

Socio-Economic Characteristics and Utilization Patterns of Maternal Health Care Services in Rural Assam: Evidence from Dhemaji District

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Abstract

Background: Despite improvements in maternal healthcare services, maternal mortality remains a major public health concern in developing countries, where limited access to adequate maternal healthcare services and complications during pregnancy and childbirth continue to pose serious risks to women's health. Maternal mortality not only impacts the well-being of women but also affects overall development. As maternal death can be reduced only through good care of maternal health, utilization of Maternal health care services is essential for reducing maternal morbidity and mortality and ensuring the well-being of both mother and child. **Objectives:** This study aimed to examine the socio-economic characteristics and patterns of maternal healthcare services utilization among rural women in Dhemaji district, Assam. **Methods:** This research is both descriptive and analytical. This study employs a mixed-methods approach, integrating quantitative and qualitative methods to examine the socio-economic characteristics and the prevailing patterns of maternal healthcare service utilization in public health facilities of Dhemaji district, Assam. Data were collected from both primary and secondary sources. A total of 340 respondents were selected employing a Multistage sampling from two health blocks. A predesigned interview schedule was used for data collection, and descriptive statistics and SPSS were employed to analyze the collected data.

Results: The study indicates that approximately 75% of women registered for antenatal care during the first trimester, 27.9% of respondents visited more than 4 ANC visits, while 3.2% did not. About 83.8% of women received iron and folic acid (IFA) tablets, and 90.6% of respondents received at least one TT vaccination throughout their pregnancy. Only 9.8% of women received postnatal care services within the recommended period after childbirth, while 90.1% did not utilize postnatal care. Almost 60.6% of women do not receive any benefits from government-sponsored maternal health schemes in the study area. This finding highlights a substantial gap in utilization of maternal healthcare services despite relatively high levels of antenatal registration and institutional delivery.

Conclusion: The utilization of maternal health care services in the study area is comparatively low. This study highlights a mixed pattern of maternal health care utilization with early ANC registration and substantial institutional delivery, but very low postnatal care utilization in the study area. The present study indicates that utilization of recommended ANC visits, consumption of IFA tablets, immunization with the TT vaccine, and adoption of family planning are limited. Socio-economic characteristics such as women's age, education, occupational status, religion, place of delivery, mode of delivery, parity, etc., were important and shaped women's access to utilization of maternal health care services. Maternal health care services are crucial for improving the health and well-being of mothers and their children, as well as enhancing overall population health.

Keywords: Maternal health, Maternal Healthcare Utilization, Antenatal care, Institutional care, Postnatal care.

Introduction

Maternal health is a fundamental component of public health, reflecting the ability to improve health outcomes and ensure the well-being of women during pregnancy, childbirth, and the postpartum period. It is an indicator of global social development. Maternal health refers to the health of women during pregnancy, childbirth, and the Postnatal Period (WHO, 2022). Safe motherhood and a healthy pregnancy throughout the process of giving birth to a child are cherished and joyous phases in a woman's life. Women require adequate care, attention, nutritional support, and skilled assistance throughout pregnancy, childbirth, and the postpartum period to ensure their health and well-being as well as that of their newborns. Consequently, the utilization of recommended maternal health care services is quintessential for both the mother and child. Despite ongoing efforts to improve maternal health, women in many developing settings remain vulnerable to preventable health risks. The situation is particularly concerning in North East India, where many women continue to face barriers in accessing essential healthcare services. Among the health risks, maternal mortality stands out as a significant and critical health issue affecting women. Pregnancy and childbirth complications are leading causes of maternal death, contributing to poor maternal health outcomes and women's overall well-being more than any other health issue.

Maternal mortality not only impacts the well-being of women but also represents a global health priority and a vital measure of development. According to the WHO (2019), nearly 810 women lose their lives every day due to complications related to pregnancy and childbirth (1). Although considerable gains have been made in improving maternal health across the world, maternal deaths remain disproportionately high in low- and middle-income countries. Many statistical studies show that more than 500,000 maternal deaths occur every year globally because of pregnancy and pregnancy-related complications, of which 94% occur in low and lower-middle-income countries (2,3).

