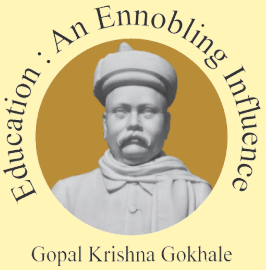

Inequalities and trends in maternal health care services utilization in India, 1992-2016: Strategies in the search for improvements

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Inequalities and trends in maternal health care services utilization in India, 1992-2016: Strategies in the search for improvements

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Abstract: Every year, about eighty per cent of maternal deaths occur due to avoidable reasons, and these unreasonable deaths can be avoided with key health interventions, like the provision of prenatal care and medically assisted delivery. The prime objective of this paper is to systematically assess the trends and economic inequalities in the utilisation of maternal health care services. Also, study tries to understand the role of the socio-economic and demographic factors in the rural-urban gap in maternal health care services utilisation in India. The four rounds of National Family Health Survey (NFHS-1 to NFHS-4) data have been utilised for the present study. Logistic regression has been applied to find out the determinants of maternal health care services utilisation. The non-linear decomposition (Fairlie's) technique has been employed to quantify the relative contribution of different factors to the rural-urban gap in maternal health care services utilisation. Further, concentration index and curve have been applied to measure the degree and magnitude of economic inequality in the utilisation of maternal health care services. The analysis found that the utilisation of maternal health care services (4 or more ANC visits, Medical assistance at delivery) is higher in the urban area compared to the rural area over time. The pattern remained consistent across the selected background characteristics. The most significant part of the rural disadvantage in maternal health care services utilisation is attributable to the underlying disadvantage in household wealth followed by maternal education, media exposure and region of residence. Women work status and religion have contributed to narrowing the rural-urban gap. The results recommend that in addition to strengthening maternal health care utilisation programmes in rural areas, substantial efforts must also be made to improve household wealth and female and male education.

Key Words: Maternal health care utilization, NFHS, India, Logistic regression and Fairile's Decomposition.

Introduction

Motherhood is the most important time for a woman in her life but can be a life-threatening event as well. During pregnancy, biological changes occur in women that can develop serious pregnancy-related problems that call for medical care. Maternal health care utilisation service is one of the critical components of newborn deaths in developing as well as developed countries. Complications during pregnancy are the principal causes of maternal deaths and disability among women of reproductive ages in developing countries (Frank, 2007). Complications during pregnancy and poor reproductive outcomes are highly associated with the non-utilisation of maternal health care services and poor socio-economic conditions of the women. However, Globally, less than sixty per cent of pregnant women receive at least four antenatal care visits. In regions with the highest rates of maternal mortality, such as Western and Central Africa and South Asia, even fewer women received at least four antenatal care visits; 53 per cent and 49 per cent, respectively (UNICEF global database, 2021).

In 2015, about 303,000 pregnant women died from pregnancy and childbirth-related complications, and 2.6 million babies were stillborn (Alkema et al., 2016). Almost all maternal deaths (99%) and child deaths (98%) occurred in low- and middle-income countries. These maternal deaths could have been prevented, if the pregnant women had access to quality antenatal care (ANC) and skilled birth attendants (WHO, 2016). Sixty per cent of the stillbirths (1.46 million) occurred during the antepartum period and were mainly due to untreated maternal infection, hypertension, and poor fetal growth (Hannah et al., 2016). These unreasonable deaths can be avoided with key health interventions, like providing prenatal care and medically assisted delivery (Adam et al., 2005, MCcaw-Binnes et al., 2007). Out of eight United Nations Millennium Development Goals (MDG) the special emphasis was on two (MDG 4 and 5), that is, reducing under-five mortality by two-thirds between 1990 and 2015, and reducing maternal mortality ratio by three quarters between 1990 and 2015. Epitomise the relevance of these indicators in global efforts towards human development and alleviation of poverty (MCcaw-Binnes et al., 2007, Freedman et al., 2007, Pathak et al., 2010). Improvement in maternal health and the development process are influenced by each other, as poor maternal health may affect child health negatively, reduce women's productive capacity, lower participation in economic activities, and sabotage the poverty alleviation programme (Rosenfield et al., 2006; Pathak et al., 2010). India is one of the largest contributors of births per year (27 million) among developing countries globally and accounts for 20% of global maternal deaths (Mavalankar et al., 2008).

India continues to have disappointingly high levels of maternal mortality despite high economic growth and impressive advancement in science and advanced technologies. The maternal mortality ratio in India was sixteen times higher than that of Russia, ten times that of China and four times higher than that of Brazil in 2005 (Nanda et al., 2005). The magnitude of the situation is very shameful and suggests that India's progress towards reducing maternal mortality will be significant to the global achievement of Sustainable Development Goals. But inadequate maternal health care services with poor organization, huge rural-urban divide, significant interstate disparities coupled with stringent social, economic and cultural constraints demand a substantial shift in programme priorities to increase service coverage and accessibility to all sections of the population (HRW, 2009, Pallikadavath et al., 2004, Navaneethamand and Dharmalingam, 2002; Jejeebhoy, 1997).

The risk of maternal mortality is higher among adolescent women than other age groups of women due to their inadequate knowledge about pregnancy care, breastfeeding, and immunisation leads them to complications of pregnancy and ill health of infants. The gaps in the utilisation of maternal health care services between developed and developing countries are large and continue rising, and there is substantiation of the inequity within and between countries (Mariam Claeson et al., 2000; Yaya & Ghose, 2019). Urban, rural differential in maternal health care utilisation is well-documented in many developed and developing countries. Literature from the developed countries shows a dynamic association between rural-urban residence and maternal health care utilisation.

