and rural-urban residency, education and household wealth emerged as the main factors, indicating that access-based barriers rather than identification alone account for a large portion of the observed discrepancy. These results indicate an imperative investment in education, accessibility of hygiene products, and empowerment at the household level to bridge the socioeconomic divide. The cross-sectional design is one of the limitations of the study, where simple associations were made without going deeper into causal inferences. The study is based on self-reported data, which may carry recall or social desirability bias. Future investigations utilising longitudinal or multilevel datasets are essential to ascertain causal relationships, especially concerning the influence of education, and to assess if the implementation of schemes, rather than mere presence, is bridging the geographical MHH disparity in Odisha.

Declarations

Ethics Approval and Consent to Participate

This study used secondary data that is publicly available. The dataset contains no identifiable information on survey participants; therefore, no additional ethical approval was required for this analysis.

Consent for Publication

Not applicable.

Competing Interests

The authors declare that they have no competing interests.

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Not applicable.

Authors' Contributions

N.R.R conceived and designed the study, performed the statistical analysis, and wrote the first draft of the manuscript. A.M contributed to the conceptualization of the study and reviewed the earlier drafts of the manuscript. B.P contributed to reading and writing sections of the manuscript. All authors read and approved the final manuscript.

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Availability of Data and Materials

The data used in this study are publicly available from the DHS Program website. Any individual can register and obtain the data in electronic format at: https://dhsprogram.com/data/new-user-registration.cfm

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