Maternal health is an indispensable building block of the United Nations' Sustainable Development Goals (SDGs), which aim to reduce maternal mortality to less than 70 deaths per 100,000 live births by 2030 and achieve universal health coverage. In India, maternal mortality remains a significant concern and serves as a crucial indicator of maternal health. India accounts for 18% of global maternal deaths, contributing the highest to maternal deaths among South Asian countries, with 24,000 deaths in 2020. The maternal mortality ratio in India is 178/100,000 live births, despite the existence of several health programs for improving maternal health. Although India has made significant progress in reducing maternal mortality, from 384 deaths per 100,000 live births in 2000 to 103 in 2020, this decline remains insufficient to meet the SDG target, with substantial regional disparities persisting across the country (3).

Maternal death can be reduced only through good care of maternal health. Maternal healthcare is comprehensive, embracing educational, social, and nutritional services, as well as medical care of women throughout motherhood. Adequate maternal healthcare utilization improves women's health outcomes, reduces preventable complications of pregnancy, and contributes to safer motherhood. Effective utilization of antenatal, delivery, and postnatal healthcare services is critical for safeguarding maternal health, reducing preventable maternal deaths, and enhancing the well-being of mothers. For this purpose, the WHO recommends that four or more ANC visits, delivery assisted by skilled birth attendants (SBAs), and three postnatal checkups be provided to achieve safe motherhood in developing countries. But in reality, women experience large disparities, which are reflected in the utilization of maternal health care services.

In an effort to increase maternal health care services, in India, numerous health schemes like Janani Suraksha Yojana (JSY) and Janani Shishu Suraksha Karyakram (JSSK), Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA), etc., are implemented by the Union Government under the National Rural Health Mission (NRHM) for safe motherhood and the well-being of pregnant women. Despite the progress brought by policymaking, women continue to face precarious conditions when it comes to accessing quality healthcare. India continues to grapple with high maternal mortality and morbidity rates, further exacerbated by low utilization of maternal healthcare services. This poor utilization of maternal health care services is caused by a range of social, economic, and demographic aspects, as well as the availability, accessibility, and affordability of health facilities, which play an important role in shaping maternal health care. These contributing factors produced disparities in maternal health care utilization that reinforced poor maternal health status by increasing the risk of maternal death. Therefore, these insights are important for developing effective interventions to improve the acceptance and utilization of maternal health care services in India and the North East.

In Assam, as in many other social settings, the utilization of Maternal health care services is largely neglected by many women, promoting the need for greater awareness and improved access to maternal health care services. Poor utilization of maternal health care services is reflected in inadequate access to essential services, including attending at least 4 ANC visits, consuming 100 iron and folic acid tablets, receiving 2 TT immunizations during pregnancy, having a delivery assisted by a skilled health professional, and obtaining recommended postnatal care. These services are vital for safeguarding the health of both mothers and newborns, and inadequate use of them can increase the risk of complications and adverse health outcomes. Although maternal health indicators have improved over time, India continues to account for a consequential share of maternal deaths globally, and Assam holds the highest position in maternal mortality. This underscores the urgent need to strengthen maternal health service utilization. Many researchers have conducted studies to investigate maternal health status and the reasons for maternal death in many fields. Several studies have explored maternal health and the causes of maternal mortality in different social contexts; however, there remains a significant research gap in understanding the utilization of maternal health care services in the study area. Therefore, this study aimed to examine the socio-economic characteristics and patterns of maternal healthcare utilization among rural women in Dhemaji district, Assam, and to provide evidence to address gaps in maternal healthcare access and continuity of care in rural and underserved populations.