To reach the unreached and improve the population's health outcomes, the Government of India launched the National Rural Health Mission (NRHM) in 2005 and a particular focus was on 18 high focus states to improve the health system performance and health status of people belonging to rural areas. The main aim of the NRHM was to reduce child and maternal mortality by providing universal access to effective primary healthcare services to the rural population (Kumar S. 2005). Furthermore, Janani Suraksha Yojana (JSY), a conditional cash transfer scheme, was launched under the umbrella of the NRHM to promote institutional delivery among women in rural areas. It is expected that the promotion of institutional delivery will reduce maternal and neonatal mortality among pregnant women in rural areas with special attention to women having low socio-economic status (Lim SS. et al., 2010). Prior to these, In India, the Reproductive and Child Health Programme was launched in 1997. One of the aims of the RCH programme was to provide at least three antenatal checkups, including weight and

blood pressure checks, abdominal examinations, immunization against tetanus, iron and folic acid prophylaxis, and anaemia management (NFHS, 2007).

In India, the urban population has exponentially increased over the last two decades and has grown 3.6 times. Although, the rural population has almost doubled between 1961 and 2001. The urban population growth in India represents the 2-3-4-5 syndrome: in the last decade, India grew at an average annual growth rate of two per cent, urban India grew at three per cent, megacities at four per cent, and the slum population rose by five to six per cent (Mahajan and Sharma, 2014; Yadav et al., 2011). A faster-growing urban population increases the inequality in the urban area and divide the population into two strata, i.e. slum and non-slum. The public health delivery system in urban areas, particularly for the deprived, has so far been infrequent, far from enough, and inadequate in its reach. However, urban areas have a better number of doctors per thousand populations than rural areas. And, also the health of the urban poor is significantly worse off than the urban middle and high strata population and even worse than the rural population (Yadav et al., 2011). In the meantime, the health and health services are still poor in the rural areas, and the gap between urban and rural areas in health care services utilisation remains the same.

Large volumes of studies have been done on some aspects of maternal and child health care services in developed and developing countries. A high volume of studies was carried out on factors affecting maternal and child health care utilisation. Some studies have been done to understand the trends, patterns and regional patterns of socio-economic differentials in the utilisation of maternal health care services in India from the equity perspective (Pathak et al., 2010). Some studies have been done on other factors such as education, economic status, healthcare programs, women autonomy and cost of healthcare services utilisation (Govindasamy and Ramesh, 1997; Bloom et al., 2001; Kesterton, 2010). However, none of these studies explains the factors contributing to the gap in the utilisation of maternal and child health care services between urban and rural areas. Therefore, this paper examines the urban-rural differential in maternal health care services utilisation and explains the factors contributing to the gap in the utilization of maternal health care services between the urban and rural areas in India. This study is unique in the sense that this study is based on the nationally representative data set conducted during 1992-93, 1998-99, 2005-06 and 2015-16. Further, we have systematically assessed the economic inequality in the utilization of maternal health care services using these data set. In our knowledge, there is exists no published study that has

explained the contribution of the factors to the urban-rural gap in utilization of maternal and child health care services in India by using this type of decomposition technique and data sets.

Data source and methods

Data

For the present study, data have been taken from all four rounds of the National Family Health Survey (NFHS), conducted during 1992-93, 1998-99, 2005-06 and 2015-16, respectively. NFHS is similar to the Demographic and Health Survey and provides consistent and reliable estimates of fertility, mortality, family planning, utilization of maternal and child health care services, and other related indicators at the national and state levels. All these rounds are nationally representative and covered more than 99 per cent of the country's population. The NFHS-1(1992-93) covered 24 states and union territory. The information was collected from 88562 households and 89777 ever-married women aged 13-49 from urban and rural areas. NFHS-2 (1998-99) collected data from 92486 households and 90303 ever-married women aged 15-49 from 26 states. During NFHS-3 (2005-06) all 29 states were covered. The information was collected from 109401 households and 124385 women aged 15-49 ages (married and unmarried). Similarly, during NFHS-4 (2015-16), all 36 states were covered. The information was collected from 601,509 households and 699,686 women aged 15-49 years (married and unmarried). Detailed descriptions of the survey design of the NFHS and the findings are available in the various reports at the national and state levels (IIPS and ORC Macro 1993, 2000, 2007, IIPS and ICF International, 2017).

Outcome variables

Four or more antenatal care visits:

Antenatal care with four or more antenatal care (ANC) visits have been taken here as a dependent variable. In the surveys, the informations on ANC were conllected for the last live birth. Hence, women who had four or more ANC visits for the last live birth considered as outcome variable of the study.

Medical assistance at delivery:

Medical assistance at delivery is defined as institutional or home delivery assisted by skilled person like doctor, mid wife/nurse /LHV/trained Dai, and other health personnels.

Exposure variables

As the main aim of this paper is to examine the factors contributing to the urban-rural gap in maternal health care utilisation in India, All the possible socio-economic and demographic variables available in the data set have been included in the analysis. Socio-economic and demographic variables such as Women's age at child birth, birth order and interval, wealth quintiles, women's education, partner/husband's education, caste, religion, working status of women, media exposure, freedom to movement, wanted last child and regions of residence are included in the study. We consider women's freedom to movement as a proxy of women autonomy in the analysis.

