REVIEW ARTICLE

Differential in Utilization of Maternal Care Services in Empowered Action Group States, India (1990 - 2006)

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Abstract | Introduction | Methodology | Results | Conclusion | References | Citation | Tables / Figures

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Abstract

Background: Low use of maternal care services is one of the reasons why child mortality and maternal mortality is still considerably high in India. Most maternal deaths are preventable if mothers receive essential health care before, during, and after childbirth. In India, the eight socioeconomically backward states referred to as the Empowered Action Group (EAG) states; lag behind in the demographic transition and low utilization of maternal health care services. Addressing the maternity care needs of women may have considerable ramifications for achieving the Millennium Development Goal (MDG – 5). **Aims & Objectives**: To explore the prevalence, trends and factors associated with the utilization of maternal care services in Empowered Action Group States, India (1990-2006). **Material Methods:** Data from three rounds of the round of the Demographic and Health Survey (DHS), known as the National Family Health Survey (NFHS) of India were analyzed. Bivariate and multivariate-pooled logistic regression model were applied to examine the utilization of the maternal and child health care trends over time. **Result**: The results from analysis indicate that the full ANC and skilled birth attendant (SBA) has increased from 17% and 20% to 25% and35% respectively during the last one and half decade (1990-2006). **Conclusion**: Various socioeconomic and demographic factors are associated with the utilization of maternal care services in EAG states, India. Promoting the use of family planning, female education, targeting vulnerable groups such as poor, illiterate, high parity women, involving media and grass root level workers and collaboration between community leaders and health care system could be some important policy level interventions to address the unmet need of maternal and child health care services among women. The study concludes that much of these differentials are social constructs that can be reduced by prioritizing the needs of the disadvantaged and adopting appropriate policy change options in EAG states in India

Key Words

NFHS; MDG pooled data; Antenatal care and skilled birth attendant

Introduction

Maternal deaths leave children without a mother, husbands without wives, and communities without female resources. Complications and morbidity may have major consequences for living situations and quality of life. Giving birth to a child is not only a strain for the body, but it also puts the woman's health at risk. On a global basis, it is estimated that 2,87,000 maternal deaths occurred in 2010(1), 99% of these happen in the global south, and 75% of these are considered avoidable(2). Several studies had documented the fact that poor availability of services is a one of the factor in non-use of skilled birth attendants during childbirth(3), but even in areas where these services are available certain groups of women, belonging poorest economic

strata, illiterate, and rural backgrounds, are not using these services (4,5)

Various studies have been indicated that countries which have improved their maternal health care services are successful in reducing the maternal morbidity or mortality(6,7,8). However, every women need access to all maternal care during the pregnancy and child birth. Therefore, it is very imperative that all the births delivery at home should be attended by skilled health professionals, as timely delivery care, proper management and careful treatment can make the difference between life and death. Several post research on demographic behaviour has indicated that much disparities in the northern and southern states of India (9,10,11,12). No study has been analyzed the trends of maternal health care services utilization in EAG states, India.

Aims & Objectives

To investigate the differentials in the use of three key maternal and child health care utilization, namely, full antenatal care and skilled birth attendant among women in Empowered Action Group States, India (1990-2006).

Material and Methods

Study Setting, Data, and Method: *Data and Sampling design:* This study is based on three round of the Demographic and Health Survey (DHS), known as the National Family Health Survey (NFHS) data, which were canvassed during 1992–93 (NFHS-1), 1998–99 (NFHS-2), and 2005–06 (NFHS-3) in India (13,14,15). In order to retain consistency, a sample for Sikkim was excluded from the final analytic samples. Appropriate sample weights were used taking into account the survey design. The details of the sampling weights as well as extensive information on survey design, data collection, and management procedures are described in the NFHS reports of the respective rounds (13, 14, 15).

Outcome variables: The present study measures two outcome variables, namely, full antenatal care (Full ANC) and skilled birth attendance (SBA).