Objectives of the Study

The main objectives of this present study are as follows

1. To describe the socio-economic characteristics of rural women in Dhemaji district, Assam.
2. To examine the patterns of maternal healthcare service utilization among rural women in Dhemaji district, Assam.

Materials and Methods

This research uses both descriptive and analytical research designs to examine the socio-economic determinants and patterns of maternal healthcare service utilization in Assam, with a particular focus on Dhemaji district. This study employs a mixed-methods approach, integrating quantitative and qualitative methods to examine socio-economic characteristics and the prevailing patterns of maternal healthcare service utilization in public health facilities in Dhemaji district, Assam, Northeast India. Both primary and secondary data were utilized in this study. Primary data were collected through fieldwork, interviews, and observations, while secondary data were obtained from books, journals, government surveys, reports, statistical handbooks, and other relevant sources.

The public healthcare centres in the Dhemaji district are divided into five health blocks: Bengenagarah, Gogamukh, Jonai, Sissiborgaon, and Dhemaji. Among the five health blocks in the district, 2 blocks were selected using Multistage sampling: Bengenagarah and Sissiborgaon, based on ANC registrations. Purposive sampling methods were also employed in this study, and 340 respondents were purposively selected from 2 health blocks within the district. A pre-designed interview schedule was used for data collection, and descriptive statistics and SPSS were employed to analyze the collected data.

Results and discussion

Table 1: Distribution of the respondents by Socio- Economic characteristics (n=340)

Variables	Frequency (n)	Percentage (%)
Age distribution of the respondents		
Less than 20	46	13.5
21 – 25	140	41.2
26 – 30	89	26.2
31 – 35	39	11.5
36 - 40	26	7.6
Religion		
Hindu	335	98.5
Islam	0	0

Christian	5	1.5
Others	0	0
Social group/ Caste of the respondents		
General/UR	7	2.1
OBC	143	42.1
SC	33	9.7
ST	157	46.2
Types of families of the respondents		
Joint family	177	52.1
Nuclear family	163	47.9
Educational qualifications of the respondents		
Illiterate	14	4.1
Primary	19	5.6
Upper Primary	69	20.3
Secondary	62	18.2
Senior Secondary	115	33.8
Graduation	55	16.2
Post-graduation and above	6	1.8
Education of respondents' husbands		
Illiterate	28	8.2
Primary	11	33.2
Upper Primary	49	14.4
Secondary	57	16.8
Senior Secondary	106	31.2
Graduation	73	21.5
Post-graduation and above	16	4.7
Working status of women		
Employed	26	7.6
Not employed	314	92.4
Occupational types of women		
Homemaker	314	92.4
Govt. employee	15	4.4
Private job	6	1.8
Self-employed	5	1.5
Occupation types of respondents' husbands		
Govt. employee	35	10.3
Private job	36	10.6
Self-employed	58	17.1
Agriculture	71	20.9
Laboring	119	35.0
Unemployed	7	2.1

Others	14	4.1
Monthly household income of the respondents (INR)		
Less than 5000	102	30.0
50001 - 10000	74	21.8
10001 - 15000	45	13.2
15001 - 20000	38	11.2
20001 and above	81	23.8
Women's health decision-making		
Women alone	61	17.9
Women and husband	91	26.8
Husband only	104	30.6
Others	84	24.7
Women's mass media exposure		
Yes	140	41.2
No	200	58.8

