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Original Research Article

Factors affecting maternal healthcare services utilization in the districts of Maharashtra

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ABSTRACT

Background: This study investigates factors influencing maternal healthcare service utilization across two contrasting districts of Maharashtra—Nandurbar (tribal) and Satara (non tribal).
Method: Using a descriptive quantitative design, primary survey data were collected from 240 mothers who had delivered within the preceding 11 months. Outcomes examined included full antenatal care (ANC), institutional delivery, and postnatal care (PNC), with associations tested against socio demographic and household characteristics.
Results: Findings reveal stark disparities. Full ANC utilization was significantly lower in Nandurbar (31%) compared to Satara (45%), with geography exerting a strong influence: plain talukas reported over 60% coverage, while hilly talukas recorded as low as 0%. Institutional delivery followed a similar pattern, with Satara achieving 81% compared to 51% in Nandurbar; plain regions reported nearly universal coverage (93%), while hilly regions lagged at 39%. PNC utilization also showed marked differences, with Satara at 75% and Nandurbar at 49%. Socioeconomic gradients were evident across all services. Women with higher education and wealth consistently reported greater utilization, while those with no schooling or low wealth indices had the lowest uptake. Parity further influenced outcomes, with first time mothers more likely to access services than those with three or more children. Caste disparities were pronounced, with Scheduled Tribe mothers consistently reporting lower utilization.
Conclusions: The study underscores that maternal healthcare access in Maharashtra is structured by geography, education, wealth, and parity. Addressing these inequities requires geographically sensitive strategies, targeted outreach in tribal and hilly regions, and interventions that strengthen education, awareness, and economic support for vulnerable women.

Keywords: Maternal healthcare utilization, Satara & Nandurbar, Maharashtra

INTRODUCTION

Maternal healthcare utilization is best understood as a continuum extending from pregnancy through childbirth and the early postnatal period. ANC provides opportunities to confirm pregnancy, assess risk, prevent and manage complications, offer counselling, and connect women with an appropriate place of delivery. Institutional delivery, particularly when supported by skilled birth attendants, is important because obstetric complications can arise suddenly and require timely clinical intervention. PNC is equally important for detecting maternal and neonatal complications, supporting breastfeeding and newborn care, and counselling women about recovery, contraception, and danger signs. Thus, measuring only one service can overstate the extent to which women receive effective maternal care; women may attend ANC but deliver at home, deliver in a facility but fail to receive a timely postnatal check, or receive several contacts that do not meet recommended standards. Recent research therefore emphasizes complete or

adequate utilization across the continuum, as well as the quality and timing of contacts, rather than service contact alone.[1-3] For this reason, examining the continuum is useful for assessing whether contact with services translates into comprehensive maternal and newborn care in India.[3]

Although India has expanded maternal health programmes and increased the availability of institutional maternity services, utilization remains uneven across places and population groups. National averages can conceal differences between states, districts, rural and urban areas, and communities with unequal social and economic resources. Multilevel analyses show that maternal healthcare utilization is shaped not only by a woman's characteristics but also by household circumstances, community conditions, and the district-level health system in which she lives.[4]

Evidence from successive national surveys similarly identifies persistent inequalities in ANC, institutional delivery, and postnatal care by wealth, education, residence, social group, and access to services.[5,6] Geographic distance, transport constraints, limited availability of skilled providers, and weak referral linkages can be especially consequential for women living in remote or underserved settings. Moreover, the likelihood of completing the continuum may decline at each stage, so high institutional-delivery coverage does not necessarily imply adequate ANC or timely PNC. Research on rural India has consequently called for geographically sensitive approaches that identify where losses in continuity occur and which barriers are most important for particular populations.[3]

The determinants of maternal healthcare utilization operate across individual, household, social, and health-system levels. Maternal education may improve knowledge of pregnancy danger signs, confidence in communicating with providers, and the ability to navigate health services. Household wealth affects both direct expenditures and indirect costs, including transport, medicines, accommodation, and lost wages. Women's autonomy and their participation in household decisions may increase the likelihood that women visit a health facility for their own and their children's healthcare.[7]

