

Reproductive morbidity and associated factors among ever-married women aged 15–49 years attending a tertiary care hospital in bihar: a hospital-based observational study.

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Page | 1

Abstract

Background

Reproductive morbidity remains an important public health concern among women of reproductive age, particularly in rural and socioeconomically disadvantaged populations. Identifying common reproductive morbidities and their associated factors is essential for improving women's reproductive health.

Aim

To determine the prevalence and pattern of reproductive morbidity among ever-married women aged 15–49 years attending Madhubani Medical College and Hospital and to identify associated socio-demographic and reproductive factors.

Materials and Methods

A hospital-based observational study was conducted among 120 ever-married women aged 15–49 years attending the Gynecology Outpatient Department. Participants were enrolled using consecutive sampling. Socio-demographic characteristics, menstrual and reproductive history, contraceptive practices, menstrual hygiene, clinical findings, and relevant investigations were recorded using a structured proforma. Data were analysed using SPSS version 27.0. Associations were assessed using the Chi-square test or Fisher's exact test, as appropriate, and multivariable logistic regression was performed to identify independent predictors.

Results

The mean age of participants was 31.8 ± 7.4 years. Overall, 72 (60.0%) women had at least one reproductive morbidity. Reproductive tract infections were the most common morbidity (31.7%), followed by menstrual disorders (24.2%), pelvic inflammatory disease (16.7%), cervical erosion (15.0%), uterine fibroids (12.5%), ovarian cysts (10.8%), and pelvic organ prolapse (8.3%). Increasing age, multiparity, poor menstrual hygiene, and low educational status were significantly associated with reproductive morbidity ($p < 0.05$). On multivariable analysis, poor menstrual hygiene, multiparity, low educational status, and age ≥ 35 years were independent predictors.

Conclusion

Reproductive morbidity was common among ever-married women attending the tertiary-care hospital. Strengthening reproductive health screening, menstrual hygiene education, health awareness, and timely diagnosis and management may help reduce the burden of reproductive morbidity.

Keywords: Reproductive morbidity; Reproductive tract infection; Ever-married women; Women's health; Menstrual disorders; Pelvic inflammatory disease; India.

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Introduction

Reproductive health is an integral component of women's overall health and well-being. According to the World Health Organization (WHO), reproductive health encompasses complete physical, mental, and social well-being in all matters relating to the reproductive system and its functions throughout the reproductive lifespan rather than merely the absence of disease. Reproductive morbidity includes a wide spectrum of gynecological, obstetric, menstrual, infectious, endocrine, and structural disorders that adversely affect the reproductive health of

women. These conditions significantly impair quality of life, reduce productivity, contribute to infertility, increase maternal morbidity, and impose substantial socioeconomic burdens on families and healthcare systems worldwide.¹

In low- and middle-income countries, reproductive morbidity continues to represent a major public health challenge. Limited awareness regarding reproductive health, poor menstrual hygiene, early marriage, repeated pregnancies, inadequate nutrition, restricted access to healthcare services, and prevailing sociocultural barriers contribute to delayed diagnosis and treatment. Many

women consider gynecological symptoms as a normal part of their reproductive life and therefore do not seek timely medical attention, resulting in chronic complications and preventable morbidity.²

India bears a considerable burden of reproductive morbidity among women of reproductive age. Community- and hospital-based studies have consistently demonstrated a high prevalence of reproductive tract infections (RTIs), sexually transmitted infections (STIs), menstrual abnormalities, pelvic inflammatory disease (PID), uterine fibroids, cervical lesions, infertility, pelvic organ prolapse, and urinary tract infections. The burden is particularly high among rural populations where healthcare accessibility, educational status, sanitation, and awareness regarding reproductive health remain inadequate.³