Source: field study

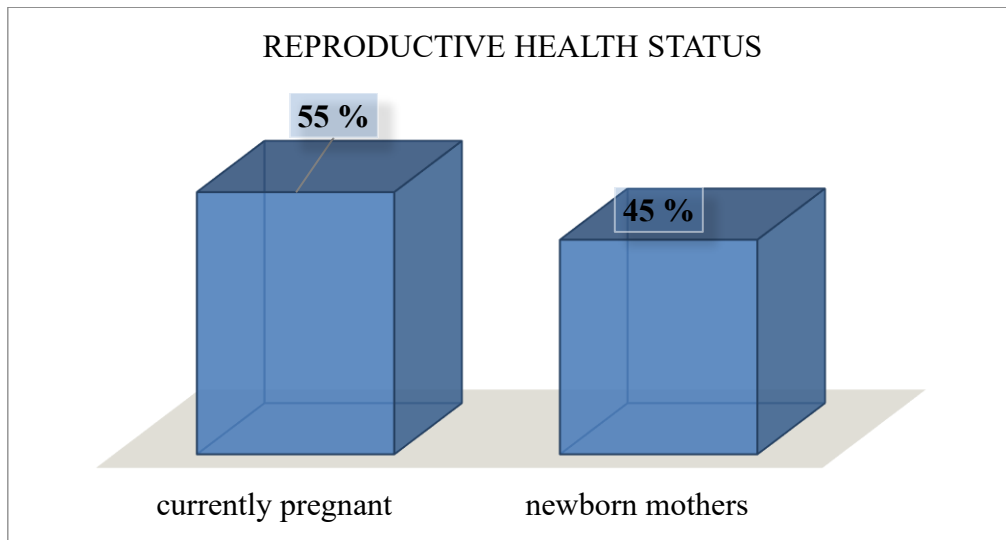
Note: N=340. The percentage may not total exactly 100 due to rounding.

Table 1 presents the socio-economic characteristics of the respondents (n = 340). The largest proportion of women (41.2%) was aged 21–25 years, followed by those aged 26–30 years (26.2%). Women aged 20 years or less accounted for 13.5%, while 11.5% and 7.6% were aged 31–35 years and 36 years or older, respectively. Nearly all respondents identified as Hindu (98.5%), with a small proportion identifying as Christian (1.5%). No respondents reported belonging to Islam or other religious groups. In terms of social category, Scheduled Tribe (ST) women constituted the largest share of the sample (46.2%), followed by Other Backward Classes (OBC) (42.1%), Scheduled Castes (SC) (9.7%), and the General category (2.1%). Regarding family structure, more than half of the respondents (52.1%) lived in joint families, while 47.9% belonged to nuclear families. The study population demonstrated relatively favorable educational attainment. Among women, the largest proportion (33.8%) had senior secondary education, followed by upper primary (20.3%), secondary (18.2%), and graduated (16.2%). Illiteracy was relatively low (4.1%), and only 1.8% had completed postgraduate education. Respondents' husbands typically followed similar educational patterns, with senior secondary education (31.2%) and graduation (21.5%). Although illiteracy among husbands (8.2%) was higher than among women, the study population demonstrated generally moderate to high levels of educational attainment. The respondents' occupational characteristics revealed that the majority (92.4%) were unemployed and primarily engaged in household chores. Only 7.6% reported being employed, with 4.4% working in government jobs. Regarding their husbands' occupations, daily wage labor was the most common source of livelihood, accounting for 35.0%. Smaller proportions were employed in the private sector (10.6%) and government services (10.3%), while 17.1% were self-employed. Moreover, 20.9% were engaged in agricultural activities, and only 2.1% were unemployed. These findings reflect the reliance of most households on manual labor occupations that offer limited employment security. The distribution of household monthly income indicated considerable economic variation among the respondents. Nearly (23.8%) of respondents reported a monthly income of INR 20,001 or above, while 11.2% earned between INR 15,001 and 20,000. Approximately 13.2% of households had a monthly income of INR 10,001-15,000, and 21.8% reported earnings of INR 5,001-10,000. Conspicuously, 30.0% of households earned less than INR 5,000 per month, highlighting considerable economic vulnerability within the study population. Regarding decision-making autonomy, only 17.9% of women reported making their own healthcare decisions independently. In contrast, 24.7% of respondents reported that healthcare decisions were made by other family members. 26.8% of women reported joint decision-making between husbands and wives, whereas 30.6% of respondents reported that healthcare decisions were made solely by their husbands. Furthermore, 41.2% of women reported exposure to mass media,

while the majority (58.8%) had no such exposure. Overall, the findings suggest that a substantial proportion of women experienced economic constraints, limited exposure to mass media, and restricted autonomy in healthcare decision-making, factors that may influence their utilization of maternal healthcare services.

