Skilled Birth Attendance across Geographical Regions in India: Rural-Urban Differentials, 1992-2006

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Abstract

Large numbers of women die globally due to pregnancy and childbirth-related causes, especially in less developed countries. Most of them die because they have no access to skilled birth attendance (SBA) and emergency care during pregnancy complications. This study assesses the inequality in the coverage of SBA during 1992-2006 in six regions of India. Data from all three rounds of National Family Health Survey conducted in 1992-93, 1998-99 and 2005-06 were used. The bi-variate analysis predicted probability obtained from logistic regression and concentration index were performed (a) to examine the trends and patterns, and (b) to show the within-group inequality in SBA in the six regions of India. The analysis of change over fifteen year period (1992-2006) shows considerable inequality in the coverage of SBA across regions. East, West and South regions have experienced a higher rate of increase in SBA than North and Central regions. The study suggests that periodic monitoring of the progress of SBA is vital to assess the differential between and within the group beyond average improvement.

Key words: Skilled Birth Attendance, Poor-non-poor differentials, Regional variations, India

I. Introduction

Health status and health service indicators present a broad picture of the development of any country. Despite several growth-orientated policies adopted by the Indian government, the income, regional and gender disparities are posing challenges for the health service differentials. An examination of the health status in India indicates that it has made progress in some respects, but not so well compared with neighbouring developing countries like Sri Lanka and China. There exist marked disparities between groups within the regions of India, which make some section of the population highly vulnerable. In addition to the rural-urban divide, caste, class and gender disparities in health persist, leading to a situation in which people in the same country live in entirely different worlds in terms of health.

Almost 800 women die every day because of problems in pregnancy and childbirth worldwide (WHO, 2013). Of these, the highest number of women die in Africa, followed by South Asian region (WHO, 2013; Shabnam et al., 2011). Almost all (99%) maternal deaths occur in low-income countries. The major identified causes for maternal mortality are severe haemorrhage (25%), infection (15%), eclampsia (12%) and obstructed labour (8%). Along with that unsafe abortion (13%) has also contributed a lot (WHO, 2008). However, it is evident that most of these deaths could be prevented through timely care-seeking during pregnancy and the provision of Skilled Birth Attendance (SBA) during delivery (Rahman et al., 2008).

India initiated maternal and child health care programmes as early as 1960s. In the 1960s and 1970s, within the plan of maternal health services, child immunization and family planning were focused. On the other hand, the level of maternal mortality remained high in the country until the mid-1980s. Reproductive and child health care (RCH) services got much attention in reducing maternal morbidity and mortality globally after the safe motherhood initiative of 1987 and after the

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International Conference on Population and Development (ICPD) held at Cairo in 1994. It was believed that good antenatal care, delivery care and post-natal care may help in reducing maternal mortality and neonatal mortality.

Child Survival & Safe Motherhood (CSSM) programme was launched by the Government of India in 1992 for improving the health status of women and newborn and to reduce their morbidity and mortality. After that Reproductive and Child Health Phase-I (1997ó2004) and Reproductive and Child Health Phase-II (2005ó2010) were launched to make the life of the mother and neonate safer. The primary aim of the RCH-II programme was to concentrate on narrowing the regional variations of reproductive and child health. Along with that, the responsibility extended for the underserved target population on the provision of assured, equitable and quality health services. In 2005, the central government launched the National Rural Health Mission (NRHM) focusing on revamping the rural health infrastructure in the country as a whole and especially in 18 low performing states. This programme aimed at improving the availability, accessibility and affordability of the health care services to the people. These programmatic efforts have benefitted the neediest population subgroups, that is, poor mothers and children living in rural areas.

India contributes the largest number of births every year to the world population and accounts for 20 per cent of global maternal deaths (Mavalankar et al., 2008). Indiaøs progress will be crucial to lowering down the maternal mortality for the globally targeted fifth Millennium Development Goal (MDG5). The primary barrier in the path to achieving this MDG5 is the inadequate and poorly organized maternal health care services with the significant differentials in rural-urban and large interstate disparities.

There is wide variation in the utilization of health care services between lower and higher economic strata in India. There is evidence that socio-economic inequality-related utilization of delivery care exists both between countries and within countries (Adai, 2001; Bhatia & Cleland 1995). Several studies have been carried out to examine the relationship between the socio-economic development and delivery care services utilization in the context of low and high-income countries (Say et al., 2007; Saxena et al., 2013). India has experienced impressive economic growth in the last two decades and made significant progress in health indicators such as a decline in infant and child mortality. However, there are variations in gains among socio-economic and regional groups. Earlier studies have highlighted the socio-economic gradient in maternal health care services utilization (Pathak et al., 2010; Mohanty & Pathak, 2010, Rai & Chauhan, 2014). The study done by Hazarika (2011) found that wealth is one of the strongest determinants of using skilled birth attendance, with the poor being at the disadvantaged position. Only a few studies have been carried out to understand the trends and patterns of the socio-economic differentials in the utilization of maternal health care services from the equity perspective at the state level in India.