Reproductive tract infections constitute one of the commonest reproductive morbidities affecting Indian women. These infections may involve the lower or upper genital tract and often present with abnormal vaginal discharge, lower abdominal pain, dyspareunia, menstrual disturbances, dysuria, or infertility. If left untreated, RTIs may progress to pelvic inflammatory disease, chronic pelvic pain, ectopic pregnancy, infertility, adverse pregnancy outcomes, and increased susceptibility to sexually transmitted infections. Early diagnosis and appropriate management therefore remain essential components of reproductive healthcare.⁴

Menstrual disorders are another important contributor to reproductive morbidity among women aged 15–49 years. Abnormal uterine bleeding, dysmenorrhea, oligomenorrhea, polymenorrhea, and amenorrhea are frequently encountered in gynecological practice and significantly affect physical, psychological, and social well-being. Similarly, structural gynecological disorders including uterine fibroids, adenomyosis, ovarian cysts, cervical erosion, and pelvic organ prolapse contribute substantially to morbidity, particularly among multiparous and older women. These conditions often require prolonged medical management or surgical intervention and considerably affect reproductive performance and quality of life.⁵

Several socio-demographic and reproductive factors influence the occurrence of reproductive morbidity. Increasing age, multiparity, low educational attainment, poor socioeconomic status, inadequate menstrual hygiene, early age at marriage, high parity, obesity, anemia, poor nutritional status, and limited utilization of reproductive health services have been identified as important determinants. Understanding these factors is essential for designing targeted preventive strategies and improving women's reproductive healthcare through health education, early screening, and timely intervention.⁶

Although several national programmes including the Reproductive, Maternal, Newborn, Child and Adolescent Health (RMNCH+A) programme have strengthened reproductive healthcare services in India, reproductive morbidity continues to remain underdiagnosed, particularly in rural and underserved populations. Hospital-based prospective studies provide valuable information regarding the pattern of reproductive morbidity, associated risk factors, and healthcare-seeking behaviour, thereby facilitating evidence-based planning of preventive and therapeutic interventions.⁷

Madhubani district of Bihar represents a predominantly rural population where socioeconomic disparities, limited awareness regarding reproductive health, inadequate sanitation, and restricted healthcare accessibility may contribute to increased reproductive morbidity among women. However, published prospective data from this region remain limited. Estimating the prevalence and identifying associated factors are important for planning appropriate reproductive health services and strengthening preventive healthcare at both institutional and community levels.

Therefore, the present prospective observational study was undertaken to determine the prevalence and pattern of reproductive morbidity among ever-married women aged 15–49 years attending Madhubani Medical College and Hospital and to evaluate the socio-demographic and reproductive factors associated with these morbidities.

Materials and methods

Study Design

A hospital-based observational study was conducted among ever-married women aged 15–49 years attending the Department of Obstetrics and Gynaecology at Madhubani Medical College and Hospital (MMCH), Madhubani, Bihar, India. Eligible participants were consecutively enrolled during the study period and evaluated for reproductive morbidity using a structured clinical and reproductive health assessment.

Study Setting

The study was conducted in the Department of Obstetrics and Gynaecology, Madhubani Medical College and Hospital, Madhubani, Bihar, India, a tertiary-care teaching hospital providing comprehensive reproductive healthcare services to both urban and rural populations.

Study Duration

The study was conducted for 12 months

Study Population

The study population comprised ever-married women aged 15–49 years attending the Gynecology Outpatient Department and fulfilling the predefined eligibility criteria.

Sample Size

The sample size was calculated using the single population proportion formula described by Lwanga and Lemeshow. Assuming a prevalence of reproductive morbidity of 60%, a 95% confidence level ($Z = 1.96$), and an absolute precision of 9%, the minimum required sample size was calculated to be 114 participants. After accounting for approximately 5% non-response or incomplete data, the final sample size was increased to 120 participants, who were enrolled consecutively during the study period.

Sampling Technique

Consecutive sampling was used until the required sample size was achieved.

Eligibility Criteria

Inclusion Criteria

- Ever-married women aged 15–49 years.
- Women attending the Gynecology OPD during the study period.
- Women willing to participate and providing written informed consent.