Reproductive Health States of the respondents

Figure 1: Reproductive health status



Source: field study

Figure 1 depicts the maternal status of the study participants, showing that 55.0% (n = 187) were pregnant, whereas 45.0% (n = 153) had already given birth and were in the postnatal period at the time of the survey.

Table 2: Distribution of the respondents according to their Reproductive health characteristics

Variables	Frequency (n)	Percentage (%)
Women's Age at Marriage		
Less than 18 years	110	32.4
18-22	156	45.9
23-29	65	19.1
30 and above	9	2.6
Women's Age at First Childbirth or Parturition		
Less than 19 years	123	36.2
20-24	140	41.2
25-29	63	18.5
30 and above	14	4.1
MCP Card		
Yes	321	94.4
No	19	5.6
Gravida		
Primiparous (first)	107	31.5
Multiparous (2 or more)	231	67.9
Grand multiparous (5 or more)	2	.6
Parity or birth order		
No children	55	16.2
One	142	41.8
Two	119	35.0

Three	23	6.8
Four	1	.3
Birth Interval		
Less than 24 months	65	19.1
More than 24 months	275	80.9
Ever Had a Stillbirth		
No	335	98.5
Yes	5	1.5
History of Miscarriage		
No	280	82.4
Yes	60	17.6

Source: field study

Note: N=340. The percentage may not total exactly 100 due to rounding.

Table 2 presents the respondents' reproductive and maternal health characteristics. Nearly half of the women (45.9%) were married between ages 18 and 22. However, almost one-third (32.4%) entered marriage before age 18, indicating a high prevalence of early marriage in the study population. A smaller proportion of respondents were married between 23 and 29 years of age (19.1%), while only 2.6% married at 30 years or older. Regarding age at first childbirth, the largest proportion of women (41.5%) had their first child between the ages of 20 and 24. More than one-third (36.2%) reported giving birth before the age of 19, whereas 18.2% experienced their first childbirth between 25 and 29 years. Only 4.1% of respondents had their first child at age 30 years or above. The findings further showed that the majority of respondents (94.4%) had received a Mother and Child Protection (MCP) card, while only 5.6% had not received one. In terms of gravida, 31.5% of women were experiencing their first pregnancy or primiparous, whereas 67.9% are multiparous and had been pregnant more than once. and 0.6% are grand multiparous (have experienced 5 or more pregnancies). Regarding parity, 41.8% of women had one child, followed by 35.0% with two children. Approximately 16.2% had not yet given birth at the time of the survey, while 6.8% reported having three children. Only a very small proportion (0.3%) had four or more children. Analysis of birth spacing revealed that 80.9% of women maintained an interval of more than 24 months between births, while 19.1% had an interval of less than 24 months. The reproductive history of respondents indicated that 98.5% reporting no history of stillbirth, and only 1.5% having experienced a stillbirth. Similarly, the majority of women (82.4%) had never experienced a miscarriage, while 17.6% reported at least one miscarriage during their reproductive years.

Utilization patterns of Maternal health care services, including antenatal, delivery, and postnatal care

Table 3: Distribution of the respondents based on the Antenatal care services utilization

Antenatal care services utilization by the respondents		
Timing for ANC Registration of respondents	Frequency (n)	Percentage (%)
Within The First Trimester (Early Registration)	255	75.0
After First Trimester (Late Registration)	85	25
Number of ANC Visits		
Zero	11	3.2
One	96	28.2
Two	69	20.3
Three	69	20.3

