Socioeconomic Inequalities and Utilisation of Maternal Health Services in India: Evidence from the National Family Health Survey

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Abstract

Maternal mortality remains a pressing issue in developing nations. This research investigates how socio-demographic factors impact the utilisation of maternal healthcare among Indian women, using data from the 2019–2021 National Family Health Survey. Significant discrepancies are evident in various aspects, including urban-rural locations, educational levels, religious affiliation, economic status, and geographic distribution. Through the application of multivariate analysis, the research establishes meaningful correlations among socioeconomic and demographic variables. It is imperative to tackle these disparities to improve access to maternal healthcare and mitigate health-related risks. Key determinants of maternal and child healthcare utilisation among married women include education, wealth status, and regional location. While India's National Health Mission has reduced maternal mortality, inequalities persist. The findings emphasise the importance of healthcare programs improving education, providing financial support, raising awareness, and offering counselling to households with married pregnant women.

Keywords: Inequality, maternal mortality, maternal healthcare, socio-demographic factors, multivariate analysis

Introduction

Addressing maternal health has been a key goal, emphasised by its inclusion among the Millennium Development Goals (WHO, 2005). The inadequate utilisation of maternal and child healthcare services poses a serious threat to the well-being of women and their children, increasing the risk of death (Tsawe et al., 2015). In 2017, approximately 295,000 maternal deaths were recorded globally, with the majority (around 86%) occurring in Sub-Saharan Africa and Southern Asia. Notably, two countries, Nigeria and

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India, contributed significantly to this figure, collectively accounting for over one-third of all maternal deaths worldwide in 2017, with about 67,000 (22%) and 35,000 (11%) maternal deaths, respectively.

A key aim within the Sustainable Development Goals (SDGs) framework is to reduce the global maternal mortality ratio (MMR) to below 70 per 100,000 live births by 2030. Over the past 20 years, the MMR has fallen by 34%, from 342 maternal deaths per 100,000 live births in 2000 to around 223 in 2020 (UNICEF, 2023). According to the latest report from the National Sample

Registration System (SRS), India's maternal mortality ratio for 2018-20 was 97 per 100,000 live births, a decrease of 33 points from 130 in 2014-16 (MHFW, 2022). India is making steady progress towards this goal, ahead of schedule, through policies focused on women's health and well-being. The initiatives implemented by the Central Government have driven significant progress in several states, with eight already achieving the SDG target. These include Kerala (19), Maharashtra (33), Telangana (43), Andhra Pradesh (45), Tamil Nadu (54), Jharkhand (56), Gujarat (57), and Karnataka (69). Efforts to improve maternal and newborn care have emphasised antenatal care, nutrition for pregnant women, and a positive birthing experience. For example, Pradhan Mantri Surakshit Matritva Abhiyan aims to enhance the quality and reach of diagnostic and counselling services while providing comprehensive, high-quality antenatal care free of charge (MHFW, 2022).

Furthermore, research has shown that antenatal care (ANC) serves as a vital foundation for adopting various healthy practices during and after pregnancy (Khan et al., 2010). These practices include institutional delivery, newborn care, exclusive breastfeeding, supplementary feeding, and numerous other aspects. A study conducted in Madhya Pradesh in 2011 indicated that using antenatal care (ANC) increases the likelihood of skilled attendance during childbirth, thereby enhancing the utilisation of postnatal care (PNC). Women who attended at least one ANC session during pregnancy had 3.52 times the odds of receiving skilled assistance at delivery compared to those who did not receive any ANC (Jat et al., 2011). The rise in institutional deliveries is expected to reduce maternal and newborn mortality rates. This positive effect is associated with the presence of qualified birth attendants, supported by appropriate infrastructure and accessible referral services when necessary (Randive et al., 2012 & 2013; Lim et al., 2009). The period immediately following childbirth is critical for both mothers and newborns. Recommending postnatal care services for mothers and infants within 42 days after delivery aims to lower maternal and neonatal deaths by promptly identifying and managing postpartum problems and potential complications. Skilled healthcare professionals provide this care to ensure timely treatment (Titaley et al., 2010). The timing of the postnatal check-up and the level of attention provided during this phase are crucial factors influencing the survival, health, and overall well-being

of both mothers and their newborns (Penh, 2013).