Exclusion Criteria

- Pregnant women.
- Women in the immediate postpartum period (within six weeks after delivery).
- Women with severe medical illness requiring emergency management.
- Women unwilling to participate.
- Women with incomplete clinical evaluation or missing essential investigation reports.

Study Procedure

After obtaining written informed consent, all eligible participants underwent a detailed interview using a predesigned structured case-record form. Information regarding socio-demographic characteristics, menstrual and reproductive history, contraceptive practices, and menstrual hygiene was recorded.

Socio-demographic variables included age, residence, educational status, occupation, socioeconomic status, and religion. Reproductive and menstrual history included age at marriage, age at menarche, menstrual cycle characteristics, menstrual hygiene practices, history of abnormal vaginal discharge, dysmenorrhea, obstetric history, parity, history of abortion, and contraceptive use.

Each participant underwent a complete general and systemic examination followed by a gynecological examination, including assessment of height, weight, body mass index, blood pressure, pallor, per-abdominal examination, speculum examination, and bimanual pelvic examination.

Diagnostic Evaluation

Relevant laboratory and imaging investigations were performed when clinically indicated based on the participant's symptoms and clinical findings. These included:

- Complete blood count
- Urine routine examination and microscopy
- Random blood sugar
- Urine pregnancy test, where indicated
- Microscopic examination of vaginal discharge
- Cervical smear/Papanicolaou (Pap) smear, when indicated
- Pelvic ultrasonography
- Culture and sensitivity testing, where clinically indicated.

Definition of Reproductive Morbidity

Reproductive morbidity was defined as the presence of one or more clinically diagnosed gynecological conditions affecting the reproductive system identified

during clinical evaluation and relevant diagnostic assessment. The reproductive morbidities assessed included reproductive tract infections, pelvic inflammatory disease, menstrual disorders, cervical erosion, uterine fibroids, ovarian cysts, pelvic organ prolapse, and other clinically significant gynecological disorders diagnosed during the study.

Outcome Measures

Primary Outcome

The primary outcome was the prevalence of reproductive morbidity among ever-married women aged 15–49 years.

Secondary Outcomes

The secondary outcomes included:

- Pattern and distribution of reproductive morbidities.
- Association between socio-demographic characteristics and reproductive morbidity.
- Association between reproductive characteristics and reproductive morbidity.
- Independent predictors of reproductive morbidity.

Bias

Consecutive sampling was used to minimize potential selection bias among eligible women attending the Gynecology OPD during the study period. A standardized structured case-record form was used for systematic collection of socio-demographic, menstrual, reproductive, and clinical information. All enrolled participants underwent the same clinical assessment, while relevant investigations were performed according to clinical indications. These measures were used to improve consistency in participant selection and data collection and to minimize potential selection and information bias.

Statistical Analysis

Data were entered into Microsoft Excel and analysed using **IBM SPSS Statistics version 27.0** (IBM Corp., Armonk, NY, USA). Continuous variables were expressed as **mean $\pm$ standard deviation (SD)**, while categorical variables were presented as **frequencies and percentages**.

Associations between categorical variables were assessed using the **Chi-square test**. **Fisher's exact test was used when expected cell frequencies were insufficient for the Chi-square test**. Continuous variables were compared using the **independent Student's t-test**.

Variables demonstrating statistical significance on univariate analysis (**$p < 0.05$**) were entered into a **multivariable logistic regression model** to identify independent predictors of reproductive morbidity. Adjusted odds ratios (AORs) with **95% confidence intervals (CIs)** were calculated. A **two-tailed p-value < 0.05** was considered statistically significant.

Ethical Considerations

The study was conducted in accordance with the ethical principles of the **Declaration of Helsinki**. Ethical approval was obtained from the **Institutional Ethics Committee of Madhubani Medical College and Hospital, Bihar, before commencement of the study**.

RESULTS

During the study period, **128 women** were assessed for eligibility. Five women were excluded because they did not meet the eligibility criteria, while three women declined participation or had incomplete clinical evaluation. Thus, **120 women were enrolled and included in the final analysis**.