1. *Full Antenatal care*: Antenatal care (ANC) is a medical examination during pregnancy but before birth(16). Full antenatal care has been defined as the mothers who had minimum of three antenatal visits, at least two tetanus toxoid injections or received one TT injection during the pregnancy and at least one in the three years prior to the pregnancy and received iron and folic acid tablets for 90 days or more(17). However, in order to maintain consistency across the information available in the three rounds of the NFHS, the full antenatal care indicator was measured as women with at least three antenatal check-ups, and who received at two tetanus toxoid injection and at least one iron and folic acid tablets or syrup during pregnancy. Yes: coded as 1 and No: coded as 0.

2. *Skilled birth attendant:* WHO, 2004:1 (18) defines a skilled birth attendant as "an accredited health professional – such as a midwife, doctor or nurse – who has been educated and trained to proficiency in the skills needed to manage normal (uncomplicated) pregnancies, childbirth and the immediate postnatal period, and in the identification, management and referral of complications in women and new-borns. However, for this study SBA define as a delivery occurring either in a medical institution or at home assisted by a doctor/nurse/lady health visitor (LHV)/auxiliary nurse midwife (ANM)/other health professional is termed as 'safe delivery' (17) or 'skilled birth attendance. Yes: coded as 1 and No: coded as 0.

Explanatory variables: Important Socioeconomic and demographic predictors such as age of the woman at the time of child birth, women's education, husband's education, women's occupation, husband's occupation, birth order and interval, status of child, mass media exposure, religion, social group, wealth quintile, type of residence, city-wise residence, and state were included as predictor variables in the present study.

Analytical approach: To identify the factors associated with maternal and child health care services in EAG states, bi-variate and multivariate analyses were performed. Bi-variate analyses were performed to examine the nature of association between maternal acre services and selected individual, household and community characteristics.

Results

Differentials in full antenatal care: Table 1 shows the weighted percentage of women who utilized full antenatal care by selected background characteristics. The proportion of women who received full antenatal care (ANC) in EAG states, India increased by nearly seven percentage points from a level of 17.4% during 1990–93 to 25.2% during 2003–06. A considerable growth in the level of full antenatal care (ANC) was observed in the women who belonging to the Scheduled caste (SCs) and scheduled tribes (STs). The prevalence (%) of of full

ANC among Scheduled caste grew by 74.5%, and scheduled tribe grew by 123.6% compared to an increase of about 38.3% among others then Scheduled Caste/Scheduled Tribes. The prevalence (%) of full ANC among rural women grew by 59.8%, compared to urban women an increase of about 13.1% only.

Differentials in skilled birth attendant: Table 2 shows the weighted percentage of women who utilized skilled birth attendant (SBA) at the time of child birth by selected background characteristics. Results shows that there was an increase of nearly 14 percentage points (78%) in the overall proportion of adolescent women availing themselves of skilled birth attendant (SBA) during the period 1990-93 to 2003-06. A considerable increase was observed in the proportion of skilled birth attendant (SBA) availed by women who had exposure to mass media as compared to women who did not have any mass media exposure. A considerable growth in the level of use was observed in the middle and the richest wealth quintiles and women belonging to the Scheduled caste (SCs).

Multivariate-pooled logistic regression results for receiving Maternal care services

Table 3 presents the influence of socioeconomic and demographic predictors on the use of maternal and child health care services by women during 1990–2006, controlling for a set of socio-demographic and regional factors. The overall probability of women availing themselves of full ANC appeared to increase by 31% between 1990–93 and 2003–06 and probability of women availing themselves of skilled birth attendant (SBA) grew by 2 times more during the same period. The probability increased significantly with the increasing economic level (that is, wealth quintile) of the users. Women's education transpired as the most influential socioeconomic predictor leading to higher probability of women availing themselves of full ANC and SBA during 1990–2006. Women belonging to the rural appeared to be disadvantaged with 15% less probability to avail themselves of full ANC and 43% less probability to avail themselves SBA than their urban counterparts.

Discussion

The present study examines the trends and factor associated with the utilization of maternal care services among women in EAG states, India during 1990-2006. The difference was almost two fold between the lower and upper structures of the educational, economic and social spectrum which indicated is several others studies that the key socioeconomic and demographic factors associated the utilization of maternal and child health care services in India is available, which reiterates the influence of place of residence (19), education (20), wealth (21) and social groups (22) on the utilization of maternal and child health care services. On the other hand, few studies have documented the extent of differentials between the least and the most favoured groups across the socioeconomic and demographic spectrum. Present study indicated that massive differentials between women of the least and the most favoured groups in availing themselves of maternal and child care services in EAG states, India.