Methods

Bivariate and multivariate techniques have been carried out for data analysis. Bivariate analysis has been used to understand the socio-economic and demographic differentials in the prevalence of maternal health care utilization. In multivariate analysis, binary logistic regression has been applied to check the association of selected socio-economic and demographic covariates on the prevalence of maternal health care services. Binary logistic regression has been used due to the nature of the outcome variables. The outcome variables have two categories - 'no' and 'yes'; coded as '0' and '1' respectively. The concentration index (CI) and curve have been used to measure the economic inequality in maternal health care utilization in urban and rural India for all the survey rounds. The CI for maternal health care utilization is defined with reference to the concentration curve, which plots the cumulative percentage of women who received maternal health care service (y-axis) against the cumulative percentage of the women ranked by household wealth, beginning with the poorest and ending with the richest quintile (x-axis). CI is defined as twice the area between the concentration curve and the line of equality (Wagstaff and Doorslaer 2004; O'Donnell et al. 2007). The value of CI varies between -1 and +1. Its value is negative when the concentration curve is above the diagonal line (line of equality) and positive when it is below the diagonal line. If there is no inequality (the concentration curve coinciding with the line of equality), the value of CI is zero. A value of 0 implies that the maternal health care service is equally distributed across the socio-economic groups. A negative value implies that maternal health services utilization is concentrated among the poor population, whereas a positive value indicates the opposite condition. The aforesaid methodology is used to estimate the Concentration Index for all four rounds of the NFHS. The non-linear decomposition technique has been used to show the

difference in the probability of an outcome between two groups, and it quantifies the contribution of the factors in group differences (Fairlie, 1999).

Results

The distribution of the sample by socio-economic and demographic characteristics across the place of residence has been given in **appendix tables A & B** which are attached at the end of the paper. For antenatal care, the data were analysed for the last birth.

Maternal health care services utilization across the place of residence, 1992-2016

The trends in the rural–urban gap in maternal care utilization services suggests that the gap is declining over the period of time, however urban area remain in advantagiuos position. There is considerable rural disadvantage in two components of maternal health care utilization services. Overall, the maternal health care services utilization was increased over the period during 1992-2016 in both rural and urban areas (Figure 1, 2). Four and more antenatal care visit was increased from 47 per cent to 66.4 percent in urban areas and 21 per cent to 44.8 per cent in rural area during 1992-2016 (Figure 1). Medical assistance at delivery has been increased from 65.5 per cent to 90 per cent in urban areas and 25.1 per cent to 78 per cent in rural areas during 1992-2016 (Figure 2).

Figure 1: Four or more ANC visits in India by type of residence, 1992- 2016

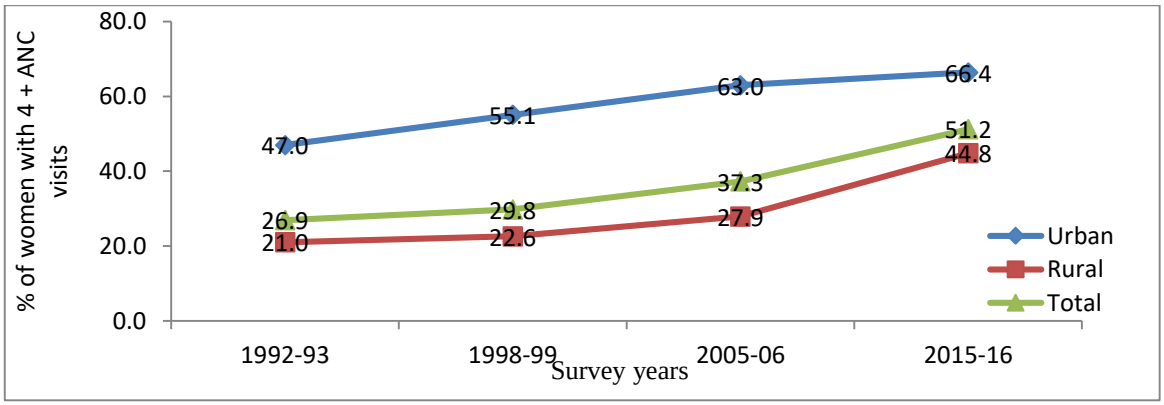


Table 1 depicts the socio-economic and demographic differentials in utilization of antenatal care across place of residence. On average, the percentage of women went for antenatal care is lower in rural than urban areas over the time. From the table it can also be seen that the percentage of women who went for four or more antenatal care visits was lower among women aged less than 20 years and aged more than 30 years, belonged to poorest wealth

quintile, non educated women, women belong to SC/ST, follower of Muslim religion, among non working women, women not exposed to any media, who had last child unwanted and women belonged to central region irrespective of place of residence.

Figure 2: Medical assistance at delivery in India by type of residence, 1992- 2016

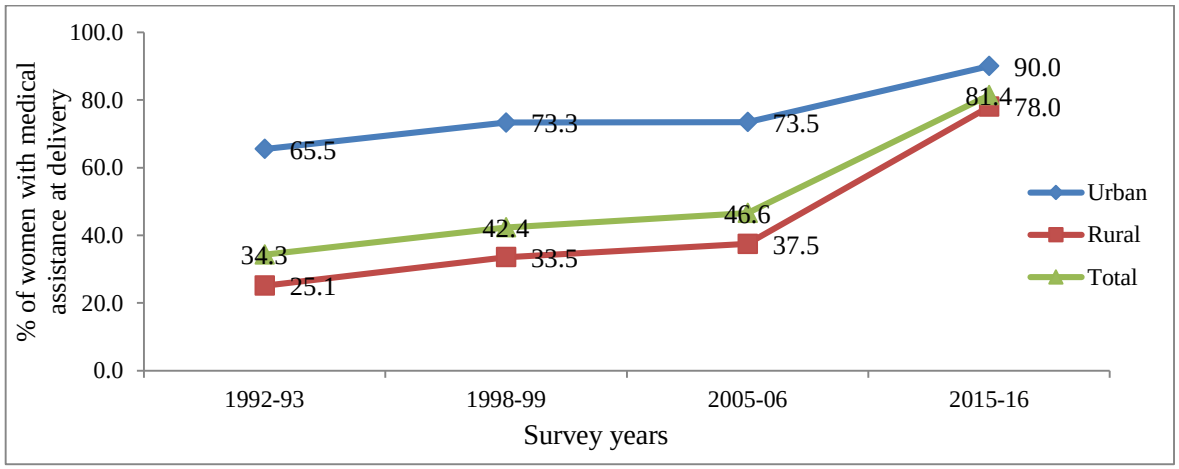


Table 2 depicts the socio-economic differential in medical assistance at delivery across the place of residence over the period of time. Overall, the utilization of medical assistance at delivery was lower in rural areas than urban areas. From the table it can be seen that among women aged more than 30 years, belonged to the poorest wealth quintile, among non-educated women, women belonged to SC/ST, follower of the Muslim religion, among working women, women with no media exposure, women who did not have freedom of movement, had last chid unwanted and women belong to the central region were less likely to utilised medical assistance at delivery over the time.