It is crucial to understand the trends and regional dimensions of socio-economic inequalities in Skilled Birth Attendance (SBA) across rural-urban sub-groups of the population to monitor policy indicators and targeted intervention programmes. Therefore, the present study is an attempt to scrutinize the economic inequalities in the utilization of SBA in India, and its regions by place of residence (urban *vs* rural) during 1992ó2006.

II. Data Source and Methodology

Data

The study used the data from all three rounds of the National Family Health Survey (NFHS) conducted in India during 1992-93, 1998-99 and 2005-06. These large-scale demographic surveys provide consistent and reliable estimates of demographic indicators of fertility, mortality, family planning, utilization of maternal and child care services and other related indicators at both the national and state levels. The NFHS-1(1992-93) covered 24 states and union territories which comprise 99 per cent of the total population of India. The information was collected from 88,562

households and 89,777 ever married women aged 13-49 from urban as well as rural areas. Data for NFHS-2 (1998-99) were collected from 92,486 households and 90,303 ever-married women aged 15-49 from 26 states that comprise 99 per cent of India's population. During NFHS-3 (2005-06), all 29 states were covered which comprise more than 99 per cent of India's population. The information gathered from 1,09,401 households and 1,24,385 women aged 15-49 years (married and unmarried).

Methodology

The present study employed bi-variate and multivariate analyses to examine the urban-rural gap in SBA among the regions of India. To show the gap between urban and rural areas, urban-rural ratio has been estimated. This ratio has calculated as:

$$\text{Urban - Rural Ratio} = \frac{\%\ \text{Delivery Assisted by Skilled Person in Urban area}}{\%\ \text{Delivery Assisted by Skilled Person in Rural area}}$$

To measure the economic inequality in SBA, rich-poor ratio (Q5/Q1) and concentration index were employed. The rich-poor ratio defined as the ratio of the richest to the poorest wealth quintile is used to measure the gap in SBA.

Computation of concentration index

The concentration index is used to measure the overall inequalities in health care utilization among the wealth quintiles (O'Donnell et al., 2008). It is defined as twice the area between the concentration curve and the line of equality and varies between -1 and +1. Inequality increases as the value move from 0 to 1. The closer the value is to 1 (absolute), the more unequal is the utilization of health services, and the closer the value is to 0, the more equal is the utilization of health services.

Computation of concentration index from group data

The concentration, C, index is conventionally computed in a spread sheet programme using the following formula:

$$C = (p_1 L_2 - p_2 L_1) + (p_2 L_3 - p_3 L_2) + \ldots + (p_{T-1} L_T - p_T L_{T-1})$$

Where p is the cumulative per cent of the sample ranked by economic status (in our study it is the cumulative percentage of mother/women who have experienced the live birth either by skilled birth attendant or by others). L is the corresponding concentration curve ordinate (in our case it may be mother/women who have given birth under the supervision of skilled birth attendant). T is the number of economic groups (in the study T=5 as there are five wealth quintiles).

Binary Logistic Regression Model

To show the economic inequalities in utilization of skilled birth attendance adjusted for the socio-demographic and cultural variable, logistic model has been used to obtain predicted probability. Logistic regression is commonly estimated by maximum likelihood function. For each selected variable, logistic models take the following general form:

$$\text{Logit P} = \ln (P/1-P) = b_0 + b_1 x_1 + b_2 x_2 + b_3 x_3 + \ldots \ldots .. + b_i x_i + e$$

Where, b_1, b_2, b_3 represent the coefficients of the each predictor variable included in the model while e is an error term. The *ln* represents the natural logarithm of the odds of the outcome.

III. Dependent variable

Skilled Birth Attendance (SBA) is considered as a dependent variable for the study. Birth attended by a professionally trained health worker is considered as SBA. Usually, the trained health worker would be a doctor or a midwife or a nurse with the entire essential skills for managing a normal labour delivery of the newborn. These health workers are also considered to be well trained for early recognition of the complicated cases and perform any essential intervention and treatment in case of emergency. They are also well aware and responsible for supervising the referral of mother and infant to the next level, if necessary. SBA can contribute a lot to reducing maternal mortality by utilising safe and hygienic techniques during delivery (WHO et al., 2004).

In the 1992-93 survey, the questions on assistance at delivery were asked for the last three births during the last four years preceding the survey, while it was for the last two births with a reference period of three and five years in 1998-99 and 2005-06 respectively. To make them comparable, SBA for last two live births during the last three years preceding the survey are estimated.