Several others studies have documented the fact that the household wealth has a positive effect on the use of maternal healthcare (23-26). This study also indicated the same. Women from richer households are more likely to use maternal and child health care services compared to mothers from the poorest households. Household wealth may facilitate the use of maternal and child health care in many ways. Mothers from richer households are generally more educated and have more autonomy compared to mothers from the poorest households. It has been argued that the low coverage of maternal and child health care services among poor households could be the outcome of their priority to meet basic daily needs, rather than spend their limited resources on healthcare (27). The urban–rural differences in the utilization of maternal and child health care show a significant effect in the case of full antenatal care (ANC) and skilled birth attendant (SBA).

Conclusion

Even though the global and the national focus are on achieving MDG4 and MDG 5 targets by reducing child mortality and maternal mortality (MMRs) respectively by adoption of utilitarian strategies for the utilization of maternal and child health care services, this has been assessed in many low-income and developing countries that the goal is unlikely to be achieved until the services reach to the marginalized. The marginalization of women in utilizing maternal and child health care services in EAG states, India over one and a half decades is clearly manifested from this study. Besides, the socioeconomic vulnerability among considerable

population who are disadvantaged in using maternal and child health care services, could foster adverse reproductive outcomes. Girl's education is the most important weapon to deal with such concerns in any society.

Recommendation

There is an urgent need to strengthen and ensure that public health facilities are capable to provide antenatal care and delivery care services. Regional variation in utilization of maternal health care services are also found to be high, therefore, appropriate resource allocation and a monitoring mechanism has to be placed to reduce regional disparities in programme implementation. It may be useful to work with private provider to expired access to all health services.

Limitation of the study

The level of maternal care services utilization is observed among women, but not the same women through cross-sectional data. However, a longitudinal data set, where the women is followed for the complete process starting from marriage to all the services utilization is ideal for such investigations.

Authors Contribution

JY and JKS contributed in the concept of the analysis of NFHS dataset. JY and JKS performed all statistical analysis. JY wrote manuscript with significant contribution from SG and RJY. All authors have read and approved the final manuscript.

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Tables 1

TABLE PERCENTAGE OF WOMEN WHO EXPERIENCING FULL ANTENATAL CARE BY SOCIOECONOMIC AND DEMOGRAPHIC CHARACTERISTICS, IN EAG STATES, INDIA, 1990–2006