Table 1: Socio-economic differentials in utilisation of four or more antenatal care visits across the place of residence, 1992-2016.

Covariates	1992-93		1998-99		2005-06		2015-16	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Women's age at child birth								
<20 years	42.5	23.8	47.7	23.1	58.1	29.5	65.2	50.4
20-24 years	50.3	25.0	59.3	26.2	61.7	30.1	65.6	47.4
25-29 years	50.9	20.7	58.7	22.5	65.9	26.6	68.5	43.4
>30 years	42.6	13.5	49.3	13.0	56.7	17.3	66.8	34.8
Birth order & interval								
First order	60.7	29.6	70.5	35.3	74.6	41.0	73.0	55.3
Higher birth order and interval <24months	41.9	20.8	46.3	18.7	46.7	22.7	57.3	36.3
higher birth order and interval ≥24 months	42.5	18.5	49.4	18.1	57.8	21.7	64.1	40.6
Wealth quintiles								
Poorest	17.5	11.1	9.2	7.3	24.1	11.4	35.1	24.7
Poor	18.7	16.4	20.1	14.2	28.5	19.6	51.0	43.8
Middle	26.1	21.1	26.1	23.1	47.0	34.2	59.9	57.0
Rich	35.7	30.8	43.2	38.3	58.2	49.4	67.8	64.6
Richest	61.4	46.8	69.5	57.2	80.4	71.1	76.2	69.0
Women's education								
No education	23.3	13.7	26.5	11.2	28.9	13.2	42.8	25.2
Primary	44.1	32.6	45.4	26.7	52.5	28.9	56.7	41.4
Secondary	61.9	46.8	67.3	46.7	70.3	48.1	69.4	56.8
>Secondary	81.2	66.0	85.8	69.7	87.4	69.4	79.9	64.8
Partner's/husband education								
No education	21.6	15.0	26.4	13.2	29.8	13.6	47.6	30.1
Primary	38.7	22.3	39.5	21.0	47.0	24.3	59.7	43.3
Secondary	55.1	27.7	56.8	26.3	65.6	34.4	71.8	52.9
>Secondary	74.0	40.6	74.6	39.1	85.0	53.0	78.1	63.9
Caste								
SC/ST	31.7	16.3	42.0	16.6	52.0	21.1	64.4	43.6
OBC	NA	NA	59.1	26.0	59.7	25.9	64.7	41.3
Others	50.5	23.6	59.4	25.1	68.5	38.0	71.0	53.9
Religion								
Hindu	38.4	16.5	56.8	22.1	64.0	27.5	67.6	44.8
Muslim	71.4	43.4	47.6	20.3	49.8	21.9	61.3	40.5
Others	57.2	31.3	72.3	39.6	78.2	40.1	77.7	60.2
Women's work status								
Not working	48.7	21.0	56.9	23.9	61.8	28.8	69.8	48.3
Working status	44.0	23.3	49.6	20.3	61.2	23.5	69.5	48.1
Media exposure								
Unexposed	22.5	12.5	23.9	9.9	30.2	14.4	41.9	26.0
Exposed	57.1	37.2	62.0	38.1	69.0	42.6	70.1	58.2
Freedom to movement								
No	NA	NA	52.1	21.0	58.1	25.2	63.2	41.5
Yes	NA	NA	67.5	34.2	64.9	30.0	72.1	52.8
Wanted last child								
Wanted	48.8	21.8	58.5	23.3	64.4	28.8	67.7	45.9
Unwanted	45.8	21.5	46.3	20.1	51.1	21.4	44.8	24.8
Region								
North	43.8	15.4	48.3	18.1	62.3	28.3	61.4	44.9
Central	27.7	7.2	30.1	5.4	31.7	10.6	49.2	27.8
East	36.9	11.6	52.7	14.7	52.8	18.4	59.6	36.6
Northeast	41.3	11.6	54.3	15.9	59.2	23.8	65.1	47.0
West	54.4	33.2	60.6	29.5	73.5	43.6	77.7	68.3
South	72.3	62.6	81.8	64.2	87.1	73.3	79.9	78.1
Total	48.0	21.7	55.8	22.7	61.7	27.2	66.7	44.9

Note: NA- data was not collected on the particular subject.

Table 2: Socio-economic differentials in medical assistance at delivery across the place of residence, 1992-2016.