Age, parity, birth order, exposure to health information, and previous experience with pregnancy may further shape perceived need for care. ANC utilization may also influence institutional delivery because ANC visits can serve as an entry point into the health system, expose women to health facilities, and create opportunities to encourage subsequent care.[8,9] PNC utilization is also associated with geographic, demographic, socioeconomic, and pregnancy-related factors, although the relative importance of these determinants may differ across settings.[2] These interrelated determinants suggest that maternal services should be analysed as linked outcomes rather than isolated events. The Maharashtra context makes a district-level investigation particularly relevant. Studies from the state and from comparable western Indian settings indicate that the place of delivery and use of maternal services are associated with socioeconomic circumstances, education, household characteristics, and the perceived accessibility and acceptability of health facilities.[10,11] At the same time, evidence from literature shows that particularly vulnerable tribal groups and women living in areas without all-weather roads are at increased risk of inadequate ANC, underscoring the importance of geographic access.[12]

These findings caution against treating Maharashtra as a homogeneous unit. Districts may differ in terrain, transport, health-facility availability, social composition, and frontline-worker capacity. Consequently, institutional delivery, ANC adequacy, and timely PNC may follow different district-level patterns. Examining districts separately can therefore reveal disparities that are obscured in state-level estimates and can help connect observed utilization patterns to locally actionable barriers.

Against this background, the present study examines factors associated with maternal healthcare service utilization among women who delivered a child during the previous 11 months in Nandurbar and Satara districts of Maharashtra. It focuses on three linked outcomes: ANC utilization, institutional delivery, and postnatal care. Comparing the outcomes can show whether predictors are consistent or vary with local social, geographic, and health-system conditions. By moving beyond a single measure of service contact, the study can indicate where women are lost along the maternal healthcare pathway. Evidence generated from the study will be helpful to support more targeted planning and contribute to a more equitable maternal health strategy for Maharashtra.

METHODS

This research paper is a part of a broader doctoral study titled Utilization of Maternal Health Care Services in Two Districts of Maharashtra: A Rights-Based Approach to Public Health. The present paper examines factors influencing maternal healthcare utilization through a cross-sectional quantitative design. Two districts Nandurbar and Satara were purposively selected based on their contrasting prevalence of ANC. A semi-structured interview schedule was administered to eligible women who had delivered within the preceding 11 months. Sampling was undertaken from villages representing different strata, with 120 women selected from each district (total 240).

The list of villages was obtained from the concerned PHCs, and households were identified with the assistance of ASHAs/Anganwadi Workers. Data collection was conducted between 2013 to 2015, and the study received approval from the doctoral research ethics committee. To understand maternal health utilization, the study analysed antenatal care, institutional vs home delivery and post-

natal checks. District level aggregate data has been presented by women's socio-demographic and household level characteristics. Full ANC was used to examine the percentage of mothers who accessed adequate antenatal care services. Full ANC variable was computed using 4 plus ANC visit, 2 TT injection and consumption of 100 IFA tablets.

Similarly, along with full ANC, other outcome variables like institutional delivery and post-natal care have been considered. The association between the outcome and socio-demographic variable has been cross-tabulated using Person's Chi-square test along with strength of association tests, to examine the statistically significant them.

RESULTS

The socio-economic and demographic profile of mothers reveals marked contrasts between the Nandurbar (tribal) and the Satara (non-tribal) district and presented in Table 1. In terms of age both the considered district has similar age distribution. Fertility patterns also diverge: Nandurbar has a larger share of women with three or more children (42%), while Satara leans toward smaller family sizes, with two children being most common (42%).

Educational attainment highlights a stark disparity. More than half of women in Nandurbar (57%) have no formal education, whereas in Satara this figure is only 17%. Conversely, Satara records much higher levels of secondary education (53% up to 10th standard) compared to Nandurbar (23%). Higher education remains negligible in both districts. Work status patterns reflect the agrarian base of both districts, with the majority engaged in cultivation on their own land. However, Nandurbar has a higher proportion of women working on others' land (28%), while Satara shows more women confined to household work (23%).

Caste composition underscores the tribal character of Nandurbar, with 100% of respondents belonging to Scheduled Tribes, while Satara is dominated by Marathas (78%) along with smaller shares of SC and OBC groups. Wealth distribution suggests women from Nandurbar concentrated in the low wealth index (62%), whereas Satara demonstrates a more affluent profile, with the similar proportion in the high wealth category.

Table 1: Socio-economic and demographic characteristics of women from Nandurbar and Satara District.