Numerous research studies have established that socio-economic and demographic factors significantly influence the utilisation of maternal health care services (Abbas & Walkar, 1986; Bhatia & Cleland, 1995; Celik & Hotchkiss, 2000; Navaneetham & Dharmalingam, 2002; Obermeyer & Potter, 1991; Ochako et al., 2011; Singh et al., 2012a, b; Tarekegn et al., 2014). Many studies highlight the importance of household-, village-, and community-level factors in determining the use of maternal health care services (Babalola & Fatusi, 2009; Navaneetham & Dharmalingam, 2002; Paul & Chouhan, 2019). These factors include education, household economic status, caste, religion, and women's level of autonomy. The findings consistently show that women's education, social standing, household wealth, and decision-making power are closely linked to their likelihood of seeking maternal health services, ultimately impacting maternal well-being (Subbaras & Rancy, 1995; Caldwell, 1993; Basu et al., 2005; Bloom et al., 2001; Mistry et al., 2009; Paul & Chouhan, 2019; Ali et al., 2021). Based on this literature, the current study has selected appropriate variables. Additionally, this research aims to provide up-to-date insights into the factors influencing the utilisation of maternal healthcare services in India. These findings will be valuable for informing policies that enhance access to maternal healthcare, particularly within marginalised socio-economic communities.

Materials and Methods

Data Source

This study used data from the most recent round of the National Family Health Survey (NFHS-5), conducted between 2019 and 2021. The NFHS is India's Demographic and Health Survey (DHS), which employs a periodic cross-sectional survey design and multistage stratified sampling to ensure a nationally representative sample of women aged 15 to 49 years. NFHS-5 is a comprehensive nationwide survey covering 636,699 households, 724,115 women aged 15-49 years, and 101,839 men aged 15-54 years. The primary aim of the 2019-21 edition of the National Family Health Survey is to provide vital information on health and family welfare, along with insights into emerging aspects within these areas. This includes topics such as fertility rates, infant and child mortality rates, maternal and child health, and other indicators relevant to health and family welfare.

These insights are broken down by demographic characteristics at the national, state, and district levels. Each district is divided into urban and rural segments. Within each rural stratum designated for sampling, a set of villages was selected as the Primary Sampling Units (PSUs). Similarly, within each urban stratum, Census Enumeration Blocks (CEBs) were chosen as the PSUs. Before selecting PSUs, the units were arranged according to the proportion of SC/ST population. In the next phase, a consistent count of 22 households per cluster was selected using a systematic method with equal probabilities. Overall, 30,456 PSUs were carefully

selected across 707 districts in 2017 for NFHS-5. The fieldwork covered 30,198 of these PSUs, where data collection was successfully carried out. The detailed sampling methodology is thoroughly described in the national report of the National Family Health Survey (NFHS) for the years 2015-2016, published by the International Institute for Population Sciences (IIPS) and the Inner City Fund (ICF) in 2017. This research is based on data from 176,843 women aged 15 to 49 years, all of whom have been married at some point and have given birth to at least one child within the five years prior to the survey.

Outcomes Variables

Maternal healthcare utilisation has been evaluated using indicators such as antenatal care (ANC), intrapartum care, and postnatal care (PNC). Assessing ANC care typically involves measuring the number of ANC visits and the timing of the first ANC visit (WHO, 2016). Antenatal care (ANC) is the support provided by skilled health professionals to pregnant women and adolescent girls to promote optimal health for both mother and baby during pregnancy (WHO, 2016). Attending at least four ANC visits during pregnancy is considered adequate. The ideal time for the first ANC visit is within the first trimester, the first three months of pregnancy. Meeting these standards ensures a "safe delivery," as defined by the World Health Organization, which involves either having a trained professional attend the delivery or conducting it in an institutional setting.

The "delivery by a trained person" category applies to cases where the delivery was assisted by a medical professional, such as a doctor, an ANM/nurse/midwife, or another qualified health worker. Conversely, "delivery by an unskilled person" includes situations where assistance was provided by a traditional health worker (Dai), friends or relatives, or an individual without formal medical training.

Besides, "institutional deliveries" occur within a medical establishment, such as a government hospital, dispensary, primary health centre, community health centre, sub-centre, non-governmental hospital, or private clinic. The postnatal period, recognised here as the phase immediately after the baby's birth and extending up to six weeks (42 days), is a vital time for women, newborns, partners, parents, caregivers, and families (WHO, 2022).

