Original Research Article

Obstetric morbidity among women in Eastern India: an analysis based on National Family and Health Survey 4 and 5

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ABSTRACT

Background: Obstetric morbidities are one of the leading causes of maternal mortality and disease burden for women in the reproductive age group. The study aims to examine the geographical disparities and the impact of socioeconomic, reproductive determinants on obstetric morbidity.
Methods: Two rounds of National Family and Health Survey (NFHS 4 and NFHS 5) data were used for analysis. The study was conducted in the eastern India covering four states that include Bihar, Jharkhand, Odisha, and West Bengal. Currently married women in 15-49 years age reporting at least one obstetric morbidity was considered. Bivariate and binary logistic regression analysis using both adjusted and unadjusted odds ratio were used to understand the influence and association of obstetric morbidity with socio-economic factors.
Results: In eastern India, obstetric morbidity decreased from NFHS 4 to NFHS 5 by 6.79%. In both rounds, Odisha has a higher prevalence of any obstetric morbidity. This analysis shows lower age, higher education of women, belonging to rural areas, not having proper toilet facilities, higher birth order, and higher age at marriage and first birth increases the prevalence of obstetric morbidity among women in the eastern region during NFHS 4 and NFHS 5.
Conclusions: Based on the analysis it can be contended obstetric morbidity in the eastern region was high. To address this issue, region/state specific programs, highlighting maternal/obstetric health awareness, along with regular monitoring and evaluation of ongoing maternal health programs are needed to target women suffering from obstetric morbidity.

Keywords: Obstetric morbidity, National Family Health Survey 4, Eastern India, Reproductive morbidity, National Family Health Survey 5

INTRODUCTION

Maternal morbidity and mortality serve as crucial indicators of both social development and the effectiveness of healthcare systems within a community. The World Health Organization (WHO) has described maternal or obstetric morbidity as any health condition in a woman who has been pregnant, regardless of the duration or outcome of the pregnancy, that arises due to causes related to or aggravated by the pregnancy or its management, excluding those resulting from accidental or incidental causes.[1] Thus, obstetric morbidity includes ill health concerning pregnancy, delivery, and post-delivery periods.[2]

The prevalence of reproductive morbidities in India is high among adolescents as well as among adult women.[3] A study reviewed more than 60 studies on the causes of maternal morbidity revealing that these studies have largely focused on biomedical risk factors, with scarce research on the socio-economic and behavioural causes of maternal morbidity.[4] Another study analyzed obstetric morbidity across Kerala, Andhra Pradesh, Madhya Pradesh, and Bihar.[5] They found that excessive fatigue and

swelling in the legs, body, or face were the most commonly reported pregnancy-related issues. Bihar had the highest proportion of women suffering from various obstetric complications. The main reasons behind this were early marriages, birth orders, and low standard of living.[6] A study counted in West Bengal depicted that one in three women had symptoms of obstetric morbidity that necessitated seeking medical assistance, with one in six of those needing an immediate obstetric intervention because their lives were in danger.[7] Several studies pointed out that socio-economic factors play a complex interplay in influencing obstetric morbidity among women.[7-9]

Maternal health is a key indicator of a country's overall health and development, and understanding the factors contributing to obstetric morbidity is detrimental for improving maternal and child health outcomes. Despite various government programs aimed at improving reproductive health, the overall reproductive health status of women in eastern India continues to be significantly influenced by socio-economic factors.[10] A systematic of National Family Health Survey (NFHS) data emphasising on maternal health found that studies on maternal morbidity is scarce.[11] A comprehensive analysis of obstetric morbidities specific to the current situation in Eastern India is noticeably lacking. Despite the availability of national surveys and regional studies, there has been insufficient focus on understanding the full scope of obstetric complications in this region. Therefore, this study aims to examine the regional variation and socio-economic correlates of obstetric morbidity in eastern India using data from the National Family Health Survey rounds four and five.