	Nandurbar District		Satara District	
Characteristics	**Frequency**	**%**	**Frequency**	**%**
Age group of women (in years)				
17–20	21	17.5	17	14.2
21–30	82	68.3	96	80.0
31–40	17	14.2	7	5.8
Children ever born				
One	39	32.5	45	37.5
Two	30	25.0	50	41.7
Three or more	51	42.5	25	20.8
Education of women				
No formal education	69	57.5	21	17.5
1–5th std	10	8.3	10	8.3
6–10th std	28	23.3	64	53.3
11–12th std	11	9.2	18	15.0
Graduation	2	1.7	7	5.8
Work status of women				
Work at home	6	5.0	28	23.3
Work in own land	80	66.7	73	60.8
In someone else's land	34	28.3	19	15.8
Caste group				
SC	0	0.0	9	7.5
ST	120	100.0	0	0.0
OBC	0	0.0	17	14.2
Other (Maratha)	0	0.0	94	78.3
Wealth index				
Low	74	61.7	6	5.0
Medium	40	33.3	40	33.3
High	6	5.0	74	61.7
Total frequency	120		120	

Table 2: Percent of Full Antenatal health care utilization by socio-economic characteristic of women in the selected districts of Maharashtra.

Characteristics	Full ANC	N	Chi-Square test	P value
District				
Nandurbar (Tribal)	30.8	120	5.115	0.024
Satara (Non-tribal)	45.0	120		
Taluka				
Dhadgaon taluka (Hilly)	0.0	60	70.713	0.000
Nandurbar taluka (Plain)	61.7	60		
Patan taluka (Hilly)	26.7	60		
Karad taluka (Plain)	63.3	60		
Geographical topography				
Hilly (Total)	13.3	120	61.615	0.000
Plain (Total)	62.5	120		
Age of mother (years)				
17-24	33.1	130	4.207	0.122
25-30	46.5	86		
31-40	33.3	24		
Number of children				
1	47.1	87	6.286	0.043
2	37.2	78		
3+	28	75		
Education of mother				
No formal education	16.7	90	32.763	0.000
Primary education	39.1	46		
High school	51.5	66		
Higher education	63.2	38		
Caste group				
SC	44.4	9	5.151	0.161
ST	30.8	120		
OBC	47.1	17		
Other	44.7	94		
Wealth index				
Low	13.8	80	30.197	0.000
Medium	47.5	80		
High	52.5	80		

Table 3: Percent of institutional delivery service utilization by their socio-economic characteristic in the selected districts of Maharashtra.

Characteristics	Institutional delivery	N	Chi-Square test	P-value
District				
Nandurbar (Tribal)	50.8	120	24.007	0.000
Satara (Non-Tribal)	80.8	120		
Taluka				
Dhadgaon (Hilly)	15	60	108.848	0.000
Nandurbar taluka (Plain)	86.7	60		
Patan (Hilly)	63.3	60		
Karad (Plain)	98.3	60		
Geographical topography				
Hilly (Total)	39.2	120	75.875	0.000
Plain (Total)	92.5	120		
Age of mother (years)				
17-24	67.7	130	2.974	0.226
25-30	67.4	86		

Continued.

Characteristics	Institutional delivery	N	Chi-Square test	P-value
31-40	50	24		
Number of Children				
1	82.8	87	34.565	0.000
2	71.8	78		
3+	40	75		
Education of mother				
No formal education	30	90	84.937	0.000
Primary education	78.3	46		
High school	89.4	66		
Higher education	94.7	38		
Caste group				
SC	77.8	9	24.238	0.000
ST	50.8	120		
OBC	76.5	17		
Other	81.9	94		
Wealth index				
Low	27.5	80	89.509	0.000
Medium	72.5	80		
High	97.5	80		

Table 4: Percent of women reported to receive post-natal service utilization by their socio-economic characteristic in the selected districts of Maharashtra.

Characteristics	Post-natal care	N	Chi-Square test	P value
District				
Nandurbar (Tribal)	49.2	120	17.010	0.000
Satara (Non-tribal)	75	120		
Taluka				
Dhadgaon (Hilly)	13.3	60	87.564	0.000
Nandurbar taluka (Plain)	85	60		
Patan (Hilly)	65	60		
Karad (Plain)	85	60		
Geographical topography				
Hilly (Total)	39.2	120	53.544	0.000
Plain (Total)	85	120		
Age of mother (years)				
17-24	66.9	130	9.739	0.008
25-30	62.8	86		
31-40	33.3	24		
Number of children				
1	77	87	38.576	0.000
2	73.1	78		
3+	33.3	75		
Education of mother				
No formal education	25.6	90	82.688	0.000
Primary education	78.3	46		
High school	87.9	66		
Higher education	84.2	38		
Caste group				
SC	88.9	9	21.544	0.000
ST	49.2	120		
OBC	52.9	17		
Other	77.7	94		
Wealth index				
Low	27.5	80	64.182	0.000
Medium	72.5	80		
High	86.3	80		

The findings of Full Antenatal health care utilization by socio-economic characteristic of women have been presented in Table 2. Full antenatal care utilization varied significantly across districts and talukas. Mothers in Satara (non-tribal) reported higher utilization (45%) compared to Nandurbar (tribal) at 31%, and the chi square test confirmed this difference as statistically significant. Within talukas, the contrast was even sharper: plain areas such as Nandurbar taluka (62%) and Karad taluka (63%) showed much higher coverage than hilly talukas, where Dhondegaon recorded virtually no utilization (0%) and Patan only 27%. This pattern was reinforced when comparing topography overall, with plain regions (63%) far ahead of hilly regions (13%), a highly significant difference.