Explanatory Variables

This study included socio-demographic variables as factors of interest. These covariates covered the sex of the household head (male or female), the type of residence (urban or rural), social classifications (Scheduled Caste (SC), Scheduled Tribe (ST), Other Backward Classes (OBC), and others), religious affiliation (Hindu, Muslim, and others), mothers' age groups (15–24, 25–34, and 35–49 years), age at marriage (below 18 and 18 years or above), the number of living children (None, 1-2, 3-4, 5 or more), maternal education levels (no education, primary, secondary, and higher education). In the absence of income and expenditure data, the study utilised a wealth index derived from household asset information and housing characteristics. The NFHS-5

provides this wealth index divided into five categories: poorest, poorer, middle, more prosperous, and most affluent. Women's exposure to mass media was also considered. This exposure was evaluated based on the frequency of engagement with different media sources, including reading newspapers and magazines, listening to the radio, and watching television, each week. Based on these three media, women were categorised into three groups: those with no exposure (no engagement with any of the three media sources at least once a week), partial exposure (engaging with any two media sources at least once a week), and full exposure (engaging with all three media sources at least once a week).

Statistical Analysis

The assessment of women's utilisation of maternal health care services during pregnancy was performed using univariate analysis. To examine the relationships between maternal health care types and key factors, a bivariate analysis was conducted using chi-square tests to assess independence. For a more comprehensive insight, a multivariate logistic regression analysis was employed, encompassing all socio-demographic variables as explanatory factors influencing the utilisation of maternal health care services. The regression analysis results were presented as estimated odds ratios (ORs) with corresponding 95% confidence intervals (CIs). The process of estimating results accounted for sample weights, ensuring accurate representation and the generalizability of the findings. All analytical procedures were performed using Stata version 15.1 (Stata Corp., College Station, TX, USA).

Results

Descriptive results

Table 1 provides an overview of the participants' socio-demographic attributes. The majority of respondents resided in households led by males. Approximately 30% of women who had given birth recently were married before turning 18. A significant portion of them lived in rural settings, identified as part of the Other Backward Classes, and adhered to the Hindu faith. More than half of the women were middle-aged, and a substantial number had attained higher levels of education. Meanwhile, over a quarter of the women had not received any formal education. The majority had one or two living children. Nearly half of the women in the lowest wealth quintile had limited exposure to mass media.

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-V (2019-2021)

Variables	Number	Percent
Sex of household		
Male	150,221	84.95
Female	26,622	15.05
Place of residence		
Urban	37,975	21.47
Rural	138,868	78.53
Religion		
Hindu	129,944	73.48
Muslim	25,234	14.27
Other	21,665	12.25
Caste		
Schedule Caste	35,271	19.94
Scheduled Tribe	35,379	20.01
Other Backward Caste	67,024	37.90
Others	37,990	21.48

Do not know/missing	1,179	0.67
Age-group		
15 to 24	53,635	30.33
25 to 34	104,032	58.83
35 to 49	19,176	10.84
Age of marriage		
< 18	53,629	30.33
≥ 18	122,987	69.55
Do not know/missing	227	0.13
Number of living children		
No children	1,566	0.89
1 − 2	125,461	70.94
3 − 4	41,042	23.21
5 & more	8,774	4.96
Education		
No education	35,976	20.34
Primary	21,737	12.29
Secondary	92,624	52.38
Higher	26,506	14.99
Wealth index		
Poorest	44,867	25.37
Poorer	40,481	22.89
Middle	34,569	19.55
Richer	31,054	17.56
Richest	25,872	14.63
Expose to mass media		
No exposure	48,997	27.71
Partial exposure	125,440	70.93
Full exposure	2,406	1.36

Source: National Family Health Survey, 2019-21 & Computed by Author

Utilisation of Maternal Healthcare Services by Women

Table 2 demonstrates the relationships between various maternal healthcare services accessed by married and pregnant women and a range of socio-demographic factors. The results reveal significant associations between these explanatory variables and each type of violence, except for place of residence and PNC visit. Among women who had given birth within the last 5 years before the survey, the study found that 42% had received at least 4 ANC visits, 75% had their first ANC visit within the first trimester, 88% opted for institutional delivery, 89% experienced delivery by skilled

health personnel, and 92% underwent PNC check-ups within 6 weeks of delivery. Notably, the percentages of all five indicators of maternal healthcare service utilisation were considerably lower among women married before 18 years of age, often due to a lack of knowledge and awareness about maternal care.