Covariates	1992-93		1998-99		2005-06		2015-16	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Women's age at child birth								
<20 years	63.8	29.2	69.4	35.8	69.8	43.9	89.6	82.0
20-24 years	69.1	29.1	75.6	37.4	75.9	43.4	90.1	80.7
25-29 years	68.6	23.7	75.9	31.3	78.6	37.3	90.7	76.6
>30 years	58.2	17.1	66.6	22.4	72.6	27.9	88.5	67.5
Birth order & interval								
First order	77.1	38.8	84.7	51.6	85.2	59.0	94.3	87.0
Higher birth order and interval <24months	60.5	22.8	66.8	27.4	64.5	32.4	83.2	71.6
higher birth order and interval ≥24 months	61.7	20.7	67.1	26.5	71.4	31.7	87.9	73.3
Wealth quintiles								
Poorest	32.1	12.9	29.7	14.5	33.3	20.3	66.9	64.0
Poor	39.4	18.5	36.7	23.0	44.0	33.1	79.2	78.1
Middle	44.2	24.5	50.9	34.9	61.2	49.4	85.5	87.3
Rich	56.3	37.9	63.0	53.2	76.4	64.7	92.2	91.4
Richest	79.2	57.8	85.4	72.2	91.5	85.7	95.8	94.6
Womens'seducation								
No education	42.5	16.5	47.0	20.2	46.3	24.9	72.7	64.7
Primary	66.9	37.2	71.6	41.3	69.3	43.2	83.9	75.4
Secondary	81.7	55.8	85.1	60.6	84.4	62.1	93.4	87.6
>Secondary	94.1	77.4	95.0	80.7	96.5	82.1	97.7	94.3
Partner's/husband education								
No education	39.0	16.1	46.6	19.9	46.6	23.7	71.0	64.9
Primary	61.1	27.1	60.3	30.3	64.7	34.4	82.0	73.8
Secondary	74.1	34.2	75.7	39.5	79.8	49.2	92.8	83.4
>Secondary	88.7	52.2	89.0	56.1	94.0	69.6	97.4	91.7
Caste								
SC/ST	49.0	18.5	63.4	26.7	66.5	31.8	87.9	75.1
OBC	NA	NA	74.4	37.1	73.7	41.2	89.5	79.1
Others	69.1	28.4	76.8	36.5	81.5	50.2	91.9	81.6
Religion								
Hindu	53.9	18.5	74.8	33.5	77.5	41.3	91.5	79.9
Muslim	83.8	46.0	65.1	27.1	65.2	29.5	84.2	66.6
Others	77.9	41.6	85.9	53.8	87.4	49.9	95.3	79.3
Women's work status								
Not working	67.4	27.0	74.0	36.4	76.2	42.2	90.9	79.7
Working	60.6	23.3	69.7	27.7	70.5	34.6	86.9	75.1
Media exposure								
Unexposed	43.0	16.7	47.9	19.9	49.6	27.5	73.4	66.7
Exposed	74.9	41.2	78.5	50.0	81.5	54.9	92.3	86.5
Freedom to movement								
No	NA	NA	70.4	32.0	72.4	39.2	88.1	76.3
Yes	NA	NA	82.5	43.8	77.8	40.9	91.2	80.3
Wanted last child								
Wanted	67.2	26.0	74.0	33.9	77.5	41.8	90.5	78.8
Unwanted	64.7	26.0	71.3	32.6	67.4	33.8	81.2	64.9
Received antenatal care								
<4 visits	47.7	16.9	53.1	22.9	51.6	27.3	82.0	71.2
4 or more visits	87.2	58.4	90.2	70.4	91.8	73.4	95.9	90.6
Region								
North	53.2	25.7	67.5	35.5	73.0	43.0	89.2	84.4
Central	51.0	15.2	55.3	17.9	55.9	25.8	81.2	70.7
East	59.6	17.9	67.5	26.7	68.5	33.3	85.5	73.1
Northeast	63.3	16.7	69.1	22.9	70.0	29.7	91.5	68.4
West	76.4	36.2	81.0	43.2	86.6	56.0	94.1	86.6
South	85.1	53.2	90.1	65.8	92.0	75.8	96.7	94.4
Total	66.4	25.9	73.3	33.5	75.3	39.9	90.0	78.0

Note: NA- data was not collected on the particular subject.

Economic inequalities in utilization of maternal health care services, 1992-2016

We have also examined the trends in economic inequalities in the utilisation of maternal health care services through concentration indices (CI) and concentration curves (CC), according to the place of residence during 1992–2016 (Table 3 & Figure 1-3).

Table 3: Trends in economic inequalities in maternal heath care utilisation across the place of residence, India, 1992–2016

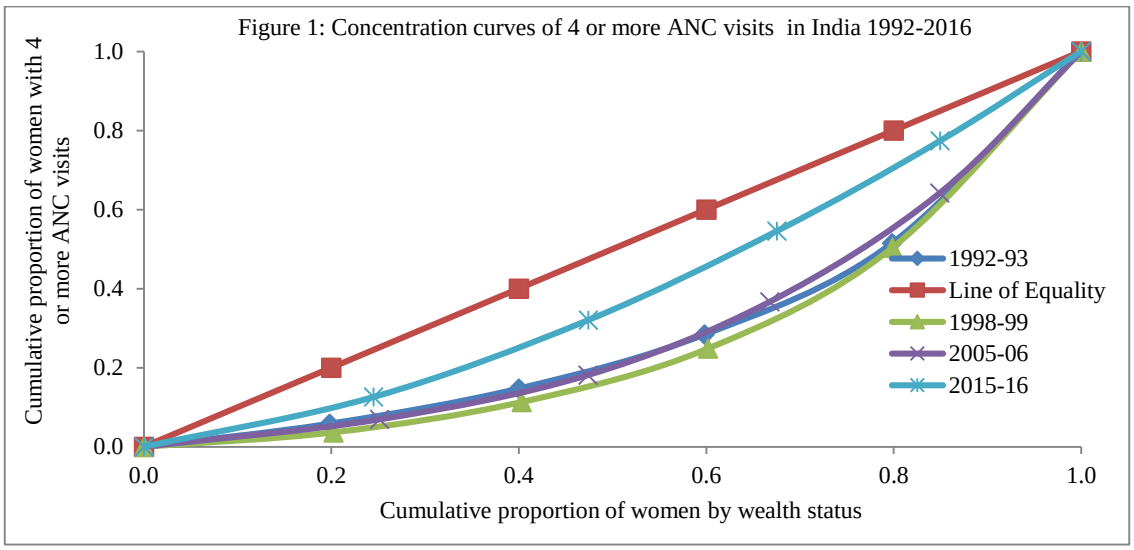
	Urban	Rural	Total
Four or more ANC visits			
1992-93	0.227	0.347	0.396
1998-99	0.209	0.419	0.440
2005-06	0.194	0.374	0.390
2015-16	0.094	0.196	0.196
Medical assistance at delivery			
1992-93	0.122	0.268	0.317
1998-99	0.109	0.291	0.310
2005-06	0.123	0.258	0.273
2015-16	0.046	0.085	0.087