Table 1. Prevalence of Skilled Birth Attendance for last two live births in three years preceding the survey by place of residence and states, India, 1992-2006

States	Skilled Birth Attendance (%)					
	1992-93		1998-99		2005-06	
	Urban	Rural	Urban	Rural	Urban	Rural
North Region	**53.2**	**25.7**	**67.5**	**35.5**	**73.0**	**43.0**
Himachal Pradesh	68.6	22.2	78.2	37.1	78.4	47.6
Jammu & Kashmir	67.5	26.1	80.2	35.2	83.0	54.8
Punjab	57.7	44.1	77.8	58.0	70.7	67.4
Haryana	52.8	25.5	66.1	34.8	79.0	45.9
Delhi	55.5	35.8	68.2	45.5	65.3	63.2
Rajasthan	42.2	14.8	62.4	29.0	77.0	34.7
Uttaranchal	64.5	24.6	54.5	29.9	64.6	34.6
Central Region	**51.0**	**15.2**	**55.3**	**17.9**	**55.9**	**25.8**
Madhya Pradesh	57.9	17.9	61.0	19.2	66.4	28
Uttar Pradesh	42.8	10.6	51.6	16.1	50.5	23.8
Chhattisgarh	61.2	15.3	64.7	28.5	74.0	38.4
East Region	**59.6**	**17.9**	**67.5**	**26.7**	**68.5**	**33.3**
Bihar	50.3	12.7	56.8	22.7	56.6	29.5
Orissa	48.1	14.1	61.0	30.3	69.0	43.1
Jharkhand	53.8	11.1	45.4	11.1	62.2	21.3
West Bengal	68.8	24.0	81.7	35.8	81.2	40.2
West Region	**76.4**	**36.2**	**81.0**	**43.2**	**86.6**	**56.0**
Goa	90.8	87.8	91.0	90.7	94.7	93.8
Gujarat	67.7	32.3	74.2	41.6	83.9	54.6
Maharashtra	79.4	36.6	84.1	43.6	87.6	56.5
South Region	**85.6**	**53.2**	**90.1**	**65.8**	**92.0**	**75.8**
Andhra Pradesh	78.2	39.1	85.3	58.5	89.4	71.0
Karnataka	75.1	35.0	86.4	46.9	87.7	62.3
Kerala	94.1	89.0	99.4	92.8	100	99.5
Tamil Nadu	92.0	56.8	94.9	77.9	96.4	90.2
Northeast Region	**63.3**	**16.7**	**69.1**	**12.9**	**70.0**	**29.7**
Assam	57.5	14.1	63.7	18.7	62.4	27.4
Manipur	64.2	30.0	68.1	48.5	85.2	52.8
Meghalaya	81.1	26.7	80.9	10.9	78.1	22.2
Mizoram	80.8	41.4	85.5	50.4	91.3	47.9
Nagaland	40.6	15.5	52.8	28.8	54.3	17.9
Arunachal Pradesh	54.7	17.0	51.2	29.1	65.4	21.1
Tripura	77.2	24.6	79.9	42.3	79.7	45.4
Sikkim	NA	NA	58.1	32.1	92.4	50.2
India	**65.2**	**23.7**	**73.3**	**33.5**	**75.3**	**39.9**

IV. Results

Skilled birth attendance by place of residence in India and its states, 1992-2006

Table 1 presents the prevalence of SBA in India and its states during 1992-2006. It is shown that SBA has continuously increased in both urban and rural areas. In case of urban population, it has increased from 65 per cent to 73 per cent during 1992-98 and to 75 per cent in third round of survey in 2005-06. In the rural population, the increment has been noticed from 24 per cent to 33 per cent during 1992-98 and to 40 per cent in 2005-06. The table clearly shows the increasing trend in the prevalence of skilled birth attendance in both the areas during 1992-2006. At state and regional level too, the prevalence of SBA has increased in urban as well as in rural areas during 1992-2006. All the states have higher prevalence of SBA in urban areas compared with rural areas. In the South region, the difference in the prevalence of SBA is less compared with other regions.

Table 2. Urban-Rural Ratio (URR) in Skilled Birth Attendance, India and states, 1992-2006

