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Association between Literacy Level and Antenatal and Postnatal Service Utilization among Rural and Peri-Urban Population in Birbhum District, West Bengal

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ABSTRACT

Background

Improving maternal health is one of the eight Millennium Development Goals. Assessing maternal health care utilization is imperative for the health of both mother and her child. Maternal education is an important determinant in subsequent maternal health care usage, according to research. This paper assesses to investigate the association between maternal education and the utilization of maternal health services, as well as present socio-economic disparities in the utilization of health care services during pregnancy, delivery and post-delivery among rural and prei-urban women in Birbhum district, West Bengal and examines its determinants.

Materials and Methods

A cross-sectional study was conducted from July, 2021, to 31 December 2022, in Bolpur Santiniketan and Illambazar areas of Birbhum district. Studies were included of sample of currently married women (14 to 40 years) who delivered a baby 12 months prior to the survey. Information was collected from 762 women spread over two blocks of Birbhum district .Information of socio-demography characteristics , utilization of antenatal care(ANC) , delivery and postnatal care(PNC) services was collected. To examine the determinants of utilization of maternal health services, the variables included were four ANC visits, institutional delivery, and at least 100 iron and folic acid tablets. Univariable and multilevel logistic regression analysis examined correlates associated with coverage of services. The output was presented using odds ratios (OR) with 95% CI.

Results

The results of this study showed that 49.07 % of the respondents used ANC at least once during their most recent pregnancy. The household socio-economic status and mother's education were the most important factors associated with the use of ANC and skilled attendance at delivery. All methods indicate a significant effect of maternal education on maternal health services where mothers exposed to middle school or higher levels of education were more likely to have 100 or more iron and folic acid tablets, delivered at facility, skilled attendant at birth as well as receiving all maternal health services compared to the mothers who have below middle school level of education.

Conclusion

Mother's education appears to have a strong and significant association with antenatal care and postnatal care practices in rural Birbhum district, West Bengal. Counseling could be integrated during antenatal care visits to increase the postnatal care service further.

Key Words: Antenatal Care, Postnatal Care, Skilled Birth Attendant , Maternal Education

Introduction

The highest risk of death for both the mother and her newborn occurs at the time of childbirth or immediately in the period after birth. Ensuring appropriate postnatal care is critical to safeguarding maternal and newborn health. (Sines E et al 2007, Martines J et al,2005,Baqui AH et al 2009).The WHO guidelines on postnatal care recommend essential routine postnatal care for all mothers and their newborns, extra care for low birth weight and small babies, and early identification and referral or management of emergency conditions(WHO, 1998).

It is a well-known fact that educated women are more likely to avail modern health-care services as compared to their lower literacy level counterparts as they are more mindful and conscious of modern health-care facilities and also enjoy greater autonomy within and outside the household. The World Health Organization (WHO) recommends at least four antenatal visits to a skilled health attendant (Lincetto, O et al, 2013).

Education level is an important and unique social determinant of maternal health service utilization. It is one of the key indicators of socioeconomic status and is known to positively impact health service utilization (Cutler DM et al, 2010).Better maternal education often indicated that women are in an advanced socioeconomic condition, where access to health services is more common. Previous studies also indicated that women with a better education tend to have more active maternal health-seeking behavior, which makes them engage in booking antenatal check appointments, seeking help from professional health services, etc.(Ahmed S, at at, 2010 , Nsibu CN at el, 2016) Those with higher socioeconomic status, including more wealth and better education, are generally considered to have higher access to maternal health services in developing countries (Kim MK et al, 2018, Makate M et al 2017, Pathak PK, et al, 2010).

As estimated in the 2019–2021 National Family Health Survey, only 58.1% women were reported to have made at least four ANC visits for their recent pregnancy in the preceding five years of the survey whereas 89.4% of deliveries were conducted by skilled health personnel(IIPS, 2021).

Materials and Methods

A cross sectional study included a sample of 762 who gave birth to singleton infants in rural areas of Birbhum district during July 2021 to December 2022. Data were collected from both tribal and non-tribal community; tribal people belonged to the Santal community and non-tribals were from Hindu and Muslim religions. Age of the participants was confirmed on the basis of birth certificate. Maternal education level was categorized into two groups: below middle school and middle school and above. Who did not have a birth certificate, the school certificate, Voter ID card or Aadhaar card was carefully considered as a secondary source

Exposures

The exposure in this study is the maternal education level. To balance the sample size in each category and draw meaningful comparisons between the categories, maternal education level was categorized into two groups: below middle school and middle school and above. Education level was regrouped in binary (0 and 1) as it was treated as dependent variable.

