



Original article

Socio-demographic factors influencing utilization of maternal health care services in India

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ABSTRACT

Background: Maternal mortality remains a major public health problem in low and middle-income countries. Adequate utilization of maternal health care services could be an effective means for reducing maternal mortality.

Objective: This study aims to examine the socio-demographic factors of maternal health care utilization among Indian women.

Methods: A cross-sectional study was conducted using the data from the 2015–2016 National Family Health Survey (NFHS-4) in India. A total of 190,898 ever-married women who had at least one live birth in the past five years preceding the survey were utilized for this study. Bivariate and multivariate analyses were performed for the analysis of the data.

Results: Our study has indicated that educational attainment of women and household wealth status are the most significant predictors of maternal health care utilization. Other important socio-demographic factors include rural-urban residence, caste, religion, women's age, age at marriage, exposure to mass media and region.

Conclusion: Our study has found that socio-demographic factors play a significant role in determining utilization of maternal health care services in India. Therefore, policymaker and programme administrators should address socio-economic and demographic vulnerabilities of women to improve the use of maternal health care services, which eventually could reduce the risk of maternal morbidity and mortality.

1. Introduction

Globally, maternal mortality ratio (MMR) has declined by 44% over the last 25 years, from an estimated 385 per 100,000 live births in 1990 to 216 per 100,000 live births in 2015.¹ Reducing maternal mortality remains a major challenge in low- and middle-income countries. Moreover, complications from pregnancy and childbirth are the leading cause of death among young married women in developing countries.² In 2015, approximately 99% of maternal deaths occurred in developing regions, with sub-Saharan Africa accounting for 66%, followed by South Asia (22%).¹

India has made a remarkable progress in reducing MMR, ranging from 556 per 100,000 live births in 1990 to 174 per 100,000 live births in 2015. This improvement is mainly due to the substantial progress in institutional deliveries, subsidized financing for delivering in a public health institution, and efforts to mitigate social vulnerabilities such as improvement in educational attainment and reduction in household poverty. In India, there are large variations in MMR across states,

ranging from 237 per 100,000 live births in Assam to 46 per 100,000 live births in Kerala.³ An estimated around 69% of maternal mortality occurred between the age group of 20–29 years in 2014–16.³

Previous studies have documented that inadequate utilization of maternal health care services significantly contributed to high maternal morbidity and mortality.^{4,5} Maternal mortality can be prevented if women regularly visit for antenatal care (ANC) during pregnancy, deliver in a health facility and receive postnatal care (PNC) after delivery. Utilization of maternal health care services is influenced by a range of structural and contextual factors and this required focused attention. A study in Ethiopia reported that the utilization of maternal health care is influenced by a number of socio-cultural factors, accessibility-related factors and perceived benefits/needs.⁶ Similarly, a study done in Turkey states the importance of socio-economic factors in determining the utilization of maternal health care services.⁷ A study recently carried out in rural Uttar Pradesh revealed that women's exposure to mass media and non-marginalization have a positive influence on the utilization of maternal health care services.²⁷ A study done in Madhya

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Pradesh looked beyond individual level characteristics and assessed the influence of community- and district-level factors on the use of maternal health care services.²⁸ A number of studies in India also documented that various socio-economic factors, i.e., education, household's wealth status, caste, religion and women autonomy have significant association with the utilization of maternal health care.^{8–12}

This paper attempts to identify the factors associated with the utilization of maternal health care services using recent database among Indian women aged 15–49 years. In this study, we have assessed socio-demographic determinants for the three key indicators of service utilization: (i) ≥ 4 ANC visits, (ii) institutional delivery and (iii) PNC within 42 days of delivery. This study will provide a recent evidence on the factors associated with utilization of maternal health care services in India, which would help for policymaking to improve the use of maternal health care services among socio-economically disadvantaged groups.