METHODS

Data source

Two rounds of NFHS data have been used that is NFHS 4 (2015-16) and NFHS 5 (2019-21) in this study. NFHS is a nationally representative survey converging all Indian states and union territories as well at district level. The Ministry of Health and Family Welfare (MoHFW) supervises the conduct of NFHS. While International Institute for Population Sciences (IIPS) in Mumbai is a nodal agency coordinating it nationally.[12,13] NFHS data was collected at household level. Women questionnaire was used in both NFHS 4 and NFHS 5 surveys. The questions regarding obstetric morbidity were self-reported. NFHS 4 data was collected between January 2015 to December 2016.[12] The fieldwork for NFHS-5 was conducted in two phases. Phase one was carried out from June 2019 to January 2020, while phase two took place between January 2020 and April 2021.[13]The study is based on the eastern India covering four states that includes- Odisha, Jharkhand, West Bengal, and Bihar. In this study women belonging to 15-49 years and currently married reporting at least one obstetric morbidity was considered. The sample size comprises 30109 and 26151 women in NFHS 4 and NFHS 5 respectively.

Dependent variable

Women having any obstetric morbidity is the outcome variable. This variable was constructed based on eight variables, that includes- difficulty with daylight vision during pregnancy, excessive bleeding during delivery, swelling of leg, body, face during pregnancy, excessive vaginal bleeding (in first two months of delivery), convulsions during pregnancy, prolonged labour during delivery, breech presentation during delivery and high fever in the first two months after delivery.[12,13] These questions were asked in both the rounds of NFHS 4 and NFHS 5. Women reporting any of these symptoms were coded as "yes," and those not having any symptoms as "no." Women having any of these eight symptoms obstetric period were considered to be suffering from obstetric morbidity.

Independent variables

The independent variables considered for the analysis includes- age of women (15-19,20-24, 25-29, 30-34, 35-39, 40-44, 45-49), age at marriage ($\leq$18, 19-24, 25-30, $\geq$31) and menarche ($\leq$12, 13-15, $\geq$16), age at first birth (($\leq$18, 19-24, 25-30, $\geq$31), wealth quintile (poorest, poorer, middle, richer, richest), caste (SC, ST, OBC, others), religion (Hindu, Muslim, others), education of women (no education, primary, secondary and higher), employment status (not working and working), access to toilet facilities (improved toilet facility, not-improved toilet facility, no toilet facility /open defecation), media exposure (not exposed, regular exposure), place of residence (urban and rural) and birth order (1,2,3,3+).

Statistical analysis

To under the regional variations in obstetric morbidity percentage distribution was used. Bivariate analysis had been used to understand the influence of socio-economic factors on obstetric morbidity. National individual sample weight was used. Binary logistic regression analysis had been used to analyse the association between obstetric morbidity and socio-economic characteristics. Both adjusted and unadjusted odds ratios were utilized to assess the impact of socio-economic factors, with the adjusted odds ratios accounting for the influence of other variables to provide a clearer understanding of their independent effects. STATA 16 software was used to conduct the analysis.

RESULTS

Regional disparities in the prevalence of obstetric morbidity among women across Eastern India

The variations in obstetric morbidity among different states in the eastern region, is depicted in Table 1, highlight the diverse health indicators observed across these states. In the eastern region, the prevalence of any obstetric morbidity decreased from 58.16% in NFHS 4 to 54.21% NFHS 5.

Women residing in Odisha had higher prevalence of obstetric morbidity of 69.02% in NFHS 4 and 68.37% in NFHS 5, however it decreased. The prevalence significantly decreased from 55.77% in NFHS 4 to 46.56% in NFHS 5 in Bihar. The prevalence of difficulty with daylight vision during pregnancy was high in Odisha and Bihar in NFHS 4 and NFHS 5 respectively. Prolonged labour during delivery was most prevalent in Odisha increasing from 49.88% in NFHS 4 to 52.84% in NFHS 5, indicating potential issues with obstructed labour and access to timely obstetric care. Convulsions during pregnancy were relatively high in Bihar (25.8%) followed by Odisha (21.08%), Jharkhand (19.68%) and West Bengal (6.53%). Breech presentation was high among women in Odisha, with 9.02% decrease from NFHS 4 to NFHS 5.