Four & more	95	27.9
Pregnancy complications among respondents		
Yes	207	60.9
No	133	39.1
Seeking healthcare for Pregnancy Complications		
Yes	72	21.2
No	268	78.8
Pregnancy Screening Test		
Yes	267	78.5
No	73	21.5
Types of screening tests received by the respondents		
Ultrasound	207	60.9
Urine test	267	78.5
Blood test	267	78.5
Weight check	267	78.5
Blood pressure	267	78.5
Abdominal examination	198	58.2
Received IFA Tablets		
Yes	285	83.8
No	55	16.2
Number of IFA Tablets		
100 and more	148	43.5
Less Than 100	192	56.5
Received TT		
Yes	308	90.6
No	32	9.4
Number of TT Received		
1 Dose	95	27.9
2 Doses	213	62.6
Zero	32	9.4

Source: field study

Note: N=340. The percentage may not total exactly 100 due to rounding.

Table 3 summarizes the antenatal care practices and maternal health service utilization among the respondents. Among the women (75.0%), their pregnancies were registered during the first trimester, reflecting timely initiation of antenatal care, whereas 25.0% registered after the first trimester. Regarding the frequency of antenatal care (ANC) visits, 27.9% of respondents attended more than four visits, while 20.3% reported attending two to three visits. Approximately 28.2% of respondents attended only one antenatal care (ANC) visit, while 3.2% did not receive any ANC during their pregnancy. More than half of the respondents (60.9%) experienced at least one pregnancy-related complication, whereas 39.1% reported no complications. Despite the high prevalence of complications, only 21.2% sought medical treatment. The majority (78.8%) did not seek healthcare services, often perceiving the symptoms as a normal part of pregnancy or expecting them to resolve without intervention. Antenatal screening services were utilized by 78.5% of women, while 21.5% did not undergo any screening. Among the different screening procedures, urine testing, blood testing, weight monitoring, and blood pressure assessment were the most commonly received services, each reported by 78.5% of respondents. Ultrasound examinations were undertaken

by 60.9% of women, and 58.2% received abdominal examinations during pregnancy. With regard to nutritional supplementation, 83.8% of respondents received iron and folic acid (IFA) tablets during pregnancy, whereas 16.2% did not receive any supplementation. Among those who consumed IFA tablets, 43.5% reported taking more than 100 tablets, while 56.5% consumed fewer than 100. Maternal immunization coverage was relatively high, with 90.6% of women receiving at least one tetanus toxoid (TT) vaccination during pregnancy. Conversely, 9.4% remained unvaccinated. Of those immunized, 27.9% received a single dose, while 62.6% completed two or more doses of the TT vaccine during pregnancy.

Table 4: Distribution of the respondents according to delivery and postnatal care services utilization

Utilization of delivery care services or institutional care services (among 153 newly delivered women)			
Variable		Numbers	Percentage
Delivery complication			
Yes		48	31.4
No		105	68.6
Place of childbirth			
Health Institutions	DH	103	67.3
	CHC	5	3.3
	PHC	22	14.4
	SC	4	2.6
	Private Hospital	12	7.9
Home Delivery		7	4.6
Types or modes of Delivery			
Normal		99	64.7
Cesarean Section		54	35.2
Delivery Attended by Skilled Birth Attendants			
Doctor & Nurse/ANM		100	65.4
Nurse only		42	27.5
Other skilled health professional		4	2.6
Home delivery assisted by			
Health worker (ANM/ASHA)		5	3.2
TBA or Untrained female or relatives		2	1.3
Duration of Stay at The Hospital			
At Least 24 Hours		55	35.9
At Least 48 Hours		35	22.9
At Least 7 Days		56	36.6
Postnatal care			
Received Postnatal Care services (153 out of 340 respondents)			
Yes		15	9.8
No		138	90.1
Number of Postnatal care visits			
One		14	9.1
Two and more		1	0.7

No visit	138	90.1
Health workers visit your home for postnatal care after delivery		
Yes	8	5.2
No	145	94.8
Timing of visiting the health worker after delivery		
After 42 hours	7	4.6
After 42 days	1	0.7
Receive any Benefits from Maternal Health Schemes (340 women)		
Received	134	39.4
Not Received	206	60.6
Adopted Family Planning Method During Pregnancy		
Yes	11	3.2
No	329	96.8

Source: field work

Note: N=340. The percentage may not total exactly 100 due to rounding.