Socioeconomic and demographic characteristics	Full ANC						R.C (%)
	NFHS-1(1990–93)		NFHS-2 (1996–99)		NFHS-3 (2003–06)		
	%	95% CI	%	95% CI	%	95% CI	a
Individual characteristics							
Mother's age at birth of child	χ2=84.213***		χ2=44.434***		χ2=62.476***		
Younger (15-24)	19.8	(18.4,21.3]	22.8	(21.4,24.2]	26.4	(24.5,28.3]	33.3
Middle (25-34)	16.1	(14.7,17.7]	19.2	(17.8,20.6]	25.7	(23.7,27.7]	59.6
Older (35-49)	9.0	(7.2,11.2]	13.1	(10.6,16.1]	12.6	(10.1,15.7]	40.0
Women's education	χ2=1938.666***		χ2=520.244***		χ2=1345.499***		
Illiterate	10.2	(9.3,11.1]	14.7	(13.7,15.8]	14.5	(13.2,15.9]	42.2
Literate but below primary	28.0	(24.7,31.5]	29.5	(25.9,33.5]	30.9	(26.4,35.7]	10.4
Primary but below middle	30.2	(22.5,39.2]	29.3	(25.4,33.6]	31.7	(28.0,35.7]	05.0
Middle but below high school	45.5	(42.2,48.9]	36.0	(32.9,39.2]	40.3	(37.5,43.2]	-11.4
High school and above	75.4	(68.5,81.2]	36.4	(33.0,40.0]	70.6	(66.2,74.7]	-06.4
Husband's education	χ2=905.767***		χ2=213.068***		χ2=615.393***		
Illiterate	7.5	(6.5,8.6]	13.2	(12.0,14.5]	12.9	(11.5,14.5]	72.0
Literate but below primary	14.3	(11.3,17.9]	22.2	(19.1,25.6]	23.8	(19.9,28.2]	66.4
Primary but below middle	15.9	(13.9,18.1]	21.0	(19.0,23.2]	24.6	(22.0,27.5]	54.7
Middle but below high school	18.2	(16.2,20.5]	23.9	(21.7,26.2]	26.0	(23.4,28.7]	42.9
High school and above	32.9	(30.4,35.4]	27.2	(25.4,29.1]	40.4	(37.8,43.0]	22.8
Women's occupation	χ2=157.415***		χ2=26.739***		χ2=195.853***		
Not working	19.0	(17.7,20.4]	21.1	(19.9,22.4]	28.0	(26.0,30.0]	47.4
Agricultural work	7.8	(6.4,9.4]	18.2	(16.4,20.0]	17.7	(15.8,19.9]	126.9
Skilled/Unskilled work	13.6	(10.8,16.9]	27.1	(21.2,34.0]	22.9	(19.2,27.1]	68.4
Professional work	31.5	(23.8,40.3]	28.7	(21.9,36.6]	48.7	(42.0,55.5]	54.6
Husband's occupation	χ2=681.119***		χ2=86.122***		χ2=295.831***		
Not working	23.3	(18.6,28.9]	22.9	(18.5,28.0]	29.9	(21.8,39.5]	28.3
Agricultural work	10.0	(8.9,11.1]	18.3	(16.8,19.8]	18.7	(16.7,20.8]	87.0
Skilled/Unskilled work	16.1	(14.6,17.8]	19.3	(17.8,21.0]	22.7	(20.9,24.6]	41.0