Socio-economic correlates impacting obstetric morbidity among women in eastern India

The socioeconomic factors that influence obstetric morbidity among women between NFHS 4 and NFHS 5 is highlighted in Table 2. If we look into the age variation, it was found that any obstetric morbidity was higher in the 15-19 years age group in the eastern region. When considering caste-based variation, there was significant diversity in obstetric morbidity among different caste groups. In NFHS 5, women from Scheduled Tribes (ST) exhibited elevated levels of obstetric morbidity, with rates recorded at 62.5%. Women residing in rural areas reported higher obstetric morbidity in NFHS 4 (58.92%) while it was vice versa in NFHS 5 (55.29%). Educational attainment significantly influences obstetric morbidity rates. The table below illustrates, those women having higher levels of education correlate with a higher prevalence of obstetric morbidity. Increased education enhances awareness, leading to greater reporting of obstetric issues. While those belonging to the poorest wealth quintile reported higher obstetric morbidity in NFHS 4 (59.63%). Women who were not working reported higher obstetric morbidity and it decreased from

NFHS 4 (59.11%) to NFHS 5 (56.07%). Regular media exposure was associated with higher obstetric morbidity due to increased awareness. From NFHS 4 to NFHS 5 there was a decrease in any obstetric morbidity due to regular media exposure. Women who do not have improved toilet facilities have higher obstetric morbidity. Additionally, women who married at the age of 31 or older and had their first birth at 31 years or older reported higher obstetric morbidity in both NFHS 4 and NFHS 5. Table 2 depicts a notable decline in obstetric morbidity across different age groups at marriage and first childbirth, comparing data from NFHS 4 to NFHS 5. Interestingly, in NFHS 4, women experiencing their first menstruation at age 16 or later demonstrated elevated obstetric morbidity (79.68% in NFHS 4 and 74.13% in NFHS 5).

Influence and association of socio-economic factors on obstetric morbidities among women in eastern India

Table 3 shows the association between obstetric morbidities with socioeconomic factors. Age and educational attainment of women were significantly associated with obstetric morbidity. Taking no education as the reference category, women having higher education 1.9 times more likely to have obstetric morbidity (AOR 1.90, 95% CI: 1.46, 2.46) in NFHS 4. Women having higher education makes them more about the symptoms of the obstetric morbidities which in turn results in reporting and seeking treatment. Wealth index, regular media exposure is significantly associated with obstetric morbidity. The findings indicate birth order, age at marriage, age at menarche and age at first birth were significantly associated with obstetric morbidity. Women having birth order three or more than three and those having the first birth ≥31 years age are more likely to suffer from obstetric morbidity. The unadjusted odds ratio indicated a significant association between caste, place of residence, wealth quintile and working status. However, these associations were not significant when examined in the adjusted odds ratio.

Table 1: Regional disparities in the prevalence of obstetric morbidity among women across Eastern India as per NFHS 4 (2015-16) and NFHS 5 (2019-21).

State	Any obstetric morbidity		Difficulty with daylight vision during pregnancy		Excessive bleeding during delivery		Leg, body or face swelling during pregnancy		Excessive vaginal bleeding (in first two months of delivery)		Convulsions (not from fever) during pregnancy		Prolonged labour during delivery		Breech presentation during delivery		High fever in the first two months after delivery	
	NFHS 4	NFHS 5	NFHS 4	NFHS 5	NFHS 4	NFHS 5	NFHS 4	NFHS 5	NFHS 4	NFHS 5	NFHS 4	NFHS 5	NFHS 4	NFHS 5	NFHS 4	NFHS 5	NFHS 4	NFHS 5
Eastern region	58.16	54.21	13.65	13.54	32.7	34.16	30.24	28.25	20.47	22.5	16.94	18.63	43.15	42.66	6.74	6.92	15.38	18.15
Bihar	55.44	46.56	17.32	15.99	34.94	32.45	29.45	29.4	25.14	23.27	23.79	25.8	44.8	35.4	6.34	6.06	21.28	22.37
Jharkha-nd	55.77	57.68	11.27	14.51	27.7	39.33	30.51	27.01	14.19	21.49	16.32	19.68	29.92	42.57	5.25	7.31	13.91	19.91