Explanatory variables

Religion was coded as Hindu, Muslim, and Christian and other. Caste was recorded as Scheduled Tribes, Scheduled Castes, Other Backward Classes and others. The Scheduled Castes include a group of the population that is socially segregated and financially/economically by their low status as per Hindu caste hierarchy. The Other Backward Classes are considered low in the traditional caste hierarchy, but include the intermediate socioeconomic groups. The "others" caste category is identified as those having higher social status.

Again, in the study, sanitation facility has been divided into categories such as no toilet, pit latrine and sanitary latrine. Here open defecation is represented by no toilet.

Skilled attendants at birth included doctors and nurses. Antenatal checks no less than four times (ANC $\geq$ 4) were defined as 1 if mothers filled in a number that was more than four and above to the question "How many times did you visit prenatal consultation during this pregnancy?" and was seen by a health professional (doctor and nurse) during the antenatal checks.

Iron and folic tablet once daily for a period of 100 days, starting after 12 weeks (first trimester) of pregnancy and hence a total of 100 tablets are to be dispensed. In research, the authors divided the period in two categories, those who have taken below 100 tablets and those who have taken 100 tablets and more.

In the formation of quintile, five groups have been created such as poor, poor middle, middle, upper middle and upper. Quintile was calculated on the basis of type of house, type of fuel materials used for cooking, sanitation and household assets through principal components analysis (PCA) guidelines.

Data Analysis

The association between maternal education and maternal health services utilization indicators was analyzed using logistic regression models. Maternal education level was categorized into two groups: below middle school (i.e. <= 5) and middle school and above (i.e. 6 and above). Education level was regrouped in binary (0 and 1) as it was treated as dependent variable. All the ORs were presented with 95 % confidence intervals (CIs).All analyses were conducted by STATA 12 and Microsoft excel. Statistical significance was determined at a p-value $\leq$ 0.05. Descriptive analyses and logistic regressions were used as analytical methods. Two models were fitted: (1) unadjusted or crude; (2) adjusted for maternal education level.

Results

Table-1 Descriptive statistics of women pregnant mothers in last 2 years before the survey, Birbhum (N= 762)

Characteristics	n	%
Mother's age		
Less than 19 years	63	8.27
19 to 25 Years	474	62.20
26 to 35 Years	217	28.48
36 Years and above	8	1.05
Highest educational level		
1 to 5 class	118	15.49
6 to 8	216	28.35
9 to 10	252	33.07
11 to 12	136	17.85
13 and above	40	5.25
Employed		
Self-employed in non-agriculture	5	0.66
Agricultural labour	7	0.92
Non-agricultural labour	13	1.71
Regular in service	4	0.52
Non-earning household work	695	91.21
Student	38	4.99
Gravida		
1	161	21.13
2	409	53.67
3	159	20.87
>=4	33	4.33
Place of Delivery		
Home	52	6.82
Health Institution	710	93.18
ANC follow-up status		
< 4	399	52.36
>= 4 times	363	47.64
Outcome of baby		
Live birth	565	74.15
Low Birth Weight	140	18.37
Abortion	52	6.82
Stillbirth	5	0.66

Table 1 presents the characteristics of the study population by maternal education, age, occupation, place of delivery etc.

Those who had a middle school and above education were more likely to live in study area (84.51%), compared to those who had below primary (15.49 %). The population with secondary and above education also had a higher percentage of participants (56.17 %). 91.21 % of mothers were engaged in non-earning household activities. For utilization of maternal health services, women tended to have better antenatal care (52.36 % received at least once and 47.64 % had antenatal checks four times and above). Percentage of LBW was 18.37, abortion 6.82 and stillbirth 0.66. Home delivery was still 6.86 % due to difficult access of health institution. The mean maternal age =23.72 and SD= 4.35.

Table-2: Maternal Education Level and Maternal Demographic and Socioeconomic backgrounds: an analysis of multiple indicator in Birbhum district, West Bengal

Background Characteristics	Primary level and none (118)	Middle school and above (644)	Adjusted OR[1](95% CI)	p-value
	N (weighted %)	N (weighted %)		
Religion				
Hindu(Reference)	64(54.24)	357(55.43)		
Muslim	53(44.92)	283(43.94)	.927(.621 1.38)	0.713
Christian	0	3(0.47)		
Other	1(0.85)	1(0.16)	.154(.009 2.50)	0.189