Professional work	33.1	(30.5,35.9]	27.7	(25.5,30.1]	38.1	(35.2,41.0]	15.1
Birth order and interval	χ2=341.860***		χ2=161.283***		χ2=393.010***		
Birth order 1	26.6	(24.4,28.9]	26.2	(24.2,28.4]	36.8	(34.2,39.5]	38.3
Birth order-2/3 and interval<=24	21.4	(18.6,24.5]	24.6	(22.0,27.5]	27.7	(24.8,30.8]	29.4
Birth order-2/3 and interval>24	17.9	(16.2,19.7]	22.9	(21.3,24.5]	27.1	(24.9,29.5]	51.4
Birth order-4+ and interval<=24	11.6	(9.6,13.9]	16.2	(13.7,18.9]	14.6	(12.1,17.4]	25.9
Birth order-4+ and interval>24	10.2	(8.9,11.6]	14.0	(12.7,15.4]	14.6	(13.0,16.5]	43.1
Status of the child	χ2=2.430		χ2=7.019***		χ2=32.914***		
Wanted	17.7	(16.5,18.9]	21.2	(20.1,22.4]	26.6	(24.8,28.4]	50.3
Unwanted	16.4	(14.4,18.5]	18.7	(17.0,20.6]	20.8	(18.8,22.9]	26.8
Mass media exposure	χ2=924.519***		χ2=350.485***		χ2=468.798***		
No exposure	10.3	(9.4,11.3]	14.9	(13.8,16.0]	13.7	(12.3,15.2]	33.0
Any exposure	32.4	(30.1,34.7]	29.9	(28.1,31.7]	32.9	(30.8,35.0]	01.5
Household characteristics							
Religion	χ2=64.668***		χ2=37.606***		χ2=65.129***		
Hindu	17.5	(16.3,18.8]	21.0	(20.0,22.1]	26.3	(24.7,28.1]	50.3
Non_Hindu	14.4	(11.9,17.4]	16.8	(13.9,20.2]	17.4	(14.6,20.6]	20.8
Social group	χ2=98.952***		χ2=14.576***		χ2=51.083***		
Scheduled caste (SCs)	11.0	(9.6,12.7]	18.3	(16.5,20.3]	19.2	(16.9,21.7]	74.5
Scheduled tribe (STs)	12.3	(10.0,14.9]	19.5	(16.7,22.5]	27.5	(23.7,31.6]	123.6
Other than SC/ST	19.3	(17.9,20.8]	21.9	(20.6,23.2]	26.7	(24.9,28.5]	38.3
Wealth quintile	χ2=1653.384***		χ2=396.085***		χ2=1079.091***		
Poorest	8.8	(7.5,10.2]	13.6	(12.2,15.0]	14.9	(13.2,16.8]	69.3
Poorer	11.3	(10.0,12.7]	17.6	(16.0,19.4]	18.1	(16.2,20.3]	60.2
Middle	15.7	(14.0,17.5]	23.8	(21.6,26.1]	24.5	(22.1,27.2]	56.1
Richer	29.0	(26.1,32.1]	34.6	(31.4,38.0]	37.8	(34.7,41.0]	30.3
Richest	58.1	(53.8,62.4]	35.1	(31.8,38.6]	62.1	(57.9,66.2]	06.9
Community characteristics							
Type of residence	χ2=757.258***		χ2=114.107***		χ2=392.136***		
Urban	38.3	(34.7,42.1]	30.4	(27.7,33.2]	43.3	(39.4,47.3]	13.1
Rural	13.2	(12.2,14.3]	18.9	(17.7,20.1]	21.1	(19.5,22.7]	59.8
City-wise residence	χ2=90.725***		χ2=123.794***		χ2=398.710***		
Capital, large city	54.8	(43.1,66.0]	36.2	(30.2,42.7]	46.6	(40.3,53.0]	-15.0
Small city	45.6	(39.4,51.9]	33.0	(28.2,38.2]	44.9	(37.7,52.3]	-01.5
Town	27.1	(22.7,31.9]	28.0	(24.6,31.6]	40.5	(34.5,46.7]	49.4
Countryside	13.2	(12.2,14.3]	18.9	(17.7,20.1]	21.1	(19.5,22.7]	59.8
State	χ2=161.773***		χ2=731.702***		χ2=632.524***		
Bihar	13.4	(11.2,16.1]	13.0	(11.4,14.8]	14.5	(12.4,17.0]	08.2
Madhya Pradesh	23.9	(21.0,27.0]	29.3	(26.5,32.2]	34.7	(31.1,38.4]	45.2
Oddisa	26.4	(23.0,30.1]	50.2	(46.3,54.1]	54.8	(50.0,59.5]	107.6
Rajasthan	14.0	(11.6,16.7]	22.0	(19.8,24.4]	33.8	(28.9,39.1]	141.4
Uttar Pradesh	16.1	(14.3,18.2]	14.1	(12.5,16.0]	20.9	(18.9,23.0]	29.8
Total	17.4	(16.2,18.6]	20.7	(19.6,21.8]	25.2	(23.6,26.8]	44.8

TABLE 2 PERCENTAGE OF WOMEN WHO EXPERIENCING SKILLED BIRTH ATTENDANT (SBA) BY SOCIOECONOMIC AND DEMOGRAPHIC CHARACTERISTICS, IN EAG STATES, INDIA, 1990–2006.

Socioeconomic and demographic characteristics	Skilled Birth Attendant (SBA)						
	NFHS-1(1990–93)		NFHS-2 (1996–99)		NFHS-3 (2003–06)		R.C(%)
	%	95% CI	%	95% CI	%	95% CI	a
Individual characteristics							
Mother's age at birth of child	χ2=56.367***		χ2=48.615***		χ2=59.306***		
Younger (15-24)	21.6	(20.0,23.3]	30.1	(28.3,31.9]	37.1	(34.9,39.4]	71.8
Middle (25-34)	18.5	(16.8,20.3]	25.8	(23.9,27.8]	33.4	(31.1,35.8]	80.5
Older (35-49)	12.3	(10.0,14.9]	19.1	(15.8,22.9]	22.9	(19.0,27.3]	86.2