Socio economic characteristics also played a decisive role. Education showed a strong gradient: women with no formal schooling had very low utilization (17%), while those with higher education reached 63%, with the chi square test indicating clear significance. Wealth status followed a similar trend, with only 14% of women in the low wealth group reporting full ANC, compared to 53% among the high wealth group. Both education and wealth were strongly associated with better utilization. Parity influenced utilization as well. First time mothers had the highest uptake (47%), while women with three or more children showed the lowest (28%), and this difference was statistically significant. Age differences were less pronounced, with no significant variation across age groups.

Similarly, the percent of women access to institutional delivery by their socio-economic characteristic have been presented in Table 3. Institutional delivery utilization showed sharp differences between tribal and non-tribal districts. In Satara (non tribal), about 81% of mothers delivered in institutions compared to only 51% in Nandurbar (tribal), and this difference was highly significant. The taluka level picture was even more striking: plain areas such as Karad (98%) and Nandurbar taluka (87%) reported very high institutional deliveries, while hilly Dhadgaon lagged far behind at just 15%. Overall, plain regions (93%) were far ahead of hilly regions (39%), confirming the strong influence of geography.

Socio economic status was another decisive factor. Education showed a steep gradient: only 30% of women with no formal schooling delivered in institutions, compared to 95% among those with higher education. Wealth followed a similar pattern, with just 28% of women in the low wealth group reporting institutional delivery, while nearly all (98%) in the high wealth group did so. Both education and wealth were strongly associated with service utilization.

Parity also mattered. First time mothers had the highest institutional delivery rate (83%), while women with three or more children had the lowest (40%), and this difference was statistically significant. Age differences, however, were not significant, with similar rates across younger and middle age groups. Similarly, caste differences were evident. Scheduled Tribe mothers had much lower institutional delivery (51%) compared to other caste groups (82%), OBC (77%), and SC (78%), with the chi square test confirming significance. Considering post-natal care utilization showed clear disparities between tribal and non-tribal districts (Table 4). In Satara (non tribal), three quarters of mothers (75%) received post-natal services compared to only half (49%) in Nandurbar (tribal), and this difference was statistically significant. At the taluka level, plain areas such as Karad and Nandurbar taluka reported high coverage (both 85%), while hilly Dhadgaon lagged far behind at just 13%. Overall, plain regions (85%) were much better served than hilly regions (39%), confirming geography as a strong determinant.

Socio economic characteristics also played a decisive role. Education showed a steep gradient: only 26% of women with no formal schooling received post-natal care, compared to nearly 88% among those with high school education and 84% among those with higher education. Wealth status followed a similar pattern, with just 28% of women in the low wealth group reporting service use, while 86% in the high wealth group did so. Both education and wealth were strongly associated with post-natal care utilization.

Parity influenced service uptake as well. First time mothers had the highest utilization (77%), followed by those with two children (73%), while women with three or more children had the lowest (33%). Age differences were also significant: younger mothers (17–24 years) reported higher utilization (67%) compared to older mothers aged 31–40 (33%). Caste differences were evident too. Scheduled tribe mothers had much lower utilization (49%) compared to other caste groups (78%), OBC (53%), and SC (89%), with the chi square test confirming significance.

DISCUSSION

This study examined the use of full ANC, institutional delivery and PNC among women in a tribal district (Nandurbar) and a non-tribal district (Satara) of Maharashtra. Four patterns stand out: a persistent tribal–non-tribal divide, a steep geographic gradient between plain and hilly areas, strong education and wealth gradients, and a decline in service use with higher parity. Together these show that access to maternal health services remains structured by social position and place, even in a relatively developed state like Maharashtra.