Use of maternal healthcare services was generally higher among women with male heads of household. Age also influenced utilisation, with women under 24 years showing lower use of ANC and PNC services but higher rates of institutional delivery. Women with one or two children used all types of facilities except PNC visits. Educational attainment was a key factor, as women with no education had lower utilisation of maternal care services compared to those with higher education. Religious and caste differences showed higher healthcare utilisation among Hindus and women from the Other Backward and unreserved categories.

Interestingly, maternal healthcare services were available across all wealth levels, with utilisation increasing significantly with higher wealth. Urban residents demonstrated better awareness and easier access to healthcare services. The study also identified notable variations in maternal healthcare service utilisation based on women's socio-economic and demographic characteristics.

Table 2

Percentage of Women Aged 15 to 49 Years who have Utilised Maternal Health Care Services by Socio-Demographic Characteristics, India, NFHS-V (2019-2021)

Variables	≥ 4 ANC Visits	P (Chi-square)	ANC visit within the first trimester	P (Chi-square)	Institutional delivery	P (Chi-square)	Delivery by skilled health personnel	P (Chi-square)	PNC check-ups within 6 weeks	P (Chi-square)
Sex of household										
Male	42.19	<0.001	75.27	<0.001	88.44	<0.001	89.27	<0.001	96.68	<0.1
Female	39.57		72.57		85.52		86.44		96.31	
Place of residence										
Urban	54.23	<0.001	80.03	<0.001	94.55	<0.001	94.41	<0.001	96.67	>0.5
Rural	38.40		73.41		86.21		87.32		96.61	
Religion										
Hindu	42.89	<0.001	75.21	<0.001	90.44	<0.001	90.55	<0.001	96.91	<0.001
Muslim	42.80		76.07		86.32		88.17		96.92	
Other	34.04		71.13		75.34		79.41		93.50	
Caste										
SC	39.31	<0.001	74.07	<0.001	88.83	<0.001	89.39	<0.001	97.04	<0.001
ST	35.95		71.76		77.37		80.84		95.55	
OBC	42.37		75.51		91.26		91.20		97.02	
Others	48.67		77.26		92.67		91.72		96.47	
Do not know	36.98		72.86				86.68		93.60	
Age-group										
15 to 24	40.30	<0.001	74.59	<0.001	89.89	<0.001	90.05	<0.001	96.48	<0.1
25 to 34	43.04		75.50		88.28		89.16		96.70	
35 to 49	39.21		72.10		81.18		83.77		96.57	
Age of marriage										
< 18	34.10	<0.001	71.14	<0.001	83.18	<0.001	84.89	<0.001	96.60	<0.5
≥ 18	45.15		76.45		90.11		90.58		96.63	
Do not know	39.65		71.64		84.14		84.58		97.22	
Number of living children										
No children	34.48	<0.001	75.51	<0.001	88.12	<0.001	87.68	<0.001	98.89	<0.001
1 – 2	46.22		76.84		92.14		92.11		96.49	
3 – 4	32.83		70.64		80.31		83.00		97.08	
5 & more	21.81		64.27		64.75		69.67		96.32	
Education										
No education	27.31	<0.001	68.69	<0.001	75.50	<0.001	78.91	<0.001	96.35	<0.001
Primary	34.09		70.84		81.81		83.75		96.41	
Secondary	45.19		76.09		91.52		91.70		96.58	
Higher	55.89		81.41		97.77		96.52		96.62	
Wealth index										
Poorest	26.97	<0.001	67.50	<0.001	74.56	<0.001	77.95	<0.001	96.51	<0.01
Poorer	36.33		71.22		86.65		87.74		96.47	
Middle	45.48		76.39		92.64		92.55		96.32	
Richer	53.02		80.21		95.75		95.19		96.85	
Richest	57.66		83.57		97.92		96.88		97.10	
Expose to mass media										
No exposure	27.09	<0.001	68.10	<0.001	77.71	<0.001	80.25	<0.001	96.56	<0.5
Partial exposure	47.29		77.23		91.86		92.05		96.65	
Full exposure	54.61		78.98		96.05		96.51		96.81	

Source: National Family Health Survey, 2019-21 & Computed by Author

Table 3 provides a comprehensive analysis using multivariate logistic regression to explore the socio-demographic factors associated with the utilisation of maternal healthcare services. In comparison to urban-dwelling women, those residing in rural areas exhibited a lower likelihood of accessing all types of maternal health care services except for postnatal care (PNC). Women belonging to the Scheduled Tribes (ST) and those not affiliated with any specific caste were found to have a higher likelihood of utilising antenatal care (ANC) services compared to the Scheduled Castes (SC) and Other Backwards Classes (OBC).