Caste				
SC(Reference)	43(36.44)	203(31.52)		
ST	16(13.56)	33(5.12)	.479(.238 .966)	0.040
OBC	13(11.02)	108(16.77)	1.6(.862 3.30)	0.126
Other	46(38.98)	300(46.58)	1.41(.892 2.23)	0.140
Type of Toilet Used				
No toilet(Reference)	71(60.17)	265(41.15)		
Pit latrine	7(5.93)	21(3.26)	.761(.309 1.87)	0.553
Sanitary latrine	40(33.90)	358(55.59)	2.36(1.54 3.62)	0.000
Type of House				
Floor				
Pukka (Reference)	24(20.34)	320(49.69)		
Semi pukka	6 (5.08)	26(4.04)	.323(.120 .865)	0.025
Mud	88(74.58)	298(46.27)	.254(.157 .413)	0.000
Wall				
Pukka (Reference)	21(17.80)	250(38.82)		
Semi pukka	17(14.41)	84(13.04)	.394(.197 .788)	0.009
Mud	80(67.80)	310(48.14)	.322(.192 .538)	0.000
Roof				
Pukka(Reference)	8(6.78)	205(31.83)		
Semi pukka	60(50.85)	324(50.31)	.221(.103 .474)	0.000
Mud	50(42.37)	115(17.86)	.089(.041 .196)	0.000
Outcome of Baby				
Livebirth(Reference)	77(65.25)	488(75.78)		
Low Birth Baby	33(27.97)	107(16.61)	.484(.304 .7707)	0.002
Abortion	7(5.93)	45(6.99(	1.23(.515 2.96)	0.634
Stillbirth	1(0.85)	4(0.62)	.609(.064 5.79)	0.667
Quintile				
Poor(Reference)	24(20.34)	66(10.25)		
Poor Middle	33(27.97)	112(17.39)	1.24(.675 2.313)	0.478
Middle	35(29.66)	121(18.79)	1.26(.687 2.330)	0.450
Upper Middle	21(17.80)	188(29.19)	3.31(1.71 6.394)	0.000
Upper	5(4.24)	157(24.38)	11.38(4.13 31.37)	0.000

Adjusted odd ratio [1]: Adjusted for blood pressure, weight, blood group, hemoglobin, blood sugar and urine protein

In table-2, adjusted odd ratio was calculated by multiple logistic regression analysis after adjusting blood pressure, weight, blood group, hemoglobin, blood sugar and urine protein measurement. Maternal religion for Muslim (AOR = .927, 95%CI: .621 1.38), low birth outcome of last pregnancy (AOR = .484, 95%CI: 1(.304 .7707), and type of sanitary latrine (AOR=2.36, 95% CI : 1.54 3.62) and upper quintile (AOR= 11.38, 95% CI : 4.13 31.37), in type of floor mud (AOR= 322, 95% CI : .192 .538) , in type of wall, mud (AOR= .322, 95% CI: .192 .538) and in type of roof , mud (AOR= .089, 95% CI: .041 .196) were positively associated with socioeconomic and PNC service utilization.

Table-3: Maternal Literacy Level and Maternal Health Care utilization at the time of birth

Indicators	Primary level (110)	Middle school and above(595)	Crude OR[1](95% CI)	p- value
	n (weighted %)	n (weighted %)		
Age Group				
Less than 19 years	6(5.45)	54(9.08)		
19 to 25 Years	56(50.91)	384(64.54)	.761(.313 1.85)	0.549
26 to 35 Years	46(41.82)	152(25.55)	.367(.148 .9081)	0.030
36 Years and above	2(1.82)	5(0.84)	.277(.043 1.756)	0.173
Skilled attendant at birth				

Skilled	103(93.64)	578(97.14)	.432(.175 1.06)	0.070
Unskilled	7(6.36)	17(2.86)		
Place of Delivery				
Home & other	8(7.27)	22(3.70)	.489(.212 1.12)	0.094
Health Institution	102(92.73)	573(96.30)		
IFA tablets taken				
< 100	53(48.18)	219(36.81)		
>=100	57(51.82)	376(63.19)	1.59(1.06 2.40)	0.025
Antenatal Care				
< 4 times	48(43.64)	298(50.08)		
>=4 times	62(56.36)	297(49.92)	.771(.512 1.16)	0.215
Type of Delivery				
Normal	92(83.64)	375(63.03)		
Caesarian	18(16.36)	219(36.81)	2.98(1.75 5.08)	0.000
Forceps	0	1(0.17)		

Crude odd ratio[1] was calculated by logistic regression analysis.

In table-3, unadjusted or crude odds ratios and 95% confidence intervals from logistic regression analyses with education level as the dependent variable in sample population. Maternal educational status of middle school and above compared to primary level , age group 19 to 25 Years (COR = .761, 95% CI: .313 1.85), skilled birth attendant (COR=. 432(.175 1.06) , place of delivery at home (COR: .489, 95% CI: .212 1.12), IFA tablets taken 100 and more (COR=1.59, 95% CI: 1.06 2.40) , ANC four and above (COR = .771, 95% CI : .512   1.16) and caesarian type of delivery (COR= 2.98, 95% CI : 1.75 5.08).