2. Materials and methods

2.1. Data source

This study utilized the data from fourth round of the National Family Health Survey (NFHS-4), conducted in 2015–2016. The NFHS-4 is a nationally representative sample survey of 601,509 households, 699,686 women aged 15–49 years with a response rate of 97%, and 112,122 men aged 15–54 years with a response rate of 92%. The primary objective of this survey was provide updated and reliable information on fertility, mortality, family planning methods, utilization of maternal health care services, breastfeeding practices, nutritional status of mother and young children, child immunization, childhood morbidity and mortality, awareness and behavior regarding HIV/AIDS and other sexually transmitted infections. The sample was selected using a stratified two-stage sampling design comprising of 28,586 clusters; 8,397 in urban, 20,059 in rural, and 130 from slums list provided by Municipal Corporation Offices (MCOs). In the first stage, clusters were selected using probability proportional to clusters size. In the second stage, 22 households from each cluster were selected with an equal opportunity systematic selection from the household listing. The sampling frame used for the NFHS-4 was the 2011 Indian Population and Housing Census. A detailed description of the sampling procedures is provided in the national report of NFHS-4.¹³ This study is based on 190,898 ever-married women aged 15–49 years who had at least one live birth in the past five years preceding the survey.

2.2. Outcome variables

To assess the socio-demographic factors of maternal health care utilization three outcome variables were considered: adequate ANC visits during pregnancy (≥ 4 ANC visits), institutional delivery (delivery in a government hospital, dispensary, primary health centre, community health centre or sub-centre, non-governmental hospital and private clinic) and PNC within 42 days of delivery.

2.3. Explanatory variables

The selected socio-economic and demographic predictor variables included in the analysis are: residence (urban and rural), caste (Scheduled Caste/Scheduled Tribe [SC/ST], Other Backward Class [OBC] and forward caste), religion (Hindu, Muslim and other), women's age (15–24, 25–34 and 35–49 years), age at marriage (< 18 and ≥ 18 years), educational attainment (no education, primary, secondary and higher), wealth quintile (poorest, poorer, middle, richer and richest), women's exposure to mass media (no exposure, partial exposure and full exposure) and region (north, central, east, northeast, west and south).

In the following, household wealth quintile, women's exposure to

mass media and region variables are discussed in detail. Wealth quintile is a proxy indicator for economic status of the household. Household wealth quintile was assessed from the ownership of household assets including consumer items and dwelling characteristic. A score has been generated for each individual using principal component analysis and categorized into five quintiles, each represents 20% of the respondents, between 1 (poorest) and 5 (richest). Women's exposure to mass media was assessed from frequency of reading newspaper and magazine, listening radio, and watching television on a weekly basis. On the basis of these three medium, women were categorized into three groups, namely no exposure (accesses none of the three media at least once a week), partial exposure (accesses any two media at least once a week), and full exposure (accesses all three media at least once a week). A region variable was constructed to assess the regional differences in utilization of maternal health care services as it is evident in other studies. For this purpose, Indian states and union territories are grouped into six regions on basis of the geographical contiguity and cultural settings.

2.4. Analytical strategy

To identify the factors associated with utilization of maternal health care services, bivariate and multivariate analyses were carried out. Bivariate analyses were performed to examine the nature of association between utilization of maternal health care services by selected socio-economic and demographic characteristics. Binary logistic regressions were employed to assess the socio-economic and demographic determinants of utilization of maternal health care services. The regression results are presented by the estimated odds ratios (ORs) with 95% confidence intervals (CIs). Sample weight was used to estimate the results. All analyses were carried out using STATA version 12.1 (StataCorp LP, College Station, TX, USA).

2.5. Ethical statement

The NFHS-4 was conducted under the scientific and administrative supervision of the International Institute for Population Sciences (IIPS), Mumbai, India. The IIPS performed an independent ethics review of the 2015-16 NFHS protocol. The data collection procedures were also monitored and approved by ICF Macro, Calverton, Maryland, USA. All individuals selected in the NFHS were provided with informed voluntary as well as written consent. Each individual's approval was sought, and only then was the interview conducted. The NFHS data set is in public domain and accessible upon a granted request from Demographic Health Survey (DHS) program (<http://www.measuredhs.com/>).

3. Results

Table 1 depicts socio-demographic characteristics of the respondents. The majority of women were residing in rural areas, belonged to OBC and believed in Hinduism. More than one-third of the women were young (aged 15–24 years). About 40% of respondents were married prior to the age of 18. Over one-fourth of the women had no formal education. Majority of them were belonged to poorest and poorer wealth quintile, had no or partial exposure to mass media and were from central and east region of the country.

Table 2 presents the utilization of maternal health care services by socio-demographic characteristics of the participants. Overall, 52%, 81% and 69% of the respondents had ≥ 4 ANC visits, institutional delivery and PNC within 42 days of delivery, respectively. Moreover, there were marked differences in the utilization of maternal health care services by socio-demographic characteristics of women.