A total of **128** ever-married women aged 15–49 years were assessed for eligibility during the study period. After excluding women who did not meet the inclusion criteria ($n=5$) and those who declined participation or had incomplete evaluation ($n=3$), **120 women** were enrolled in the final analysis.

The mean age of the study participants was **31.8 ± 7.4 years** (range: 17–49 years). Most participants belonged to the **25–34 years age group (41.7%)**, followed by **35–44 years (30.0%)**. Rural residents constituted **70.0%** of the study population, while **61.7%** were multiparous. Overall, **72 women (60.0%)** were diagnosed with at least one reproductive morbidity.

Baseline Socio-demographic Characteristics

The majority of participants were between 25 and 34 years of age (41.7%). Most women belonged to rural areas (70.0%), had education up to the secondary level or below, and were homemakers. Multiparity was observed in more than half of the study population (Table 1).

Table 1. Baseline socio-demographic characteristics of the study participants (n = 120)

Variable	Frequency	Percentage (%)
Age group (years)		
15–24	22	18.3
25–34	50	41.7
35–44	36	30.0
45–49	12	10.0
Mean age (years)	31.8 ± 7.4	—
Residence		
Rural	84	70.0
Urban	36	30.0
Education		
Illiterate	28	23.3
Primary	32	26.7
Secondary	38	31.7
Graduate & above	22	18.3
Occupation		
Homemaker	91	75.8
Employed	29	24.2

Obstetric and Reproductive Characteristics

Most women were multiparous (61.7%). Approximately one-third reported previous contraceptive use, while poor menstrual hygiene practices were observed among 40.8% of participants (Table 2).

Table 2. Obstetric and reproductive characteristics

Variable	Frequency	Percentage (%)
Multiparity	74	61.7
Previous abortion	21	17.5
Contraceptive use	43	35.8
Poor menstrual hygiene	49	40.8
Age at marriage <20 years	58	48.3

Prevalence and Pattern of Reproductive Morbidity

Among the 120 women studied, **72 (60.0%)** had at least one reproductive morbidity. Reproductive tract infections

were the commonest diagnosis (**31.7%**), followed by menstrual disorders (**24.2%**), pelvic inflammatory disease (**16.7%**), cervical erosion (**15.0%**), uterine fibroids (**12.5%**), ovarian cysts (**10.8%**), and pelvic organ prolapse (**8.3%**) (Table 3). The distribution of reproductive morbidities is illustrated in **Figure 1**.

Table 3. Pattern of reproductive morbidity among study participants

Reproductive morbidity	Frequency	Percentage (%)
Reproductive tract infection	38	31.7
Menstrual disorders	29	24.2
Pelvic inflammatory disease	20	16.7
Cervical erosion	18	15.0
Uterine fibroid	15	12.5
Ovarian cyst	13	10.8
Pelvic organ prolapse	10	8.3

Clinical Presentation

Abnormal vaginal discharge was the commonest presenting complaint (43.3%), followed by lower abdominal pain (35.0%), menstrual irregularities (29.2%),

dysmenorrhea (25.8%), and backache (22.5%) (Table 4). The frequency of common clinical symptoms is shown in Figure 2.

Table 4. Clinical presentation among women with reproductive morbidity

Clinical feature	Frequency	Percentage (%)
Abnormal vaginal discharge	52	43.3
Lower abdominal pain	42	35.0
Menstrual irregularity	35	29.2
Dysmenorrhea	31	25.8
Backache	27	22.5
Dyspareunia	18	15.0

Association Between Socio-demographic Factors and Reproductive Morbidity

Increasing age, lower educational status, multiparity, and poor menstrual hygiene were significantly associated with reproductive morbidity (Table 5).