Table 3

Multivariate Logistic Regressions for Socio-Demographic Factors Associated With the Utilisation of Maternal Health Care Services in India, NFHS-V (2019-2021)

Variables	≥ 4 ANC Visits	ANC visit within the first trimester	Institutional delivery	Delivery by skilled health personnel	PNC check-ups within 6 weeks
	OR [95% CI]	OR [95% CI]	OR [95% CI]	OR [95% CI]	OR [95% CI]
Sex of household					
Male (Ref.)					
Female	0.97[0.93,0.98]	0.91[0.88,0.93]	0.90[0.87,0.94]	0.87[0.84,0.91]	0.97[0.86,1.06] †
Place of residence					
Urban (Ref.)					
Rural	0.81[0.79,0.83]	0.97[0.94,1.00] †	0.94[0.89,0.99]	0.90[0.85,0.95]	1.12[1.00,1.25]
Religion					
Hindu (Ref.)					
Muslim	1.05[1.02,1.09]	1.10[1.06,1.14]	0.70[0.66,0.73]	0.84[0.80,0.88]	0.79[0.70,0.91] †
Other	0.62[0.60,0.65]	0.78[0.75,0.82]	0.36[0.35,0.38]	0.45[0.43,0.47]	0.49[0.44,0.56]
Caste					
SC (Ref.)					
ST	1.21[1.16,1.25]	1.08[1.04,1.13]	0.77[0.73,0.80]	0.82[0.78,0.86]	0.79[0.70,0.91]
OBC	0.97[0.95,1.00] †	0.97[0.94,1.00] †	1.08[1.03,1.13]	1.01[0.97,1.06] †	0.94[0.84,1.05] †
Others	1.12[1.09,1.16]	0.97[0.84,1.12] †	0.99[0.93,1.05] †	0.95[0.90,1.01] †	0.81[0.71,0.92]
Respondent Age Group					
15 to 24 (Ref.)					
25 to 34	1.14[1.11,1.17]	1.04[1.01,1.07]	1.03[0.99,1.08] †	1.07[1.02,1.11]	1.00[0.91,1.10] †
35 to 49	1.32[1.27,1.38]	1.01[0.96,1.05] †	1.12[1.05,1.19]	1.18[1.11,1.26]	0.97[0.83,1.14]
Age of marriage					
≥18 (Ref.)					
<18	0.89[0.87,0.91]	0.92[0.90,0.95]	0.85[0.83,0.88]	0.89[0.86,0.92]	0.93[0.85,1.03] †
Number of living children					
No children (Ref.)					
1 – 2	1.39[1.24,1.54]	0.98[0.86,1.10] †	1.26[1.07,1.48]	1.34[1.15,1.57]	0.31[0.17,0.84]
3 – 4	0.98[0.88,1.10] †	0.82[0.73,0.93]	0.69[0.58,0.81]	0.82[0.69,0.96]	0.37[1.14,1.00] †
5 & more	0.71[0.63,0.81]	0.72[0.63,0.82]	0.48[0.41,0.57]	0.55[0.47,0.65]	0.31[0.11,0.85]
Education					
No education (Ref.)					
Primary	1.15[1.11,1.20]	1.00[0.97,1.05] †	1.22[1.16,1.27]	1.15[1.10,1.21]	1.05[1.00,1.10]
Secondary	1.36[1.32,1.40]	1.08[1.04,1.12]	1.72[1.66,1.79]	1.55[1.49,1.62]	1.68[1.57,1.81]
Higher	1.43[1.38,1.50]	1.13[1.08,1.19]	3.13[2.85,3.44]	2.03[1.87,2.20]	1.73[1.66,1.79]
Wealth index					
Poorest (Ref.)					
Poorer	1.23[1.20,1.28]	1.09[1.06,1.13]	1.63[1.56,1.69]	1.52[1.46,1.58]	1.06[0.95,1.20]
Middle	1.54[1.50,1.61]	1.34[1.29,1.39]	2.46[2.33,2.59]	2.12[2.01,2.23]	1.06[0.93,1.20]
Richer	1.84[1.77,1.91]	1.60[1.54,1.67]	3.53[3.30,3.77]	2.79[2.62,2.98]	1.30[1.13,1.51]
Richest	1.93[1.85,2.01]	1.94[1.84,2.04]	5.75[5.20,6.35]	3.65[3.35,3.99]	1.58[1.33,1.86]
Expose to mass media					
No exposure (Ref.)					
Partial exposure	1.51[1.48,1.56]	1.19[1.16,1.23]	1.39[1.34,1.44]	1.38[1.34,1.43]	1.05[0.94,1.19]
Full exposure	1.53[1.41,1.68]	1.10[0.99,1.22] †	1.57[1.27,1.95]	2.03[1.62,2.54]	1.09[1.05,1.14] †
Constant	0.26	2.23	3.49	3.72	1.55
Log Likelihood	-113117.54	-91309.69	-54171.83	-54760.48	-51403.17
LR X^2	14137.25	3857.65	21423.46	14187.02	1178.35
Pseudo R²	0.06	0.02	0.17	0.11	0.01