Table 3 presents multivariate logistic regressions for assessing the socio-demographic factors associated with the utilization of maternal health care services. Compared with women living in urban areas,

Table 1
Socio-demographic characteristics of women aged 15–49 years who had at least one live birth in the past 5 years preceding the survey in India, NFHS 2015-16.

Variables	%	n
Residence		
Urban	29.7	47,833
Rural	70.3	143,065
Caste		
SC/ST	31.4	73,059
OBC	43.6	74,060
Forward	20.3	34,705
Don't know/missing	4.7	9,074
Religion		
Hindu	78.9	138,343
Muslim	16.1	29,309
Other	5.0	23,246
Women's age in years		
15-24	34.7	62,082
25-34	55.9	107,500
35-49	9.4	21,316
Age at marriage in years		
< 18	38.9	69,751
≥ 18	59.5	117,078
Don't know/missing	1.6	4,069
Women's education		
No education	27.6	55,165
Primary	13.5	26,712
Secondary	46.9	88,871
Higher	12.0	20,150
Wealth quintile		
Poorest	23.4	46,782
Poorer	21.2	43,739
Middle	19.9	38,393
Richer	19.0	33,212
Richest	16.6	28,772
Women's media exposure		
No exposure	24.6	49,374
Partial exposure	67.7	126,910
Full exposure	7.7	14,614
Region		
North	13.2	36,079
Central	25.7	52,952
East	25.4	39,243
North-east	3.9	28,825
West	13.1	13,892
South	18.7	19,907
Total n	100.0	190,898

women from rural areas were less likely to have had ≥4 ANC visits, deliver in an institution and receive PNC. Women belonged to forward caste were more likely than the SC/ST to use maternity care. Muslim women were less likely to deliver in a health facility and seek for PNC than the Hindu women. Older women were less likely to have maternal health care services than the younger women. The odds of all the three indicators of maternal health care utilization were significantly lower among the women who married before 18 years compared with those who married at 18 years or older.

Education have a positive influence on the utilization of maternal health care services. Compared with uneducated, higher educated women were almost 2 times, 3.6 times and 1.6 times more likely to have ≥4 ANC visits, institutional delivery and PNC check-ups, respectively. Women from the richest quintile were 2.8 times more likely to receive 4 or more ANC visits compared with women belonging in the poorest wealth quintile. The odds for institutional delivery were 4.6 times higher among richest women compared with the poorest women. Similarly, the likelihood of having PNC was more than 2 times higher among richest women compared with those from the poorest wealth quintile. The odds of utilization of maternal health care services were significantly higher among the women who have partial and full exposure to mass media compared with the women who have no exposure to mass media.

There were significant regional differences in the use of maternal

Table 2
Utilization of maternal health care services by socio-demographic characteristics of women in India, NFHS 2015-16.

Variables	≥ 4 ANC visits	Institutional delivery	PNC within 42 days
Residence			
Urban	67.1	90.5	76.5
Rural	45.1	77.5	66.0
Caste			
SC/ST	48.1	77.2	67.1
OBC	48.6	82.4	68.9
Forward	61.8	86.1	73.9
Religion			
Hindu	51.3	83.1	69.7
Muslim	49.3	72.1	63.2
Other	65.3	83.2	78.3
Women's age in years			
15-24	53.6	84.5	70.4
25-34	52.4	81.5	69.7
35-49	39.5	69.1	60.9
Age at marriage in years			
< 18	42.2	74.4	63.0
≥ 18	58.1	86.2	73.6
Women's education			
No education	28.2	63.7	54.8
Primary	45.7	75.6	65.0
Secondary	61.6	89.4	75.2
Higher	73.7	97.0	82.9
Wealth quintile			
Poorest	25.2	61.3	52.2
Poorer	44.7	77.1	64.6
Middle	57.7	86.9	73.9
Richer	66.5	91.9	78.6
Richest	73.9	96.2	82.1
Women's exposure to mass media			
No exposure	24.6	62.8	51.6
Partial exposure	60.1	86.8	74.5
Full exposure	64.5	93.1	77.5
Region			
North	50.5	85.6	72.3
Central	32.0	73.6	62.3
East	41.9	72.6	60.7
North-east	49.3	71.3	61.9
West	72.3	91.2	78.4
South	78.8	96.2	82.7
Overall	51.7	81.4	69.1

health care services. Women from central region were less likely to have had ≥4 ANC visits, while women from, while women from east, north-east, west and southern region were more likely to visit for ≥4 ANC than the northern region. In case of institutional delivery, women from central and north-east region were less likely to deliver in a health institution, whereas women from west and southern region have higher odds of institutional delivery compared to northern region. Women from central and east region were less likely to use PNC, while women from west and southern region were more likely to have PNC service within 42 days of delivery.