States	Skilled Birth Attendance		
	1992-93	**1998-99**	**2005-06**
North Region	**2.1**	**1.9**	**1.7**
Jammu& Kashmir	2.6	2.3	1.5
Himachal Pradesh	3.1	2.1	1.6
Haryana	2.1	1.9	1.7
Punjab	1.3	1.3	1.0
Rajasthan	2.8	2.1	2.2
Delhi	1.6	1.5	1.0
Uttaranchal	2.6	1.8	1.9
Central Region	**3.3**	**3.1**	**2.2**
Madhya Pradesh	3.2	3.2	2.4
Uttar Pradesh	4.0	3.2	2.1
Chhattisgarh	4.0	2.3	1.9
East Region	**3.3**	**2.5**	**2.1**
Bihar	4.0	2.5	1.9
Jharkhand	4.9	4.1	2.9
Orissa	3.4	2.0	1.6
West Bengal	2.9	2.3	2.0
West Region	**2.1**	**1.9**	**1.5**
Goa	1.0	1.0	1.0
Gujarat	2.1	1.8	1.5
Maharashtra	2.2	1.9	1.6
South Region	**1.6**	**1.4**	**1.2**
Andhra Pradesh	2.0	1.5	1.3
Karnataka	2.1	1.8	1.4
Kerala	1.1	1.1	1.0
Tamil Nadu	1.6	1.2	1.1
Northeast Region	**3.8**	**5.4**	**2.4**
Assam	4.1	3.4	2.3
Manipur	2.1	1.4	1.6
Meghalaya	3.0	7.4	3.5
Mizoram	2.0	1.7	1.9
Nagaland	2.6	1.8	3.0
Arunachal Pradesh	3.2	1.8	3.1
Tripura	3.1	1.9	1.8
Sikkim	NA	1.8	1.8
India	**2.8**	**2.2**	**1.9**

Table 2 reveals the decline in Urban-Rural Ratio (URR) in SBA during 1992-2006. It has decreased from 2.8 to 1.9 in India during 1992-2006. The states provide mixed picture of the urban-rural ratio trend. The rural-urban gap in utilization of SBA was much bigger in Uttar Pradesh,

Jharkhand and Bihar in 1992-93 and 1998-99, while the urban-rural ratio was high in Utter Pradesh, Madhya Pradesh, Jharkhand and Meghalaya. In 2005-06, the urban-rural ratio for utilization of SBA was also high in Jharkhand and other northern states and the central region of India.

Table 3 represents the trend and coverage of SBA in India by wealth quintile and place of residence from 1992 to 2006 for all three rounds of NFHS survey. To measure the economic inequality for seeking SBA, we have used rich-poor ratio for both urban and rural areas separately. The rich-poor ratio is more in rural areas compared with the urban areas during 1992-2006. It indicates that rural area has more economic inequality for seeking SBA compared with the urban areas during the study period. From the table, it can be seen that the richópoor ratio in urban area has marginally increased from 2.5 in 1992-93 to 2.8 in 2005-2006. On the other hand, in the rural areas rich-poor ratio had marginally declined from 4.5 to 4.2 for the same duration. It seems that economic inequality in SBA has marginally declined in rural areas while it has marginally increased in urban areas. It may be partially because of the availability of cash incentive programme to increase the SBA in rural areas.

Table 3. Percentage of Skilled Birth Attendance by wealth quintile, rich-poor ratio (Q5/Q1) and place of residence in India, 1992-2006

Wealth Quintile	1992-93		1998-99		2005-06	
	Urban	Rural	Urban	Rural	Urban	Rural
Poorest (Q1)	32.0	12.9	29.7	14.5	33.3	20.3
Poor	39.8	18.4	36.7	23.0	44.0	33.1
Middle	43.7	24.5	50.9	34.9	61.2	49.4
Richer	56.2	37.9	63.0	53.2	76.4	64.7
Richest (Q5)	79.3	57.9	85.4	72.2	91.5	85.7
Total	66.5	25.9	73.3	33.5	75.3	39.9
Rich-Poor Ratio (Q5/Q1)	**2.5**	**4.5**	**2.9**	**5.0**	**2.8**	**4.2**

Table 4. Rich-poor ratio for Skilled Birth Attendance for the regions of India, 1992-2006

Region	Urban			Rural		
	1992-92	1998-99	2005-06	1992-92	1998-99	2005-06
North Region	16.2	15.9	2.8	4.8	3.3	3.6
Central Region	2.5	4.4	5.6	3.8	6.6	4.4
East Region	2.8	3.1	3.3	5.4	4.6	4.5
West Region	2.0	2.9	3.4	4.3	5.3	3.6
South Region	2.2	1.7	1.6	2.8	2.4	1.8
North-east Region	10.5	4.1	8.4	10.3	7.1	10.6

Table 4 shows the rich-poor ratio of SBA by regions of India and place of residence for 1992-2006 *(percentage of SBA by wealth quintile and regions is given in Appendix 1)*. It is observed that the rich-poor ratio for SBA is more in rural areas compared with urban areas in all six regions for the study duration of 1992 to 2006. It indicates that rich are more likely to receive the SBA compared with poor women. It may be because of availability of financial resources among the rich. In the central region, the rich-poor ratio is more among urban women compared to their rural counterparts in 2005-06. The North-east region has shown highest rich-poor ratio in both urban and rural areas in 2005-06. South region has reflected the declining picture of rich-poor ratio in both the areas and the urban-rural disparity is also less in the region compared with other regions. In north-east region, during 1998-2006 the rich-poor ratio increased both in rural and urban areas.