Source: National Family Health Survey, 2019-21 & Computed by Author

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

Meanwhile, OBC women demonstrated a greater tendency toward institutional delivery care. Muslim women, in contrast, were less likely than Hindu women to opt for institution-assisted delivery and skilled health personnel, as well as PNC care. Maternal health care service utilisation showed a positive correlation with age, with older women having higher odds of accessing these services than their younger counterparts, reflecting the increasing age at marriage. Notably, women who married before the age of 18 had significantly lower odds of utilising all five indicators of maternal health care services compared to those who married at 18 years or older.

Furthermore, women with one or two living children displayed a higher likelihood of utilising various facilities than those with no children or more than three children. Education emerged as a crucial factor, with higher-educated women being approximately 1.4, 3.1, and 1.73 times more likely to have ≥4 ANC visits, opt for institutional delivery, and undergo PNC check-ups, respectively, than less educated women. Socio-economic status also played a pivotal role. Women from the wealthiest quintile were approximately 1.9 times more likely to receive ≥4 ANC visits and have an initial ANC visit within the first trimester compared to women in the poorest wealth quintile. Similarly, the odds of institutional delivery and of being assisted by medical practitioners were 5.8 and 3.7 times higher among the wealthiest women than among the poorest. This trend extended to PNC,

with richer women more likely to access such care. Access to mass media significantly influenced maternal health care service utilisation. Women with partial or complete exposure to mass media had notably higher odds of utilising maternal health care services compared to those with no exposure. In essence, Table 3's findings underline the intricate interplay of socio-demographic factors in shaping maternal health care service utilisation.

Discussion

The current research provides valuable insights into how socio-demographic characteristics influence the utilisation of maternal healthcare services in the Indian context. Disparities in access to maternal healthcare are evident across different layers of society, affecting both the quality of care and socioeconomic gradients in India (Singh et al. a,b). These disparities lead to circumstances that make certain women more vulnerable to maternal mortality than others. In low-income countries like India, marrying young and having lower educational attainment increase the lifelong risk of pregnancy-related mortality among economically disadvantaged women.

Maternal healthcare inequalities are not limited to international borders; they occur within countries and reflect differences between wealthy and poorer women living in rural areas, urban centres, and slum communities (Gwatkin et al., 2007; Goldenberg et al., 2012; Gupta et al., 2017).

The results of our investigation indicate a significant correlation

between various socio-demographic factors and the utilisation of antenatal care (with a minimum of four visits and visits during the first trimester of pregnancy), childbirth care (institutional delivery and assistance by skilled healthcare personnel), as well as postnatal care (post-delivery check-ups within 42 days). Cross-national studies of maternal healthcare consistently demonstrate that living in urban areas provides a protective advantage. This suggests that women with higher levels of education and economic status tend to use healthcare services more effectively than their rural counterparts (Anmed et al., 2010). Our own research findings align with this pattern, showing that women living in urban areas are more likely to seek antenatal care (ANC) and give birth in healthcare facilities compared to women residing in rural areas. However, in a multivariate analysis of postnatal care (PNC) usage, no significant association with rural-urban residence was observed. Similar trends have been identified in India's context (Paul & Chouhan, 2020; Bharti & Raj T.P., 2019) as well as in other developing countries (Ononokpono et al., 2019).