State	Any obstetric morbidity		Difficulty with daylight vision during pregnancy		Excessive bleeding during delivery		Leg, body or face swelling during pregnancy		Excessive vaginal bleeding (in first two months of delivery)		Convulsions (not from fever) during pregnancy		Prolonged labour during delivery		Breech presentation during delivery		High fever in the first two months after delivery	
	NFHS 4	NFHS 5	NFHS 4	NFHS 5	NFHS 4	NFHS 5	NFHS 4	NFHS 5	NFHS 4	NFHS 5	NFHS 4	NFHS 5	NFHS 4	NFHS 5	NFHS 4	NFHS 5	NFHS 4	NFHS 5
Odisha	69.02	68.37	16.84	17.51	39.34	40.24	37.07	33.52	24.49	28.77	20.32	21.08	49.88	52.84	11.09	8.14	13.34	19.26
West Bengal	59.07	59.28	7.72	7.82	28.23	31.86	28.09	24.64	14.17	18.88	5.57	6.53	42.68	49.16	5.87	7.44	8.28	10.73

Analysed using NFHS 4 and NFHS 5 data; data is in percentage

Table 2: Socio-economic correlates impacting obstetric morbidity among women in eastern India, based on NFHS 4 and NFHS 5.

Socio-economic characteristics	Any obstetric morbidity (%)	
	NFHS 4	NFHS 5
Age group (in years)		
15-19	74.78	71.97
20-24	71.77	71.08
25-29	68.64	68.48
30-34	61.51	57.66
35-39	46.96	39.32
40-44	28.61	22.13
45-49	21.88	16.44
Caste		
SC	58.89	52.91
ST	62.93	62.5
OBC	56.30	49.86
Others	58.96	57.93
Religion		
Hindu	57.58	52.46
Muslim	60.49	58.56
Others	58.98	63.56
Place of residence		
Urban	54.66	55.29
Rural	58.92	53.44
Educational status		
No education	51.72	41.18
Primary	58.72	52.9
Secondary	64.62	64.19
Higher	66.02	65.99
Wealth index		
Poorest	59.63	53.91
Poorer	58.69	54.01
Middle	56.98	52.61
Richer	55.63	53.67
Richest	52.17	55.56
Working status		
Not working	59.11	56.07
Currently working	58.43	50.98
Toilet facility		
Improved toilet facility	55.93	52.75
Not-improved toilet facility	59.49	58.32
No toilet facility/open defecation	59.11	52.39

Continued.

Socio-economic characteristics	Any obstetric morbidity (%)	
	NFHS 4	NFHS 5
Media exposure		
Not exposed	57.14	51.72
Regular exposure	59.18	57.57
Birth order		
1	60.98	57.86
2	58.54	55.93
3	56.46	49.93
3+	54.63	46.77
Age at marriage (in years)		
≤18	55.77	49.94
19-24	63.71	62.9
25-30	65.64	62.68
≥31	61.49	60.7
Age at menarche (in years)		
≤12	73.61	75.51
13-15	71.15	70.09
≥16	79.68	74.13
Age of women at 1st birth (in years)		
≤18	52.92	48.6
19-24	60.48	56.31
25-30	64.06	60.66
≥31	66.36	64.06

Analysed using NFHS 4 and NFHS 5 data

Table 3: Logistic regression analysis of any obstetric morbidity by socio-economic determinants in eastern India.