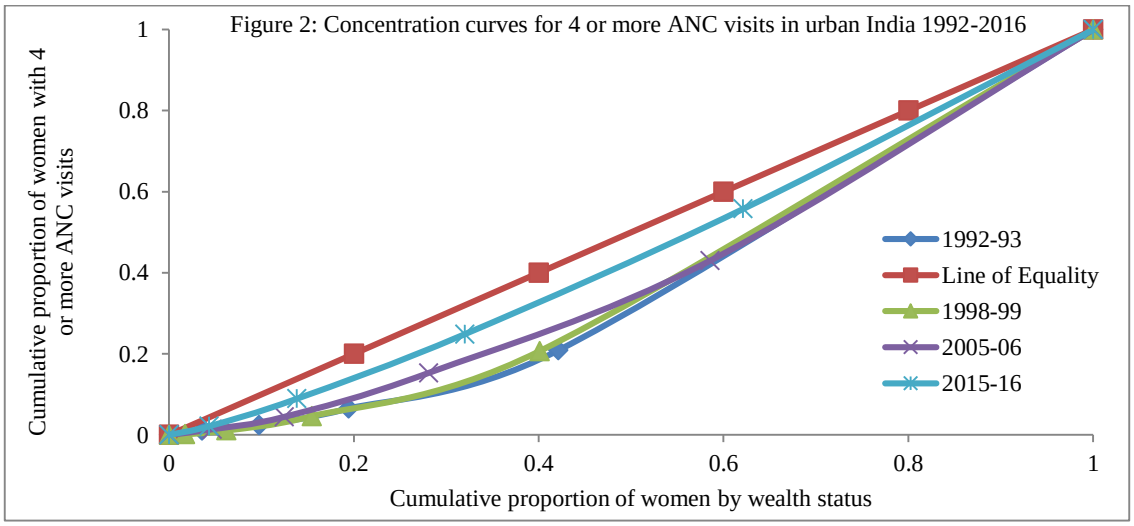
Result revels substantially large, consistent and pro-rich inequalities in both urban and rural areas during 1992-2016 in the use of maternal health care services. Concentration index for 4 or more ANC visits was 0.39, 0.44, 0.39, 0.19 during 1992–1993, 1998–1999 & 2005–2006 and 2015-16 respectively. Further, economic inequalities for seeking four or more antenatal care visits remained precipitously high among rural mothers (CI: 0.347 to 0.196) compared to their urban counterparts (CI: 0.227 to 0.094) in India during 1992–2016 (Table 3). In the rural areas, the inequality in receiving antenatal care are increased during 1992-1999 after that it shows the declining trends, moreover during the period 2005-06 to 2015-16 it has been gradually declined. Over the period, in the urban area similar pattern has also been observed. The magnitude of economic inequality remained significantly higher in rural areas compared with the urban areas during 1992–2016.

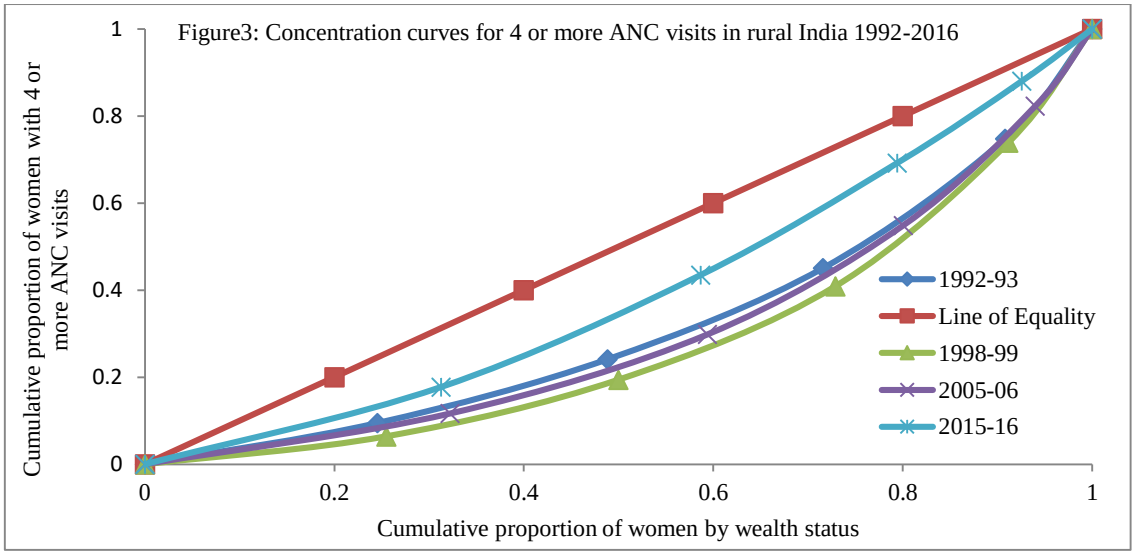
In the case of medical assistance at delivery, the result suggests that the inequalities in utilization of medical assistance at delivery remained large and pro-rich in India (CI: 0.317, 0.310, 0.273, 0.087 during 1992–1993, 1998–1999, 2005-06 & 2015–16 respectively) during the study period. The economic inequalities in seeking medical assistance at delivery are precipitously high and pro-rich among rural mothers (CI: 0.268 to 0.085) compared to their urban counterparts (CI: 0.122 to 0.046) during 1992-93 to 2015-16. The trend of economic

inequality was almost stagnated during 1992-99, but it was gradually declined during 2005-06 to 2015-16. A similar pattern has also been observed in the urban areas during 1992-2016. Furthermore, the economic inequalities in the use of medical assistance at delivery remained substantially larger among rural mothers than among their urban counterparts in India during 1992–2016 (Table 3 & figure 4-6).