The religious affiliation of women, especially those belonging to the Muslim faith, significantly influences the utilisation of safe delivery and postnatal care (PNC) services. However, this affiliation does not appear to affect the use of antenatal care (ANC) or child immunisation. A similar finding was observed in an Indian study that examined the

relationship between women's religious affiliation and their use of ANC services. Interestingly, this result contradicts an earlier study suggesting that Muslim women are less likely to access maternal healthcare services (Kumar et al., 2011; Singh et al., 2012; Hazarika, 2010; Ali et al., 2021). Likewise, caste does not influence the utilisation of antenatal care services. Notably, scheduled tribes mainly benefit from the primary healthcare programme, which allocates a large share of government funding (Rao et al., 2005). However, the use of safe delivery services is significantly lower among women from scheduled tribes. The availability of skilled birth attendants—crucial for ensuring appropriate and timely delivery care within the community—has been inadequate, particularly affecting delivery practices among scheduled tribes (Saroha et al., 2008). To address this issue, substantial efforts are needed to increase the number of trained birth attendants in tribal communities.

Women who entered into marriage before the age of 18 showed a significantly lower likelihood of utilising maternal healthcare services compared to those who married at 18 or older. Research also highlights that limited decision-making power within the household is a notable barrier to young married women's access to healthcare services (Bloom et al., 2001; Mistry et al., 2009; Rai et al., 2012). The use of maternal healthcare services was more common among women aged 35 to 49 years, those with at least

secondary education, living in households headed by men, and those exposed to mass media, according to studies by Goland et al. (2012) and Srivastava et al. (2014). Additionally, higher utilisation was seen among women with one or two living children, those belonging to the Other Backward Classes (OBC), and the Hindu religion.

Education plays a crucial role in improving the quality of maternal healthcare and increasing access to and use of antenatal (ANC) and postnatal care (PNC) services. Pregnancy outcomes and ANC coverage are poorer among women experiencing poverty, limited education, and living in rural areas, as noted by the World Health Organization (WHO, 2015). Educated mothers are more likely to utilise public health services, actively seek better care options, and have greater ability to use healthcare resources to achieve better outcomes, compared with women with no education (Shawky & Milaat, 2001; Celik & Hotchkiss, 2000; Mistry et al., 2009). Additionally, an educated woman can subtly influence her in-laws' decisions and introduce new ideas about the advantages of skilled healthcare (Furuta & Salway, 2006).

Beyond women's education, economic status emerged as another significant factor influencing the utilisation of the selected maternal and child healthcare services in India. This trend vividly illustrates the substantial inequality across economic strata. Earlier research similarly concluded that the gap in the utilisation of maternal and child healthcare services

between the impoverished and affluent has grown wider, with programs inadequately reaching the economically disadvantaged segments of society. Upon deconstructing the disparities in maternal health services utilisation, the study found that higher levels of education, exposure to media, and elevated wealth status were the primary contributors to the observed inequality, findings corroborated by Pallikadavath et al. (2004), Mohanty & Pathak (2005), and Pathak et al. (2010). This divergence likely stems from the fact that economically disadvantaged households lack the financial resources to cover healthcare costs, as they focus on meeting basic daily needs. In contrast, wealthier households can allocate a larger share of their income to healthcare expenses (Singh et al., 2012).

Conclusion

In conclusion, this comprehensive study provides valuable insights into the complex factors influencing the use of maternal healthcare services in India. The research highlights notable disparities in access and utilisation across different socio-demographic and economic groups. These inequalities perpetuate situations that make certain women more vulnerable to maternal mortality, emphasising the urgent need for targeted interventions. Notably, the findings stress the crucial role of education as a foundation for improving the quality, accessibility, and utilisation of maternal and child healthcare services. This leads to better health outcomes for both women and their children. The analysis of

healthcare disparities shows that higher education, media exposure, and greater wealth significantly reduce inequalities. However, the widening gap in healthcare service utilisation among economic groups presents a challenge, with implications for policy and programme development to ensure fair access to quality care. The findings act as a call to action for policymakers, healthcare providers, and communities alike. By recognising and addressing the complex interplay of factors such as education, economic status, and socio-demographic characteristics, sustainable improvements can be made. It is essential to prioritise investments in education, healthcare infrastructure, and resources for marginalised communities to close existing gaps and build a more equitable maternal and child healthcare system in India.

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