Discussion

Current study re-emphasized that utilization of maternal health care services is affected by multiple socio-demographic factors like maternal education, religion and gradiva of women. Education increases awareness about health, availability and accessibility of services and help develop the confidence while religious faith also decides the utilization of services.

Caesarean section was positively associated with maternal education level. However, the association was only significant among rural and peri-urban residents and in the upper and upper quintile population. In many developed countries and emerging economies, countries have a higher than necessary caesarean section prevalence. In the current study, the caesarean section rate for mothers with middle school and above education is 36.81% % and the rate for below middle school is 16.36%. Consistent with the present findings, a study conducted in India observed that mothers with higher education had better access to caesarean Section (Gondwe T, 2018).

 Better maternal education often indicated that women are in an advanced socioeconomic condition, where access to health services is more common. Previous studies also indicated that women with a better education tend to have more active maternal health-seeking behavior, which makes them engage in booking antenatal check appointments, seeking help from professional health services, etc.(Ahmed S et al 2010 , Nsibu CN, 2016)

Limitation of the study

First, we conducted our survey only on small sample population. Secondly, we do not consider the dietary questionnaire and are therefore unable to comprehensively characterize the diet style for this community. Thirdly, there could be recall bias since the women were asked for events within the last one year prior to the study. Lastly, since the design is quantitative it doesn't address cultural issues of the respondents.

Conclusion

The better utilization of the maternal health services can be achieved by overall socio-economic development including focus on women empowerment and education, focus on religious norms and faiths in the health policies.

Conflict of interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and publication of this article.

References

- Ahmed S, Creanga AA, Gillespie DG, Tsui AO. Economic status, education and empowerment: implications for maternal health service utilization in developing countries. *PloS One*. 2010; 5(6).

- Andrew, EVW, Pell, C, Angwin, A, Auwun, A, Daniels, J, Mueller, I, et al. Factors Affecting Attendance at and Timing of Formal Antenatal Care: Results from a Qualitative Study in Madang, Papua New Guinea. *PLoS One* (2014) 9(5):e93025. doi:10.1371/journal.pone.0093025

- Baqui AH, Ahmed S, El Arifeen S, Darmstadt GL, Rosecrans AM, et al. (2009) Effect of timing of first postnatal care home visit on neonatal mortality in Bangladesh: a observational cohort study. *British Medical Journal* 339: b2826.

- Cutler DM, Lleras-Muney A: Understanding differences in health behaviors by education. *Journal of health economics* 2010, 29(1):1–28.

- Gondwe T. Cesarean section delivery in India: an analysis of maternal factors and infant outcomes. University of Pittsburgh; 2018

- International Institute for Population Sciences (IIPS) and ICF. National Family Health Survey (NFHS-5), 2019–21: India. (IIPS, 2021).

- Kim MK, Lee SM, Bae S-H, Kim HJ, Lim NG, Yoon S-J, Lee JY, Jo M-W: Socioeconomic status can affect pregnancy outcomes and complications, even with a universal healthcare system. *International journal for equity in health* 2018, 17(1):2.

- Lincetto, O, Mothebesoane-anoh, S, Gomez, P, and Munjanja, S. Opportunities for Africa's Newborns: Antenatal Care. Geneva, Switzerland: WHO (2013).

- Martines J, Paul VK, Bhutta ZA, Koblinsky M, Soucat A, et al. (2005) Neonatal survival: a call for action. *The Lancet* 365: 1189–1197.

- Makate M, Makate C. The evolution of socioeconomic status-related inequalities in maternal health care utilization: evidence from Zimbabwe, 1994–2011. *Global Health Res Policy*. 2017; 2(1):1.

- Nsibu CN, Manianga C, Kapanga S, Mona E, Pululu P, Aloni MN. Determinants of antenatal care attendance among pregnant women living in endemic malaria settings: experience from the Democratic Republic of Congo. *Obstet Gynecol Int*. 2016;2016

- Pathak PK, Singh A, Subramanian S. Economic inequalities in maternal health care: prenatal care and skilled birth attendance in India, 1992–2006. *PloS One*. 2010; 5(10).

- Sines E, Syed U, Wall S, Worley H (2007) postnatal care: A critical opportunity to save mothers and newborns. Washington DC: Population Reference Bureau.

- World Health Organization (1998) *Postpartum care of the mother and newborn: a practical guide*. Geneva: World Health Organization.