4. Discussion

Despite several national and international efforts to improve the utilization of maternal health care services, a substantial proportion of women are not seeking adequate ANC and PNC services in India. However, a remarkable progress has been observed in institutional delivery over past two decades. As service utilization is directly associated with maternal mortality, India needs to improve maternity care in all three aspects of service utilization (ANC, delivery care and PNC) to meet the target of Sustainable Development Goal (SDG) for maternal mortality, which is MMR below 70 per 100,000 live births by 2030.

This study has identified a number of socio-demographic factors for the utilization of maternal care services. Multivariate analysis of this

Table 3
Multivariate logistic regressions for socio-demographic factors associated with the utilization of maternal health care services in India, NFHS 2015-16.

Variables	≥ 4 ANC visits		Institutional delivery		PNC within 42 days	
	OR	95% CI	OR	95% CI	OR	95% CI
Residence						
Urban (Ref.)	1.00		1.00		1.00	
Rural	0.85	0.83–0.87	0.85	0.82–0.88	1.03†	1.01–1.06
Caste						
SC/ST (Ref.)	1.00		1.00		1.00	
OBC	0.83	0.81–0.85	1.24	1.21–1.28	0.98†	0.96–1.01
Forward	1.07	1.04–1.11	1.19	1.14–1.24	1.06	1.03–1.10
Religion						
Hindu (Ref.)	1.00		1.00		1.00	
Muslim	0.99†	0.96–1.02	0.53	0.51–0.55	0.80	0.78–0.83
Other	0.78	0.75–0.81	0.49	0.47–0.52	0.76	0.73–0.79
Age in years						
15-24 (Ref.)	1.00		1.00		1.00	
25-34	0.96	0.93–0.98	0.77	0.75–0.79	0.96	0.93–0.98
35-49	0.86	0.82–0.89	0.62	0.59–0.64	0.85	0.82–0.88
Age at marriage in years						
< 18	0.76	0.74–0.77	0.77	0.75–0.79	0.81	0.79–0.83
> 18 (Ref.)	1.00		1.00		1.00	
Women's education						
No education (Ref.)	1.00		1.00		1.00	
Primary	1.36	1.31–1.40	1.24	1.20–1.29	1.17	1.13–1.21
Secondary	1.63	1.58–1.68	1.88	1.82–1.95	1.34	1.30–1.38
Higher	1.98	1.89–2.07	3.64	3.35–3.95	1.57	1.50–1.65
Wealth quintile						
Poorest (Ref.)	1.00		1.00		1.00	
Poorer	1.33	1.28–1.37	1.40	1.35–1.45	1.21	1.17–1.24
Middle	1.62	1.56–1.68	1.91	1.83–1.99	1.51	1.45–1.56
Richer	1.98	1.90–2.06	2.65	2.52–2.79	1.80	1.73–1.88
Richest	2.81	2.68–2.95	4.62	4.30–4.96	2.26	2.15–2.38
Women's exposure to mass media						
No exposure (Ref.)	1.00		1.00		1.00	
Partial exposure	1.74	1.69–1.79	1.30	1.26–1.34	1.45	1.41–1.49
Full exposure	1.86	1.77–1.95	1.54	1.44–1.64	1.54	1.47–1.62
Region						
North (Ref.)	1.00		1.00		1.00	
Central	0.74	0.72–0.76	0.80	0.77–.83	0.88	0.85–0.91
East	1.06	1.03–1.10	0.99†	0.95–1.03	0.97†	0.94–1.01
Northeast	1.26	1.21–1.31	0.64	0.61–0.67	0.70	0.67–0.73
West	2.73	2.60–2.86	1.59	1.48–1.70	1.32	1.25–1.38
South	3.83	3.66–4.01	4.29	3.92–4.69	1.60	1.52–1.67
Constant	0.32	0.30–0.34	2.22	2.08–2.36	1.12	1.06–1.18
N	176,607		177,718		178,221	
Log likelihood	–104161.37		–77976.83		–105712.46	
LR χ^2	35834.25		30474.26		14522.39	
Pseudo R ²	0.15		0.16		0.06	