Women's education	χ2=2469.211***		χ2=1526.479***		χ2=1504.976***		
Illiterate	11.3	(10.4,12.4]	17.7	(16.5,19.0]	22.2	(20.5,24.0]	96.5
Literate but below primary	27.7	(24.4,31.3]	29.9	(25.8,34.3]	38.8	(34.0,43.8]	40.1
Primary but below middle	40.3	(30.6,50.9]	36.8	(32.8,41.0]	40.4	(36.3,44.7]	00.2
Middle but below high school	52.4	(48.8,55.9]	48.5	(45.1,51.9]	55.2	(52.0,58.3]	05.3
High school and above	91.6	(87.2,94.6]	70.8	(66.7,74.7]	84.5	(80.5,87.7]	-7.8
Husband's education	χ2=1159.585***		χ2=798.734***		χ2=864.967***		
Illiterate	8.2	(7.1,9.4]	15.4	(14.0,17.0]	19.5	(17.6,21.5]	137.8
Literate but below primary	14.0	(11.2,17.3]	20.2	(17.3,23.5]	27.2	(23.2,31.5]	94.3
Primary but below middle	16.8	(14.8,19.0]	23.1	(20.9,25.4]	32.3	(29.1,35.6]	92.3
Middle but below high school	20.8	(18.4,23.5]	29.1	(26.7,31.7]	37.1	(34.0,40.4]	78.4
High school and above	38.0	(35.3,40.7]	45.4	(42.7,48.2]	54.8	(51.8,57.8]	44.2
Women's occupation	χ2=194.624***		χ2=286.423***		χ2=340.316***		
Not working	21.6	(20.1,23.3]	31.7	(29.9,33.6]	40.5	(38.1,42.9]	87.5
Agricultural work	9.2	(7.4,11.4]	15.6	(14.0,17.3]	23.1	(20.9,25.5]	151.1
Skilled/Unskilled work	11.0	(8.3,14.5]	26.1	(20.5,32.6]	23.7	(19.6,28.2]	115.5
Professional work	32.7	(25.2,41.2]	45.3	(37.1,53.8]	53.3	(46.5,60.0]	63.0
Husband's occupation	χ2=831.659***		χ2=528.913***		χ2=468.448***		
Not working	29.8	(24.7,35.4]	38.5	(32.8,44.6]	46.6	(37.7,55.7]	56.4
Agricultural work	11.3	(10.0,12.8]	19.0	(17.5,20.6]	25.8	(23.4,28.4]	128.3
Skilled/Unskilled work	17.3	(15.6,19.0]	26.6	(24.7,28.6]	31.1	(28.7,33.5]	79.8
Professional work	37.6	(34.5,40.8]	45.4	(42.5,48.4]	52.3	(49.1,55.5]	39.1
Birth order and interval	χ2=351.348***		χ2=524.700***		χ2=699.487***		
Birth order 1	29.4	(27.1,31.9]	44.0	(41.4,46.7]	53.7	(50.9,56.6]	82.7
Birth order-2/3 and interval<=24	22.9	(20.0,26.1]	30.2	(27.1,33.4]	37.8	(34.4,41.3]	65.1
Birth order-2/3 and interval>24	20.2	(18.3,22.2]	26.8	(24.6,29.0]	34.2	(31.7,36.8]	69.3
Birth order-4+ and interval<=24	14.8	(12.3,17.8]	17.2	(14.6,20.1]	19.1	(16.1,22.4]	29.1
Birth order-4+ and interval>24	11.7	(10.3,13.2]	17.9	(16.2,19.7]	21.2	(19.1,23.6]	81.2
Status of the child	χ2=1.073***		χ2=0.707		χ2=29.540***		
Wanted	19.3	(17.9,20.9]	27.8	(26.2,29.5]	36.5	(34.4,38.6]	89.1
Unwanted	20.2	(18.2,22.5]	27.0	(24.6,29.5]	29.1	(26.6,31.8]	44.1
Mass media exposure	χ2=1063.110***		χ2=910.502***		χ2=492.439***		
No exposure	11.6	(10.5,12.7]	17.3	(16.1,18.5]	21.8	(19.8,23.8]	87.9
Any exposure	36.4	(33.9,39.0]	44.0	(41.7,46.4]	43.3	(41.0,45.7]	19.0
Household characteristics							
Religion	χ2=67.572***		χ2=15.586***		χ2=240.821***		
Hindu	19.6	(18.2,21.1]	27.5	(26.0,29.1]	36.0	(34.0,38.1]	83.7
Non_Hindu	16.7	(13.8,20.1]	27.1	(23.0,31.6]	27.6	(23.5,32.0]	65.3
Social group	χ2=194.106***		χ2=196.009***		χ2=240.821***		
Scheduled caste (SCs)	11.1	(9.5,12.9]	22.2	(20.2,24.3]	26.0	(23.3,28.8]	134.2
Scheduled tribe (STs)	10.8	(8.3,14.1]	14.2	(12.1,16.7]	19.8	(16.6,23.4]	83.3
Other than SC/ST	22.4	(20.7,24.1]	31.7	(29.8,33.6]	39.5	(37.2,41.9]	76.3
Wealth quintile	χ2=2580.117***		χ2=1912.689***		χ2=1809.968***		
Poorest	8.8	(7.7,10.0]	12.7	(11.5,14.1]	18.1	(16.2,20.1]	105.7
Poorer	10.5	(9.2,11.9]	20.3	(18.5,22.1]	25.2	(22.9,27.6]	140.0
Middle	17.7	(15.7,19.8]	31.1	(28.8,33.4]	37.5	(34.2,40.9]	111.9
Richer	35.9	(32.5,39.5]	49.8	(46.5,53.2]	54.4	(51.0,57.8]	51.5
Richest	72.1	(68.3,75.7]	80.5	(76.8,83.8]	84.2	(81.2,86.8]	16.8
Community characteristics							
Type of residence	χ2=1409.105***		χ2=877.988***		χ2=186.832***		
Urban	49.4	(45.5,53.3]	57.3	(53.1,61.3]	61.5	(57.1,65.7]	24.5
Rural	13.6	(12.4,14.9]	22.1	(20.8,23.5]	28.6	(26.7,30.6]	110.3
City-wise residence	χ2=1541.548***		χ2=923.051***		χ2=749.585***		
Capital, large city	57.7	(43.2,71.0]	67.3	(54.1,78.2]	68.4	(59.5,76.1]	18.5