Table 5. Association between socio-demographic factors and reproductive morbidity

Variable	Morbidity Present (n=72)	Morbidity Absent (n=48)	p-value
Age ≥35 years	36	12	0.011
Rural residence	55	29	0.248
Low education	46	14	0.003
Multiparity	53	21	0.006
Poor menstrual hygiene	38	11	0.001

Association Between Reproductive Factors and Reproductive Morbidity

Women married before 20 years of age and those not using contraception demonstrated a significantly higher prevalence of reproductive morbidity (Table 6).

Table 6. Association between reproductive characteristics and reproductive morbidity

Variable	Morbidity Present	Morbidity Absent	p-value
Marriage before 20 years	41	17	0.028
Previous abortion	17	4	0.083
No contraceptive use	51	26	0.041

Multivariable Logistic Regression Analysis

Variables demonstrating statistical significance in univariate analysis were entered into a multivariable logistic regression model. Poor menstrual hygiene

remained the strongest independent predictor of reproductive morbidity, followed by multiparity and low educational status (Table 7). The adjusted odds ratios are illustrated in **Figure 3**.

Page | 7

Table 7. Multivariable logistic regression analysis for predictors of reproductive morbidity

Variable	Adjusted OR	95% CI	p-value
Poor menstrual hygiene	3.42	1.54–7.58	0.003
Multiparity	2.84	1.32–6.11	0.008
Low educational status	2.31	1.08–4.95	0.031
Age ≥ 35 years	2.09	1.01–4.36	0.047

Figure 1: Distribution of reproductive morbidities among the study participants

Discussion

The present prospective observational study demonstrated that **60.0%** of ever-married women aged 15–49 years had at least one reproductive morbidity, indicating a substantial burden of gynecological disorders among women attending a tertiary care hospital. This finding highlights that reproductive morbidity continues to be an important public health problem despite ongoing reproductive health programmes. Similar studies from India have also reported a high prevalence of reproductive morbidity, particularly among women from rural and socioeconomically disadvantaged populations, emphasizing the need for early diagnosis and comprehensive reproductive healthcare.^{8–10}

Reproductive tract infections (31.7%) were the most common morbidity identified in the present study, followed by menstrual disorders (24.2%) and pelvic inflammatory disease (16.7%). This pattern suggests that infectious and inflammatory conditions continue to account for a major proportion of gynecological morbidity. The predominance of RTIs may be attributed to inadequate menstrual hygiene, delayed healthcare-seeking behaviour, poor genital hygiene, and limited awareness regarding reproductive health. Similar observations have been reported in previous Indian studies, where RTIs consistently represented the leading reproductive health problem among women of reproductive age.^{8,9}

Abnormal vaginal discharge was the commonest presenting complaint, followed by lower abdominal pain, menstrual irregularities, dysmenorrhea, and backache. These symptoms are well-recognized manifestations of reproductive tract infections and pelvic inflammatory disease and should prompt comprehensive gynecological evaluation rather than symptomatic treatment alone. Early recognition and appropriate management may prevent

long-term complications, including chronic pelvic pain, infertility, and adverse reproductive outcomes.¹¹

The present study identified increasing age, low educational status, multiparity, and poor menstrual hygiene as significant determinants of reproductive morbidity. Women aged ≥ 35 years had a significantly higher prevalence of reproductive disorders, which may reflect cumulative exposure to reproductive risk factors, repeated pregnancies, hormonal changes, and chronic gynecological conditions. Similar associations between advancing age and reproductive morbidity have been reported in previous epidemiological studies.¹²

Low educational status was independently associated with reproductive morbidity. Women with limited education may have reduced awareness regarding menstrual hygiene, reproductive health, and the importance of early healthcare utilization. Education also influences health-seeking behaviour and adoption of preventive practices, making it an important social determinant of women's reproductive health.¹³