The first and most consistent finding is the gap between the two districts. Women in Satara had higher full ANC (45% vs 31%), institutional delivery (81% vs 51%) and PNC (75% vs 49%) than women in Nandurbar. Similar pattern has been observed with respect caste groups. Scheduled Tribe mothers had the lowest institutional delivery (51%) and PNC (49%). This is consistent with national evidence that caste, class and region jointly produce inequities in health service access and with the

Expert Committee on Tribal Health's finding that tribal populations lag behind on maternal and child health indicators. Andersen's behavioural model helps explain this. Nandurbar's women had far less schooling and wealth (predisposing and enabling resources), and likely face greater need-related and structural barriers. Tribal status here therefore operates largely through these compounded disadvantages rather than in isolation.[13-15]

Geography emerged as an equally strong determinant. Plain talukas such as Karad and Nandurbar had institutional delivery of 98% and 87%, whereas hilly Dhadgaon recorded 15%, and plain regions overall were far ahead of hilly regions for ANC (63% vs 13%), delivery (93% vs 39%) and PNC (85% vs 39%). The near-zero full ANC in Dhadgaon is notable. These results echo the "three delays" framework, which identifies distance, poor transport and weak facility availability as major obstacles to care.[16] Existing literature showing that distance to facilities is a major determinant of delivery service use.[17] Kesterton et al similarly found that accessibility and economic status together shape institutional delivery in rural India.[18] Notably, the Nandurbar taluka, which is a plain area within the tribal district, performed on a par with Karad. This suggests that remoteness, rather than tribal identity alone, drives much of the deficit, and that tribal disadvantage is concentrated in hard-to-reach habitations.

Third, education and wealth showed steep gradients across all three services. Women with no schooling had 17% full ANC, 30% institutional delivery and 26% PNC, against 63%, 95% and about 84-88% among the most educated. Women in the lowest wealth group reported 14%, 28% and 28%, compared with 53%, 98% and 86% in the highest wealth group. These gradients agree with studies documenting a wide rich–poor gap in reproductive and child health services in India with analyses of full ANC using NFHS-4 and with systematic reviews linking maternal education and household economic status to ANC utilization.[19-21] Education likely improves health literacy, autonomy and the ability to navigate services, while wealth reduces the direct and indirect costs of travel and care. Evidence from low- and middle-income countries also shows that PNC is distributed inequitably, favoring richer and better-educated women.[22] Because over half of Nandurbar's women had no formal education and most were in the low wealth category, these two factors probably account for a large share of the district gap.

Fourth, parity and age shaped utilisation. First-time mothers had the highest ANC (47%), institutional delivery (83%) and PNC (77%), while women with three or more children had the lowest (28%, 40% and 33%). Younger women (17-24 years) also reported higher PNC than those aged 31-40 (67% vs 33%). Higher-parity women may feel more confident in previous home births, face competing household and agricultural duties, and have less time or support to travel for care; these factors have been noted in other studies of maternity care use in India.[23] Since Nandurbar has a larger share of women with three or more children, parity compounds the district disadvantage.

An additional pattern is the weak continuity of care. In both districts, institutional delivery exceeded full ANC by a wide margin (81% vs 45% in Satara; 51% vs 31% in Nandurbar). This suggests that demand-side incentives such as Janani Suraksha Yojana, which raised facility births have not been matched by comparable gains in the quality and completeness of ANC.[24] Only about one in three women in Nandurbar received full ANC, falling short of the contact-based standard recommended by the World Health Organization.[25]

Limitation

This study was confined to two districts of Maharashtra, which may limit the generalizability of findings to other regions. The cross-sectional design captures associations but does not establish causality between socio-demographic factors and maternal healthcare utilization. Data were collected through self-reported surveys, making the results vulnerable to recall bias and social desirability bias. Finally, in this paper, the study analysis relied primarily on quantitative indicators, and qualitative insights into cultural practices, perceptions, and health system functioning could have given the better insights into the subject.

CONCLUSION

First, resources should be targeted at hilly and tribal talukas, particularly Dhadgaon, through mobile medical units, strengthened sub-centres and primary health centres, and reliable referral transport such as emergency ambulances and birth-waiting homes. Second, community health workers (ASHAs, ANMs and anganwadi workers) should be trained and supported to track pregnancies, ensure complete ANC and conduct home-based PNC visits, with special attention to women with no schooling and those of higher parity. Third, ANC and PNC should be linked to incentives that reward completion, not just institutional delivery, to strengthen the continuum of care. Fourth, culturally appropriate, tribal-language health communication and tribal community participation can reduce non-economic barriers. Finally, long-term investment in girls' education and livelihood support is needed, as these address the root drivers of unequal utilisation. Closing the gap in maternal health service use requires combining improved physical access with action on education, poverty and parity, concentrated on hilly and tribal areas.

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