Small city	59.1	(53.4,64.7)	65.8	(59.3,71.8)	66.9	(59.3,73.8)	13.2
Town	38.7	(33.5,44.1)	51.3	(46.2,56.4)	53.9	(47.6,60.0)	39.3
Countryside	13.6	(12.4,14.9)	22.1	(20.8,23.5)	28.6	(26.7,30.6)	110.3
State	χ2=87.776***		χ2=115.832***		χ2=160.377***		
Bihar	17.8	(15.2,20.7)	23.5	(20.8,26.6)	31.7	(27.7,36.0)	78.1
Madhya Pradesh	26.4	(22.7,30.4)	29.3	(25.7,33.2)	39.8	(35.8,44.1)	50.8
Oddisa	20.3	(17.1,23.9)	34.3	(29.9,38.9)	47.7	(42.0,53.6)	135.0
Rajasthan	20.1	(17.1,23.5)	36.4	(32.7,40.1)	43.4	(37.5,49.6)	115.9
Uttar Pradesh	17.3	(15.1,19.9)	24.7	(22.1,27.5)	29.7	(26.9,32.8)	71.7
Total	19.5	(18.1,21.0)	27.6	(26.1,29.2)	34.7	(32.7,36.6)	77.9

TABLE 3 SOCIO-DEMOGRAPHIC PREDICTORS FOR WOMEN ACCESSING SAFE DELIVERY CARE, INDIA, 1990–2006. (POOLED DATA ANALYSIS).