Concentration Index (economic inequality) for SBA in India and its regions, 1992-2006

We have used the concentration index to measure the degree and magnitude of economic inequality (Table 5). Figures in the table reveal that substantially large, consistent and poor-rich inequalities have occurred in both urban and rural areas in India during 1992-2006. The analysis has

shown that economic inequalities for seeking SBA were precipitously high. The table demonstrates that poor-rich inequality among rural mothers was greater (CI: 0.268, 0.291 and 0.258) compared with their urban counterparts (CI: 0.122, 0.109 and 0.123). The trend of economic inequality for seeking the SBA slightly increased in the rural areas during 1992-1998-99 and after that it declined (0.219) for the third round of survey in 2005-06. But in urban areas, economic inequality almost stagnated during the study period.

All the regions reflect that the rural areas have higher economic inequalities for seeking SBA compared with urban areas. The trend of economic inequalities for seeking SBA has declined in both the areas. North and east regions have more economic inequalities compared with other regions and least inequality was found in south region in seeking SBA. In this region, the inequality has declined from 0.181 to 0.101 and from 0.073 to 0.039 in the rural and urban areas respectively during 1992-2006. In the most emphasised region, i.e., the north-east region, the decline in economic inequalities recorded from 0.396 to 0.371 in rural area and from 0.208 to 0.178 for the urban area during 1992-1996. The interesting result comes out from the central region, and it shows that the trends of economic inequalities for seeking SBA have an increasing pattern in urban and rural areas during the period of 1992 to 1999. In urban areas, it has continuously risen from the point of 0.179 to 0.221 for the duration of 1992 to 2006. On the other hand, in the rural area, first it had risen up from 0.218 to 0.302 for 1992 to 1999 and after that it started declining from 0.302 to 0.229 for 1999-2006.

Table 5. Concentration Index (economic inequalities) for Skilled Birth Attendance in India and its region, 1992-2006

Region	Skilled Birth Attendance		
	Year	Urban	Rural
India	1992-93	0.122	0.268
	1998-99	0.109	0.291
	2005-06	0.123	0.258
North Region	1992-93	0.148	0.278
	1998-99	0.112	0.233
	2005-06	0.142	0.229
Central Region	1992-93	0.179	0.218
	1998-99	0.201	0.302
	2005-06	0.221	0.229
East Region	1992-93	0.196	0.283
	1998-99	0.171	0.264
	2005-06	0.177	0.251
West Region	1992-93	0.107	0.257
	1998-99	0.073	0.269
	2005-06	0.065	0.199
South Region	1992-93	0.073	0.181
	1998-99	0.045	0.144
	2005-06	0.039	0.101
North-east Region	1992-93	0.208	0.396
	1998-99	0.165	0.356
	2005-06	0.178	0.371

Table 6 represents the result of the predicted probabilities for seeking SBA by place of residence adjusted for the socio-demographic and cultural characteristic for 1992-2006 for India. The results indicate a statistically significant effect of interaction term on the predicted probability of seeking SBA. It also suggests that economic inequality in SBA has changed over the period and the predicted probability of seeking SBA also changed during 1992 to 2006.

Table 7 showed clearly that urban women were significantly more likely to use SBA than rural women. The percentage change in the probability of seeking SBA among urban poorest women (10.14%) and its tempo was about six time less than the rural poorest women (60.98 % points). This

percentage change in the probability among urban poor women was (1.79 % points) much less than rural poor women (42.03% point) during 1992-99. For the period of 1992-2006 the percentage change in the predicted probability for seeking SBA was almost five times higher among the rural poorest women than the urban poorest women. Similarly, the percentage change of the predicted probability among the urban richest women was less than rural richest women during 1992-2006. It indicates that in urban areas poorest are more vulnerable compared with rural poorest. It might be the programme factor that creates this differential. In rural areas, poorest, poor and middle have higher changes (more than 100%) than the rich and richer (up to 50%) for duration of first round survey of 1992 to the third round of 2006.

Table 6. Predicted probabilities for Skilled Birth Attendance adjusted for socio-demographic characteristics*, India 1992-2006

Wealth Quintile	1992-93	1998-99	2005-06
Urban			
Poorest	0.267	0.295	0.353
Poor	0.360	0.366	**0.458**
Middle	0.335	0.503	**0.615**
Rich	**0.576**	0.645	**0.773**
Richest	**0.754**	**0.860**	**0.918**
Total	0.639	0.749	0.773
Rural			
Poorest	0.090	0.145	0.209
Poor	**0.160**	**0.227**	**0.334**
Middle	**0.217**	**0.348**	**0.504**
Rich	**0.420**	**0.529**	**0.652**
Richest	**0.629**	**0.724**	**0.862**
Total	0.313	0.359	0.437

All bold characters are significant at 95 % level of significant, p<0.01
*: Adjusted for mother's age at delivery, parity, religion, family type, caste, residence, ANC visits, mass media exposure, mother's education, father's education and working status of mother.