Notes: All odds are significant at $p \leq 0.01$ except indicated by †; OR, Odds ratio; CI, Confidence interval; Ref.: Reference category of the variable.

study has found that urban women were more likely to have ANC and deliver in a health facility compared with those women who were living in rural areas. This finding is consistent with other studies conducted in India¹⁰ and Nigeria.¹⁵ Urban women have several advantages compared with the rural women. Women living in urban areas have higher levels of educational knowledge, greater awareness and easy access to public and private health care facilities, whereas rural women are often denied of these opportunities.^{10,16} However, rural-urban residence has no significant association with PNC usage in multivariate analysis. A study conducted in Nigeria reported similar finding.²⁹ Caste has made a significant difference in the utilization of maternal health care services. Our study has found that women belonged to socially marginalized caste (SC/ST) have significantly lower likelihood of maternal health care services than the women belonged to forward caste. This finding is also in the same line of previous study conducted in India.¹⁰ This finding can be explained by the fact that women belonged to SC/ST are educationally and economically backward than the forward caste group of women. In addition, our study also demonstrated that women belonged to Muslim religious community are less likely to use maternal health care services compared with the women belonged to Hindu religion. A study conducted in India also found a similar finding on the

association between religion affiliation of women and the use of ANC services.¹⁰

Women's education has a significant positive influence on the use of maternal health care services. Compared to women with no education, women who had at least primary level of education were more likely to use maternity care services. This finding is consistent with several other previous studies conducted in low- and middle-income countries.^{7,9,10,15,17} This finding highlighted the importance of women's education for improvement in maternity care services. The result implies that educated women have better access to health care information and aware about negative consequences of not seeking maternity care. Moreover, educated women have greater decision making ability to use health care services.^{12,18,19} Household economic status is likely to be the most powerful factor of maternal health care utilization. Consistent with the findings of previous studies,^{10,15,17,20,21} our study also documented that wealthier economic status has a significant positive influence on maternity care utilization. Economically well-off women have greater access to health care information and would go for better hospital facility.^{10,15}

Furthermore, our study demonstrated that child married women were less likely to receive maternity care services than the women who

married during their adulthood. This finding is consistent with previous studies conducted in India and elsewhere.^{22–25} Child married women have lower decision making power regarding their health care.²⁶ Lower access to health care information and living in poverty are made early married women to inadequate use of maternity care.²⁵ Exposure to mass media such as reading newspaper, listening radio, and watching television helps to access health care information and increases the awareness of people on health care.^{10,15} The finding of this study also confirmed that women's greater exposure to mass media has a significant positive impact on maternity care. A significant regional difference in utilization of maternal health care services was found in our study. An earlier study conducted in India also confirmed marked differences in maternity care by region.¹² The level of socioeconomic development, education, and access to health care facilities made significant differences in maternity care across regions. Empowered Action Group (EAG) states (mostly northern and central part) have low women's education, high proportion of below poverty line population, limited exposure to mass media and lower access to health care facilities, which makes this region to seek low utilization of maternal health care services.¹⁰

5. Conclusion

This study has examined the socio-demographic factors of ANC, institutional delivery and PNC services in India. It is found that utilization of maternal health care services in India is not adequate across socio-economic groups and is determined by number of socio-economic and demographic factors.

Educational attainment of women and wealth status of household are the strongest determinants of the utilization of maternal health care services. There is a large difference in the use of maternal health care services between rural and urban areas. Caste and religion are also found to be significant determinants of maternal health care use, which suggests empowerment of women to the less advantaged groups. Lower age at marriage is also a significant predictor of service utilization.

The findings of this study show the importance of education and economic improvement of women. Moreover, infrastructural improvements like roads and transportation facilities in rural areas, eliminating child marriage and access to health information are recommended. Therefore, effort to improve the use of maternal health care services needs targeted approach. The government should pay attention on better educational opportunities, economic condition, and access to health care and information for improvement of maternal health care utilization.

Availability of data and materials

We have used the publicly available secondary data (National Family Health Survey, 2015–2016) for this study. The data can be downloaded through online upon a granted request from Demographic Health Survey (<https://dhsprogram.com/data/available-datasets.cfm>).

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Declaration of competing interest

The authors have no conflict of interest.

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