Background characteristics	Maternal health care utilization			
	Full ANC		SBA	
	Odds Ratio	95% C.I	Odds Ratio	95% C.I
Period	OR	95% CI	OR	95% CI
1990–93 (ref)	1.00		1.00	
1996–99	1.09	[0.98-1.22]	1.60***	[1.42-1.79]
2003–06	1.31***	[1.17-1.46]	2.19***	[1.95-2.47]
Individual characteristics				
Mother's age at birth of child				
Younger (15-24) (ref)	1.00		1.00	
Middle (25-34)	1.13***	[1.04-1.24]	1.32***	[1.21-1.44]
Older (35-49)	0.94	[0.80-1.11]	1.43***	[1.20-1.70]
Sex of child				
Male(ref)	1.00		1.00	
Female	0.96	[0.90-1.03]	0.89***	[0.84-0.95]
Women's education				
Illiterate (ref)	1.00		1.00	
Literate but below primary	1.64***	[1.44-1.86]	1.40***	[1.23-1.60]
Primary but below middle	1.62***	[1.41-1.87]	1.44***	[1.25-1.66]
Middle but below high school	2.03***	[1.83-2.25]	1.88***	[1.69-2.10]
High school and above	2.53***	[2.14-2.99]	3.24***	[2.67-3.92]
Husband's education				
Illiterate(ref)	1.00		1.00	
Literate but below primary	1.34***	[1.16-1.54]	1.11	[0.96-1.28]
Primary but below middle	1.39***	[1.24-1.55]	1.23***	[1.10-1.37]
Middle but below high school	1.42***	[1.27-1.60]	1.30***	[1.17-1.46]
High school and above	1.59***	[1.41-1.79]	1.45***	[1.30-1.63]
Women's occupation				
Not working(ref)	1.00		1.00	
Agricultural work	1.10**	[1.00-1.22]	0.91*	[0.82-1.01]
Skilled/Unskilled work	1.03	[0.87-1.22]	0.77***	[0.65-0.93]
Professional work	1.33***	[1.06-1.66]	1.03	[0.83-1.29]
Husband's occupation				
Not working(ref)	1.00		1.00	
Agricultural work	0.87	[0.70-1.07]	0.82**	[0.67-1.00]
Skilled/Unskilled work	1.11	[0.90-1.37]	0.99	[0.80-1.21]
Professional work	1.20*	[0.97-1.49]	1.07	[0.87-1.31]
Birth order and interval				
Birth order 1(ref)	1.00		1.00	
Birth order-2/3 and interval<=24	0.75***	[0.67-0.84]	0.49***	[0.44-0.55]
Birth order-2/3 and interval>24	0.74***	[0.68-0.81]	0.48***	[0.43-0.52]

Birth order-4+ and interval<=24	0.60***	[0.51-0.70]	0.35***	[0.30-0.41]
Birth order-4+ and interval>24	0.58***	[0.51-0.66]	0.36***	[0.32-0.41]
Status of the child				
Wanted (ref)	1.00		1.00	
Unwanted	0.89***	[0.82-0.97]	1.00	[0.91-1.09]
Mass media exposure				
No exposure (ref)	1.00		1.00	
Any exposure	1.32***	[1.21-1.44]	1.14***	[1.05-1.24]
Household characteristics				
Religion				
Hindu (ref)	1.00		1.00	
Non_Hindu	1.01	[0.90-1.13]	0.78***	[0.69-0.89]
Social group				
Scheduled caste (SCs) (ref)	1.00		1.00	
Scheduled tribe (STs)	1.14*	[0.98-1.32]	0.76***	[0.64-0.90]
Other than SC/ST	1.07	[0.97-1.18]	1.25***	[1.14-1.38]
Wealth quintile				
Poorest (ref)	1.00		1.00	
Poorer	1.12**	[1.00-1.25]	1.16***	[1.05-1.28]
Middle	1.23***	[1.09-1.40]	1.54***	[1.38-1.73]
Richer	1.68***	[1.45-1.94]	2.34***	[2.03-2.69]
Richest	2.40***	[1.99-2.91]	5.38***	[4.41-6.56]
Community characteristics				
Type of residence				
Urban (ref)	1.00		1.00	
Rural	0.85***	[0.76-0.95]	0.57***	[0.50-0.64]
State				
Bihar (ref)	1.00		1.00	
Madhya Pradesh	2.50***	[2.17-2.88]	1.40***	[1.21-1.61]
Oddisa	4.86***	[4.19-5.65]	1.51***	[1.30-1.75]
Rajasthan	1.76***	[1.50-2.05]	1.35***	[1.15-1.58]
Uttar Pradesh	1.17***	[1.03-1.33]	0.72***	[0.63-0.82]

*Levels of significance: *p<0.10; **p<0.05; ***p<0.01.HR= Hazard Ratio*
City wise residence was excluded from the multivariate analysis after examining high collinearity between type of residence and city wise residence.