Multiparity remained an independent predictor of reproductive morbidity in the multivariable logistic regression analysis. Repeated pregnancies and childbirth may contribute to pelvic floor weakness, cervical trauma, pelvic organ prolapse, and chronic pelvic infections, thereby increasing the risk of reproductive disorders. Likewise, poor menstrual hygiene emerged as the strongest independent predictor in the present study, with affected women demonstrating more than threefold higher odds of reproductive morbidity. This finding underscores the importance of menstrual hygiene education, improved access to sanitary products, and community-based awareness programmes as practical strategies for reducing preventable reproductive health problems.^{14,15}

Early marriage and non-use of contraception were also significantly associated with reproductive morbidity in

univariate analysis. Early marriage often results in early childbearing, repeated pregnancies, and prolonged reproductive exposure, whereas regular interaction with family planning services may facilitate timely counselling and early identification of gynecological disorders. These observations support strengthening adolescent reproductive health education and improving access to family planning and preventive reproductive healthcare services.¹⁶

Generalizability

The findings of this study may be applicable to ever-married women aged 15–49 years attending similar tertiary-care gynecological facilities, particularly those serving rural and socioeconomically disadvantaged populations. However, the study was conducted at a single tertiary-care centre and included women seeking gynecological care; therefore, the findings may not be directly generalizable to the wider community or to women who do not seek healthcare services. The observed prevalence may also differ across populations with different socioeconomic, educational, cultural, and healthcare-access characteristics. Multicentre community-based studies involving larger and more diverse populations are required to establish the broader population burden of reproductive morbidity.

Limitations of the study

This study has several limitations. First, it was conducted at a single tertiary-care hospital with a relatively small sample size, which may limit the generalizability of the findings to the wider population. Second, hospital-based recruitment may have introduced selection bias because women seeking gynecological care may differ from women in the community who do not seek medical attention. Third, some menstrual and reproductive characteristics were based on participant-reported information and may therefore be subject to recall or reporting bias. Finally, the study primarily assessed the prevalence and associated factors of reproductive morbidity and did not evaluate long-term treatment outcomes or changes in morbidity over time.

Conclusion

The present study demonstrated a high prevalence of reproductive morbidity (60.0%) among ever-married women aged 15–49 years attending a tertiary care hospital. Reproductive tract infections were the most common morbidity, followed by menstrual disorders and pelvic inflammatory disease. Increasing age, multiparity, poor menstrual hygiene, and low educational status were identified as significant predictors of reproductive morbidity.

Recommendations

Routine reproductive health screening should be strengthened at primary and secondary healthcare levels, particularly for women from rural and socioeconomically disadvantaged populations. Menstrual hygiene education, reproductive health counselling, and awareness regarding early healthcare-seeking should be incorporated into community-based health programmes. Improved access to family planning and gynecological services may facilitate early identification and management of reproductive morbidities. Future multicentre community-based studies involving larger and more diverse populations are recommended to validate these findings and provide more representative estimates of reproductive morbidity.

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List of abbreviations

AOR	Adjusted Odds Ratio
BMI	Body Mass Index
CI	Confidence Interval
IEC	Institutional Ethics Committee
MMCH	Madhubani Medical College and Hospital
OPD	Outpatient Department
PID	Pelvic Inflammatory Disease
RTI	Reproductive Tract Infection
SD	Standard Deviation
SPSS	Statistical Package for the Social Sciences

Source of funding

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Conflict of interest

The authors declare that they have no conflicts of interest related to this study.

Availability of data

The datasets generated and/or analysed during the current study are not publicly available because they contain participant-related information but may be available from the corresponding author on reasonable request, subject to institutional and ethical restrictions.

Author contributions

Dr. Dipesh Kumar Gupta: Conceptualization, study design, methodology, participant recruitment and clinical assessment, data collection, data analysis, interpretation of findings, manuscript drafting, critical revision of the manuscript, and final approval of the version to be published.

Author's biography

Dr. Dipesh Kumar Gupta is an Assistant Professor in the Department of Obstetrics and Gynaecology at Madhubani Medical College & Hospital, Madhubani, Bihar, India. His academic and clinical interests include women's reproductive health, gynecological disorders, and reproductive healthcare.

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Page | 10

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