Socio-economic factors	NFHS 4		NFHS 5	
	Adjusted odds ratio	Unadjusted odds ratio	Adjusted odds ratio	Unadjusted odds ratio
Age group (in years)				
15-19®				
20-24	0.89 (0.67-1.17)	0.83 (0.74-0.93)**	0.78 (0.70-0.88)***	0.96 (0.85-1.07)
25-29	0.83 (0.63-1.09)*	0.70 (0.62-0.78)***	0.54 (0.48-0.61)***	0.83 (0.74-0.93)***
30-34	0.68 (0.51-0.90)**	0.52 (0.46-0.58)***	0.30 (0.27-0.35)***	0.54 (0.48-0.61)***
35-39	0.32 (0.24-0.42)***	0.29 (0.26-0.33)***	0.16 (0.14-0.18)***	0.27 (0.24-0.31)***
40-44	0.22 (0.16-0.30)***	0.14 (0.12-0.15)***	0.08 (0.07-0.09)	0.13 (0.11-0.14)***
45-49	0.13 (0.09-0.18)***	0.09 (0.08-0.10)***	0.05 (0.04-0.09)***	0.07 (0.69-0.89)***
Caste				
SC ®				
ST	1.11 (0.94-1.32)	1.20 (1.13-1.28)***	1.01 (0.72-1.42)	1.57 (1.48-1.67)***
OB	1.03 (0.91-1.18)	0.84 (0.80-0.88)***	1.29 (0.99-1.67)*	0.91 (0.87-0.95)***
Others	0.95 (0.81-1.12)	0.92 (0.86-0.97)**	0.98 (0.70-1.37)	1.19 (1.12-1.25)***
Religion				
Hindu ®				
Muslim	1.10 (0.95-1.26)	1.02 (0.97-1.0)	1.41 (1.03-1.93)**	1.10 (1.04-1.15)***
Others	0.84 (0.66-1.08)*	1.05 (0.96-1.15)	0.73 (0.43-1.5)	1.40 (1.27-1.55)***
Place of residence				
Urban®				
Rural	0.98 (0.86-1.13)	1.25 (1.19-1.30)***	0.99 (0.70-1.40)	0.93 (0.88-0.98)***
Educational status				
No education®				
Primary	1.03 (0.88-1.19)	1.27 (1.20-1.34)***	1.25 (0.87-1.80)	1.50 (1.52-1.59)***
Secondary	1.37 (1.20-1.55)***	1.62 (1.56-1.69)***	1.21 (0.92-1.59)*	2.39 (2.30-2.49)***
Higher	1.90 (1.46-2.46)***	1.81 (1.66-1.98)***	1.06 (0.81-1.71)	2.87 (2.65-3.11)***

Continued.