Table 4 presents the respondents' experiences with childbirth and postnatal care. Among the 340 women included in the study, 153 had recently delivered a child. 31.4% experienced complications during childbirth, while the remaining 68.6% reported no delivery-related complications. Institutional delivery was highly prevalent, with 95.4% of births occurring in healthcare facilities and only 4.6% at home. Among institutional deliveries, the majority (67.3%) occurred at the District Hospital, primarily via referral. Deliveries at Primary Health Centers (PHCs) and Community Health Centers (CHCs) accounted for 14.4% and 3.3%, respectively, while 2.6% occurred at Sub-Centers under emergency circumstances. In addition, 7.9% of women opted for private hospitals, often due to limited availability or poor service quality at public facilities. Regarding the mode of delivery, nearly two-thirds of women (64.7%) had a normal vaginal birth, whereas 35.3% underwent cesarean section. Most deliveries were attended by skilled health personnel, with 65.4% conducted by doctors or nurses and a further 27.5% assisted by nurses or Auxiliary Nurse Midwives (ANMs). Skilled health professionals were involved in 2.6% of births. Among the small proportion of home deliveries (4.6%), assistance was primarily provided by ASHA workers or ANMs (3.3%), while 1.3% were attended by traditional birth attendants. The duration of stay at a health facility after childbirth varied considerably. Mostly women (36.6%) remained admitted for at least seven days, mainly due to complications associated with cesarean deliveries. Approximately 35.9% stayed for at least 24 hours, while 22.9% remained for 48 hours or longer, reflecting the initial uptake of postnatal care services within health facilities. Despite the high rate of institutional delivery, utilization of postnatal care (PNC) services was significantly low. Only 9.8% of women reported receiving postnatal care after childbirth, whereas the majority (90.2%) did not access postnatal care services. Among those who utilized PNC, 9.1% had a single visit, and only 0.7% had two or more visits. Home-based postnatal follow-up was also limited. Just 5.2% of women reported receiving a postnatal home visit from an ASHA worker, while 94.8% reported no such visit following delivery. Access to government-sponsored maternal health schemes: 39.4% of respondents reported receiving scheme-related benefits. In contrast, 60.6% had not benefited from any maternal health support program. Adoption of family planning methods was extremely low, as only 3.2% of women reported using any contraceptive method, whereas 96.8% had not adopted family planning practices during the study period.

Discussion

The present study revealed an enormously higher prevalence of institutional delivery, with almost all recent mothers giving birth in a health institution in the study area. The proportion of institutional delivery among women observed in this study was higher than the state average of Assam reported in NFHS-5 and also higher than the findings studied by Nath et al., and Paul and Chouhan (6,16,18).

The findings suggest that the extensive use of institutional delivery services in the study area was influenced by government initiatives and programs that promoted institutional childbirth, ensured timely and appropriate health care, and increased

awareness of safe delivery practices among women and their families. Most women deliver their children at the District Hospital, indicating that such a health facility plays a pivotal role in maternal healthcare and serves as a major referral center for patients from lower-level facilities. The study found that institutional delivery included normal and cesarean deliveries, with more than one-third of women undergoing cesarean section, a proportion higher than in several previous studies by Sharma et al. and Sarmah et al., who observed that normal delivery remained the predominant mode of childbirth (14,17). Although cesarean delivery plays an important role in managing pregnancy and childbirth complications and improving maternal and newborn outcomes, the increasing rate observed in this study highlights the need to ensure cesarean delivery is performed only when required for medical reasons.