Table 7. Percentage change in predicted probability for Skilled Birth Attendance adjusted for the socio-demographic characteristics by place of residence, India, 1992-2006

Wealth Quintile	1992-98	1998-06	1992-2006
Urban			
Poorest	10.14	19.95	32.12
Poor	1.79	25.20	27.45
Middle	50.31	22.18	83.65
Rich	12.03	19.81	34.23
Richest	13.97	6.81	21.73
Total	17.14	3.31	21.03
Rural			
Poorest	60.98	43.96	131.74
Poor	42.03	47.53	109.54
Middle	60.17	45.06	132.35
Rich	25.93	23.22	55.17
Richest	15.07	19.10	37.05
Total	14.66	21.69	39.54

Table 8 illustrates the result of predicted probabilities for SBA adjusted for the socio-demographic and cultural variable for all the regions of India by place of residence during 1992-93 to 2005-06. The probability of utilization of SBA is higher in urban areas compared with their rural counterparts. Poor mothers were significantly less likely to go for SBA than non-poor mothers in both urban and rural areas and in all regions. Again it confirms that the poorer women are at the verge of disadvantages compared with non-poor women in both urban and rural areas.

Table 9 represents the percentage change in the predicted probability of SBA by place of residence in all the regions of India during 1992-2006. Overall percentage change in the predicted probability was higher in rural areas than urban areas during the study periods. Results indicate that percentage change in the predicted probability was higher among rural poor (poorest and poor) population group compared with urban poor (poorest and poor) population group during 1992-2006 in all the regions. In the central region, percentage change in the predicted probability is more in the rural areas among the poorest group (89.6 % points) compared to its urban counterparts among poorest (-34.2 % points) during 1992-2006. Similar results are found for the east, west and south regions too.

Table 8. Predicted probability for Skilled Birth Attendance by place of residences adjusted for the socio-demographic characteristics* of the women by regions, India, 1992- 2006

Regions	Urban					Rural				
1992-93	**Poorest**	**Poor**	**Middle**	**Rich**	**Richest**	**Poorest**	**Poor**	**Middle**	**Rich**	**Richest**
North	0.081	0.000	0.200	0.304	0.607	0.092	0.183	0.327	**0.551**	0.344
Central	0.273	0.333	0.200	0.283	0.537	0.094	0.123	0.093	0.188	0.361
East	0.142	0.174	0.142	0.367	0.544	0.065	0.079	0.110	0.252	0.286
Northeast	0.810	0.214	0.302	0.601	0.826	0.039	0.088	0.128	0.290	0.490
West	0.250	0.611	0.466	0.742	0.918	0.148	0.299	0.448	0.639	0.824
South	0.534	0.575	0.512	0.858	0.943	0.375	0.445	0.539	0.777	**0.927**
1998-99										
North	0.333	0.389	0.403	0.789	0.700	0.180	0.282	0.394	0.620	0.358
Central	0.179	0.162	0.313	0.414	0.761	0.083	0.142	0.186	0.323	0.567
East	0.288	0.400	0.419	0.740	0.895	0.241	0.349	0.436	0.700	0.842
Northeast	0.000	0.315	0.361	0.678	0.902	0.086	0.120	0.179	0.408	0.678
West	0.375	0.438	0.570	0.729	0.901	0.151	0.286	0.443	0.596	0.822
South	0.596	0.658	0.815	0.853	0.964	0.382	0.481	0.613	0.804	0.923
2005-06										
North	0.169	0.402	0.581	0.875	0.701	0.245	0.422	**0.518**	**0.774**	**0.455**
Central	0.179	0.302	0.369	**0.559**	**0.856**	0.178	**0.253**	**0.324**	**0.476**	**0.733**
East	0.346	0.447	0.590	**0.759**	**0.937**	0.206	0.337	**0.517**	**0.659**	**0.894**
Northeast	0.125	0.355	**0.640**	**0.808**	**0.943**	0.085	**0.166**	**0.358**	**0.616**	**0.861**
West	0.363	0.673	**0.746**	**0.850**	**0.963**	0.336	**0.718**	**0.777**	**0.845**	**0.964**
South	0.573	0.825	**0.876**	**0.945**	**0.975**	0.563	0.627	**0.776**	**0.888**	**0.996**

Note: All bold characters are significant at 1% level of significance. NA: very least value

*: Adjusted for mother's age at delivery, parity, religion, family type, caste, residence, ANC visits, mass media exposure, mother's education, father's education and working status of mother.