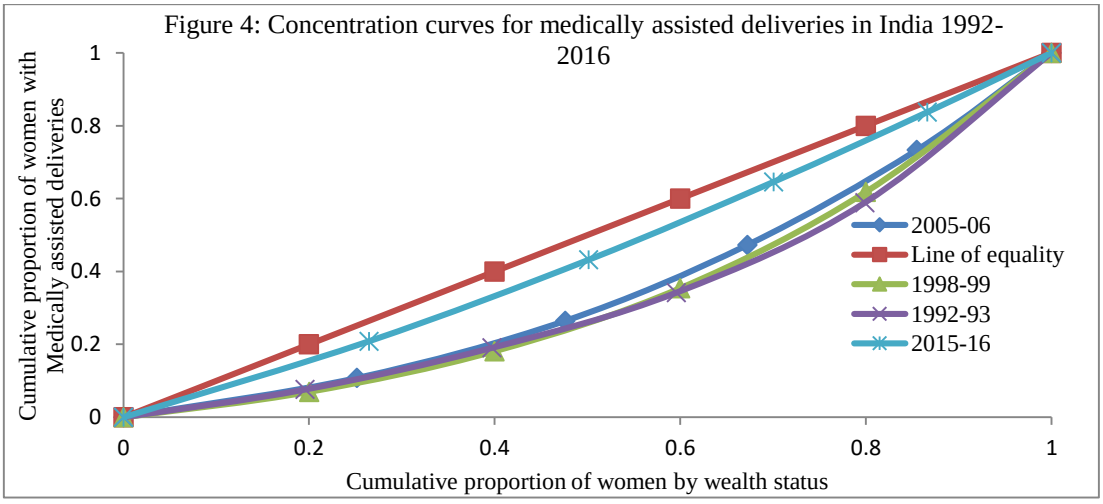
Concentration curves for four or more antenatal care visits in India, 1992-2016

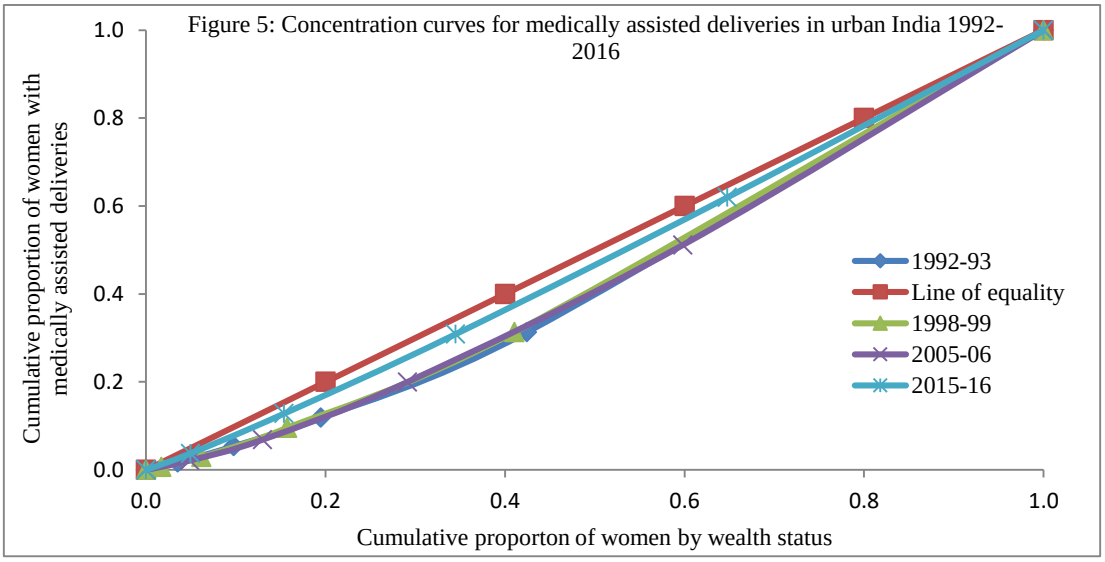


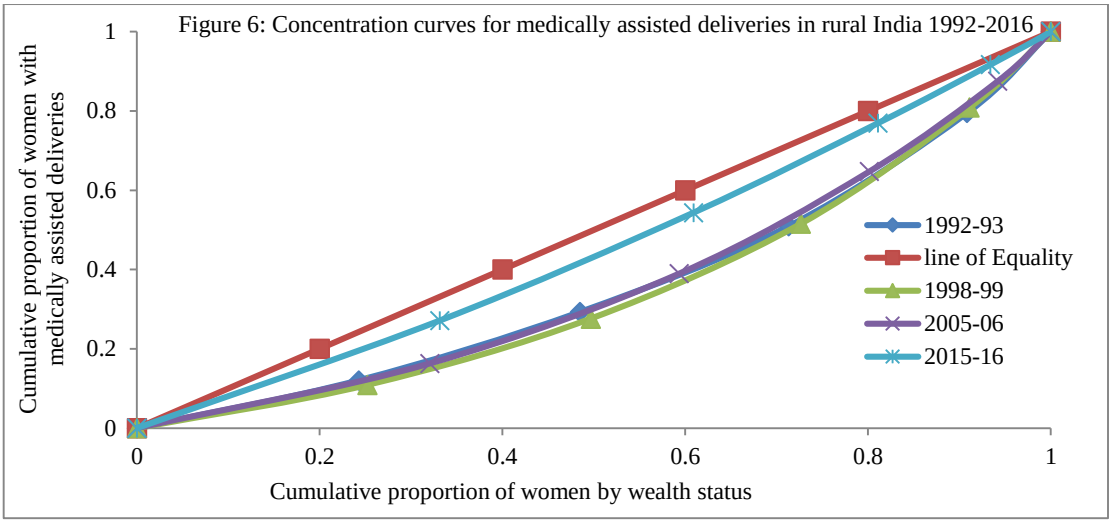




Concentration cures for medical assistance at delivery India, 1992-2016







Determinants of maternal health care services utilization in rural and urban areas