Safe delivery encompasses delivery attended by skilled health professionals. In this study, the majority of childbirths attended by skilled health personnel demonstrate significant progress in ensuring safe deliveries and minimizing risks associated with home deliveries or births attended by unskilled health personnel.

The present study showed an extremely low utilization of postnatal care services. Only a small proportion of women received postnatal care after delivery, which is considerably lower than the Assam state average reported in NFHS-5 and lower than that reported in studies carried out by Nath et al. and Paul and Chouhan (6,16,18). Throughout pregnancy, although most women had contact with the health care system for antenatal care and institutional childbirth, only a small proportion received postnatal care after delivery in the study area, as mentioned, and this is also substantially below rates documented in many developing countries.

The findings suggest a significant break in the continuum of maternal healthcare following childbirth. The low utilization of postnatal care services is attributed to several factors that contribute to this gap, including limited awareness of the importance of postnatal care, inadequate counseling before discharge, insufficient follow-up support from the health workers, transportation barriers, socio-cultural perceptions that childbirth marks the end of required maternal care services, and the tendency to seek healthcare only when complications arise. The low coverage of home visits by ASHA workers observed in the study further underscores missed opportunities to promote postnatal care utilization and early identification of maternal and newborn health problems. Similar barriers have been reported in previous studies conducted in low- and middle-income countries (3,19).

A majority of women reported not receiving benefits from available programs, such as government-sponsored maternal health schemes, suggesting barriers to awareness, eligibility, administrative procedures, or service delivery. A similar pattern was observed by Kumar et al., who reported low utilization of maternal welfare schemes among rural women (13). Similarly, the adoption of family planning methods remained very low, indicating an unmet need for postpartum contraceptive counseling and reproductive health education. Strengthening counseling services during antenatal, delivery, and postnatal care could help improve both contraceptive uptake and the overall maternal healthcare.

In aggregate, these findings indicate that while substantial progress has been achieved in promoting institutional delivery and skilled birth attendance, postnatal care remains the weakest component of maternal healthcare utilization in the study area. Addressing this critical gap through strengthened community-based follow-up, enhanced postnatal counseling, improved outreach by frontline health workers, and greater awareness of the importance of postpartum care is essential for improving maternal and newborn health outcomes in rural Assam.

Conclusion

In conclusion, this study provides important insights into the patterns of maternal healthcare utilization among rural women in Dhemaji district of Assam. The findings reveal a mixed pattern of maternal healthcare utilization. Despite encouraging levels of antenatal care registration and institutional delivery, the extremely low utilization of postnatal care indicates a critical weakness in maternal healthcare utilization, and substantial gaps remain in the use of recommended antenatal services, adequate iron and folic acid supplementation, and family planning. This highlights a critical discontinuity in the utilization of maternal healthcare services and denotes that increases in antenatal and delivery care are not sustained during the postpartum period.

The study further demonstrates that maternal healthcare utilization is shaped by women's socio-economic characteristics, including women's education, household economic status, decision-making autonomy, mass media exposure, parity, and

access to healthcare facilities. These findings are consistent with evidence from previous studies and national surveys, which have identified socio-economic inequalities as important determinants of maternal healthcare utilization (13,18,20).

Addressing the persistent gaps in maternal healthcare utilization requires a greater focus on postnatal care services, which remain the most neglected aspect of maternal healthcare in the study area. Strengthening community-based follow-up through ASHA workers, improving women's health education, enhancing decision-making autonomy, expanding awareness of government maternal health schemes, and ensuring timely access to quality postnatal care services are essential for improving maternal health outcomes in rural and underserved populations. Furthermore, efforts to support socioeconomically disadvantaged women may improve access to maternal healthcare services and reduce existing inequalities in healthcare utilization. Strengthening these aspects of maternal healthcare delivery will be crucial for improving maternal and newborn health outcomes and advancing progress toward national and global maternal health goals.

Supplementary Materials

None

Conflict of Interest

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