V. Conclusion

The study reveals a slow increase in the utilization of SBA in India and its regions, and in rural and urban areas. Use of SBA remained lower in rural areas compared with urban areas across the regions during 1992-2006. Further, the urban-rural differential in the utilization of SBA persisted in India and its regions during the study period, although over the period it has declined. Multivariate results show that the predictors like mother's age at child birth, birth order, wealth index and parents' education are significant for determining SBA. Other than that, mass media exposure, caste and religion are also important variables to influence the SBA irrespective of the place of residence. Rural areas have shown higher economic inequality in utilization of SBA compared with their urban counterparts during 1992-2006 in India and its six regions. Result from the concentration indices indicated that poor are more deprived of SBA during the last fifteen years. It is also observed that women from poorer strata in the rural areas are more likely to receive the SBA compared with poorer woman from urban areas during 1992-2006. Between 1992 and 2006, patterns of inequality in India remained largely unchanged. This is cited as one of the contributors for the slow progress of the maternal and child health related MDGs for India.

Results from the predicted probability also show that the probability of SBA is increasing over the years in both the areas, but the increase is higher among the richer strata compared with the poorer strata. It is also found that the poorer are more likely to receive the SBA in the rural areas compared with the urban poor in India and its regions. These trends raise critical questions about the role and mechanism of the supply side factors that are related to the public health care delivery system in India specifically for its rural and urban poor.

Delivery under the supervision of skilled birth attendant was expectedly higher in urban than in rural parts. Other studies have also reported similar results (Ronsmans et al. 2003) that in the rural areas, a higher number of women give birth at home in the absence of skilled delivery care. It is because the urban mothers have many advantages over their counterparts as they have higher levels of knowledge about maternal health care services, access to health facilities, safe delivery care services and ample media exposure (Ezeonwu, 2011; Mekonnen & Mekonnen, 2002).

Table 9. Per cent change in the predicted probabilities in Skilled Birth Attendance by region, India 1992- 2006

Residence / Wealth Quintile	North Region			Central Region			East Region		
	1992-99	1999-06	1992-2006	1992-99	1999-06	1992-2006	1992-99	1999-06	1992-2006
Urban									
Poorest	NA	-49.2	NA	-34.5	0.5	-34.2	102.7	20.0	143.2
Poor	NA	3.8	NA	-51.5	86.7	-9.5	129.9	11.8	157.1
Middle	101.3	44.2	190.4	56.7	17.7	84.4	195.4	40.8	315.9
Rich	159.3	10.8	187.4	46.5	34.8	97.4	101.5	2.5	106.6
Richest	15.4	0.1	15.5	41.7	12.6	59.5	64.7	4.7	72.4
Total	-24.7	-41.2	-55.7	34.1	10.4	48.1	99.7	2.6	105.0
Rural									
Poorest	95.8	36.2	166.7	-11.5	114.1	89.6	268.0	-14.4	215.0
Poor	53.9	49.8	130.5	15.4	77.9	105.4	344.7	-3.5	329.2
Middle	20.5	31.5	58.4	99.9	73.9	247.6	297.5	18.6	371.4
Rich	12.5	24.9	40.5	72.1	47.4	153.7	177.9	-5.8	161.8
Richest	4.0	27.1	32.1	56.9	29.2	102.7	194.6	6.3	213.0
Total	239.5	9.1	270.4	18.7	46.8	74.3	234.7	-7.8	208.6

Table continued...

Residence / Wealth Quintile	Northeast Region			West Region			South Region		
	1992-99	1999-06	1992-2006	1992-99	1999-06	1992-2006	1992-99	1999-06	1992-2006
Urban									
Poorest	NA	NA	-84.3	50.0	-3.3	45.1	11.8	-3.9	7.4
Poor	46.8	12.9	65.8	-28.4	53.9	10.2	14.5	25.4	43.6
Middle	19.6	77.3	112.0	22.4	30.9	60.2	59.1	7.4	70.9
Rich	12.8	19.1	34.4	-1.7	16.6	14.6	-0.5	10.8	10.2
Richest	9.2	4.5	14.1	-1.9	6.8	4.8	2.2	1.2	3.4
Total	18.3	6.0	25.4	1.8	-1.8	-0.1	5.4	2.5	8.1
Rural									
Poorest	119.5	-0.3	118.9	2.2	122.2	127.1	1.9	47.3	50.1
Poor	35.9	38.1	87.8	-4.1	150.8	140.4	8.0	30.4	40.9
Middle	40.2	99.9	180.3	-1.1	75.3	73.4	13.7	26.5	43.8
Rich	40.5	51.2	112.4	-6.7	41.7	32.3	3.5	10.4	14.3
Richest	38.4	27.0	75.8	-0.2	17.3	17.0	-0.5	8.0	7.5
Total	47.4	22.9	81.1	-12.1	84.8	62.4	-3.9	15.2	10.6