Socio-economic factors	NFHS 4		NFHS 5	
	Adjusted odds ratio	Unadjusted odds ratio	Adjusted odds ratio	Unadjusted odds ratio
Wealth index				
Poorest®				
Poorer	1.06 (0.82-1.37)	0.92 (0.88-0.97)***	1.18 (0.91-1.54)	0.94 (0.91-0.99)**
Middle	1.14 (0.81-1.57)	0.89 (0.84-0.93)***	1.16 (0.82-1.63)	0.91 (0.86-0.96)***
Richer	1.21 (0.71-1.76)	0.79 (0.74-0.84)***	1.29 (0.78-2.11)	1.01 (0.95-1.08)
Richest	0.87 (0.44-1.72)	0.74 (0.68-0.81)***	0.97 (0.47-2)	1.10 (1-1.21)**
Working status				
Not working®				
Currently working	1.09 (0.96-1.23)	1.47 (0.83-1.04)	1.38 (0.97-1.96)*	0.84 (0.74-0.94)***
Toilet facility				
Improved®				
Not-improved	1.07 (0.90-1.27)	1.27 (1.19-1.35)***	0.84 (0.64-1.09)*	1.16 (1.10-1.22)***
No toilet /open defecation	1.21 (1.05- 1.39)**	1.21 (1.16-1.25)***	1.06 (0.81-1.39)	1.02 (0.98-1.06)
Media exposure				
Not exposed®				
Regular exposure	1.09 (0.97-1.23)*	1.10 (1.06-1.14)***	1.10 (0.86-1.40)	1.30 (1.25-1.35)***
Birth order				
1®				
2	0.79 (0.72-0.76)***	0.87 (0.83-0.91)***	0.64 (0.51-0.81)***	0.91 (0.87-0.95)***
3	0.81 (0.71-0.93)***	0.79 (0.76-0.84)***	0.65 (0.43-0.98)**	0.74 (0.70-0.78)***
3+	0.80 (0.60-1.08)*	0.73 (0.70-0.78)***	1.04 (0.43-2.54)	0.64 (0.61-0.68)***
Age at marriage (in years)				
≤18®				
19-24	1.37 (1.30-1.44)***	1.48 (1.43-1.54)***	1.39 (1.31-1.47)***	1.75 (1.68-1.83)***
25-30	1.23 (1.08-1.40)***	1.51 (1.36-1.66)***	1.55 (1.34-1.81)***	1.86 (1.67-2.07)***
≥ 31	1.01 (0.71-1.45)*	1.29 (0.94-1.76)*	1.57 (1.05-2.33)*	1.39 (0.98-1.96)**
Age at menarche (in years)				
≤12®				
13-15	0.83 (0.77-0.92)***	0.84 (0.77-0.93)***	0.75 (0.58-0.97)**	0.73 (0.66-0.81)***
≥16	1.19 (0.93-1.53)*	1.20 (0.94-1.54)*	0.76 (0.36-1.60)	1.13 (0.85-1.50)
Age of women at 1st birth (in years)				
≤18®				
19-24	1.68 (1.56-1.81)*	1.74 (1.61-1.87)***	1.19 (1.09-1.29)***	1.42 (1.37-1.47)***
25-30	1.75 (1.60-1.90)***	2.17 (2-2.34)***	1.45-1.32-1.60)***	1.74 (1.62-1.87)***
≥31	1.99 (1.76-2.25)***	2.47 (2.23-2.73)***	2.26 (1.95-2.61)***	2.08 (1.73-2.49)***

***p<0.01, **p<0.05, *p<0.10 level of significance, ®- reference category

DISCUSSION

The study revealed that over 50% of women experienced at least one symptom of obstetric morbidity, although its prevalence decreased from NFHS-4 to NFHS-5. In eastern India, women residing in Odisha reported the higher prevalence of any obstetric morbidity. The findings show that during the antenatal period, excessive fatigue and swelling in the legs, body, or face were the most common issues. Post-delivery, the most frequently reported problems were high fever and heavy vaginal bleeding. Pregnancy-related complications were notably more prevalent than post-delivery problems. A study found similar variations in obstetric morbidity and complications across different states in central India, highlighting the need for targeted interventions to improve pregnancy outcomes.[14] Another study conducted in Bihar depicted similar findings highlighting that about 53% of women suffer from pregnancy and the postpartum period.[15] Obstetric problems reported by women have been found to vary significantly based on their socioeconomic characteristics, such as age, employment status, birth order, and educational level.[5,16] Women marrying and having their first child ≥31 years age pose higher risk of obstetric morbidity. While those women had menarche ≥16 years or ≤12 years age reported higher prevalence of obstetric morbidity. Significant association has been found with women belong to birth order three with obstetric complications. A study conducted in Uttar Pradesh increasing fertility increases the pregnancy complication.[17] A positive association has been observed between higher educational attainment and the prevalence of obstetric

morbidity, indicating that educated women were more aware about their health condition and thus they have reported and sought treatment. Similar findings have been highlighted in a study conducted among tribal women in India.[18]

Limitations

The obstetric morbidity data that is collected by NFHS is self-reported. This often results in underestimation of morbidity, because unless women understand the symptoms properly it may cause underreporting. NFHS is a survey data and thus, does not include in-depth and comprehensive information about obstetric morbidities and its influencing factors.

CONCLUSION

In eastern India obstetric morbidity remains high in both the rounds of NFHS 4 and 5. In addition, to present policies and programs, geared specifically toward interventions, and maternal morbidity and mortality awareness campaigns would lower the prevalence of obstetric complications, resulting in improved maternal health and lower maternal mortality.

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