NA: not applicable

This study illustrates that wealth/economic status of the mother is significantly associated with the utilization of safe delivery services. Similar findings are reported in other contexts also (Rahman et al., 2007). Evidence from African countries highlights significant economic inequality in

healthcare service utilization (Nwogu, 2009; Ochako et al., 2011). It may happen because the mothers from lowest wealth quintile are less educated and living in the interior of the country where access to health facilities is low. They also need to spend their time for earning their livelihood rather than to visit institutions for delivery care services. In contrast to this, the people from richer households can spend a considerable proportion of their income for healthcare (Amin, Shah, & Becker, 2010). The study also illustrates the positive effects of educational attainment on use of skilled birth attendant services for delivery care. This finding is consistent with studies from other developing countries (Magadi, Agwanda & Obare, 2007; Ogunlesi, 2010; Ogunlesi & Ogunlesi, 2012) and in India too (Singh, Rai & Singh, 2011; Singh et al., 2012; Rai & Chauhan, 2014). The reason is probably the well-educated mothers and fathers have better knowledge about the need of skilled birth attendant for delivery (Antai, 2011).

The recently started National Health Mission (NHM) strives to provide health care services efficiently in rural and urban areas by encompassing two sub-missions separately for rural and urban areas, National Rural Health Mission (NRHM) and National Urban Health Mission (NUHM). The sub-components of NHM like Janani Suraksha Yojana (JSY) and Janani Shishu Suraksha Karyakram (JSSK) are specifically trying to target the rural and urban poor vigorously to reduce the rich-poor gap in utilisation of SBA services. However, recent evaluation of the conditional cash transfer under JSY found that it is not the poorest and least educated women who always have the highest odds of receiving JSY payments. The evaluation further revealed significant effects of JSY on increasing antenatal care and in-facility births (Lim et al., 2010). These findings emphasize that there is an urgent need for targeting poor mothers in both rural and urban areas for providing the safe delivery services. It is to be noted that India has not achieved the MDG target set for the reduction in child mortality and maternal mortality by 2015. Unless the poor are included, India may fail again to meet the targets set by the international community.

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Appendix 1. Percentage of delivery assisted by Skilled Birth Attendance by wealth index and place of residence in the regions of India, 1992-2006

Residence/ Wealth Quintile	North Region			Central Region			East Region		
	1992-93	1998-99	2005-06	1992-93	1998-99	2005-06	1992-93	1998-99	2005-06
Urban									
Poorest	3.93	4.87	31.96	25.95	16.81	14.73	29.25	28.43	28.41
Poor	4.58	34.82	15.11	22.24	18.12	29.67	36.21	40.53	40.72
Middle	22.49	38.79	40.37	21.90	30.43	36.45	35.29	39.22	57.7
Rich	30.90	38.51	65.53	33.74	39.83	56.91	51.5	70.25	74.38
Richest	63.72	77.60	88.93	65.54	74.28	81.87	82.04	87.73	93.37
Rural									
Poorest	10.13	18.80	21.25	9.76	8.23	16.26	10.07	15.52	19.36
Poor	13.37	18.68	27.49	12.39	15.00	23.00	13.38	22.56	32.41
Middle	19.29	28.41	46.77	12.58	18.66	31.92	19.24	33.91	47.92
Rich	27.15	40.62	51.51	23.62	31.51	46.54	30.45	50.62	63.86
Richest	48.41	62.88	77.04	37.25	54.37	71.72	53.94	70.74	86.43

Table Continued...

Residence/ Wealth Quintile	North-east Region			West Region			South Region		
	1992-93	1998-99	2005-06	1992-93	1998-99	2005-06	1992-93	1998-99	2005-06
Urban									
Poorest	8.30	22.04	11.16	44.25	30.41	28.52	43.41	58.23	61.61
Poor	19.07	28.08	34.02	37.55	41.74	56.38	69.41	66.36	83.59
Middle	32.97	34.04	61.54	50.81	59.42	71.67	67.15	80.29	90.62
Rich	58.81	66.05	77.56	66.71	71.04	83.03	82.62	84.70	93.91
Richest	87.05	89.73	94.02	88.5	89.39	95.56	94.56	96.21	97.83
Rural									
Poorest	6.25	9.53	8.53	16.1	14.69	26.13	30.33	38.45	54.38
Poor	7.72	11.15	20.01	25.36	27.89	48.79	40.98	48.6	64.15
Middle	14.69	17.3	40.0	36.13	42.16	53.34	51.53	61.69	76.71
Rich	30.03	40.9	64.62	48.17	57.88	78.19	69.19	80.02	88.58
Richest	64.12	67.87	90.83	69.37	78.34	93.54	86.42	91.87	98.96