In order to find out the significant determinants of maternal health care services utilisation, a binary logistic regression model was used separately for urban and rural areas for all four rounds of the NFHS (Table 4 & 5). Mother's age at childbirth and wealth quintile has a significantly positive effect on the utilisation of four or more antenatal care visits. Women with more than 20 years of age at childbirth and who belongs to the richest wealth quintiles were significantly more likely to go for four or more antenatal care visit in urban and rural areas and over time. Women with higher birth order and birth interval of more than 24 months were significantly less likely to go for four or more antenatal care visits than first-order birth in rural and urban areas, but the effect was somewhat stronger in urban than rural areas in all four rounds of the NFHS. Both women and their partner's education shows a significant positive effect on the utilisation of four or more ANC visits in rural and urban areas over the period, but maternal education showed a greater impact. Women belonging to the other caste group were more likely to utilise the four or more ANC visits in urban as well as rural areas during four rounds of survey time. Exposure to media and freedom to movement was significantly positive determinants of utilisation of four or more ANC visits, regardless of the place of residence and time. The utilisation of four or more ANC visits was significantly higher in west and south regions than in the northern region in urban and rural areas, regardless of the time period.

Table 5 shows the results of binary logistic regression for medical assistance at delivery for urban and rural areas for 1992-2016. Women with more than 30 years of age at childbirth and who belonged to the richest wealth quintile were significantly more likely to utilise medical assistance at delivery in urban as well as in rural areas and over the period of time. However,

the effect was somewhat stronger in urban than rural counterparts. Women with higher birth order and birth interval more than 24 months were significantly less likely to utilise the medical assistance at delivery than first-order birth in rural and urban areas during all four rounds of the survey. Both women and their partner's education showed a significant positive effect on the utilisation of medical assistance at delivery in rural and urban areas over the period, but maternal education has shown a greater impact. Women belonging to the other caste group were more likely to utilise the medical assistance at delivery in urban and rural areas during four rounds of survey time.

Table 4: Binary Logistic regression model showing the odds ratio for four or more ANC visits for last live birth in urban and rural India, 1992-2016.

Covariates	1992-93		1998-99		2005-06		2015-16	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Women's age at child birth								
<20 years®								
20-24 year	1.411 [b]	1.273 [c]	1.514 [a]	1.237 [a]	1.196 [b]	1.126c	1.053	1.212[b]
25-29 year	1.674[a]	1.305[c]	1.682 [a]	1.517 [a]	1.364 [a]	1.265 [a]	1.145	1.364 [a]
>30 year	1.965 [a]	1.483 [a]	1.644 [a]	1.482 [a]	1.260[b]	1.317 [a]	1.440[c]	1.340 [a]
Birth order & interval								
First order®								
Higher birth order and interval <24months	0.517 [a]	0.737[b]	0.529 [a]	0.457 [a]	0.472 [a]	0.514 [a]	0.653 [a]	0.592 [a]
Higher birth order and interval ≥24 months	0.499[a]	0.666 [a]	0.589 [a]	0.545 [a]	0.675 [a]	0.558 [a]	0.864	0.682 [a]
Wealth quintiles								
Poorest®								
Poor	2.708c	1.153	1.688c	1.408 [a]	1.507 [b]	1.205 [b]	1.424 [c]	1.265 [a]
Middle	1.567	1.1	1.960 [b]	1.643 [a]	2.431 [a]	1.703 [a]	1.616 [b]	1.667 [a]
Rich	2.339 [c]	1.608 [a]	3.507 [a]	2.653 [a]	2.969 [a]	2.437 [a]	2.339 [a]	1.929 [a]
Richest	3.056 [b]	2.255 [a]	6.123 [a]	4.720 [a]	5.655 [a]	4.605 [a]	2.931 [a]	2.591 [a]
Women's education								
No education®								
Primary	1.774 [c]	1.729 [a]	1.636 [a]	1.583 [a]	1.592 [a]	1.529 [a]	1.460 [b]	1.330 [a]
Secondary	2.660 [c]	2.577 [a]	2.434 [a]	2.385 [a]	1.950 [a]	2.057 [a]	1.637 [a]	1.660 [a]
>Secondary	6.361 [c]	4.899 [a]	6.413 [a]	4.539 [a]	3.519 [a]	2.875 [a]	2.011 [a]	1.607 [a]
Partner's/husband's education								
No education®								
Primary	1.396 [b]	1.242 [c]	1.191 [c]	1.152c	1.320 [a]	1.280 [a]	1.282	1.276 [a]
Secondary	1.823 [a]	1.355 [a]	1.328 [c]	1.143 [b]	1.437 [a]	1.323 [a]	1.246	1.227 [a]
>Secondary	1.695 [b]	1.689 [a]	1.436 [a]	1.201 [b]	1.847 [a]	1.533 [a]	1.152	1.146
Caste								
SC/ST®								
OBC	NA	NA	1.221 [b]	1.125 [b]	1.144 [b]	1.151 [b]	0.769[b]	0.732 [a]
Others	0.82	1.067	1.233 [b]	1.075 [c]	1.152 [b]	1.167 [a]	1.210 [c]	0.948
Religion								
Hindu®								
Muslim	1.541 [a]	1.866 [a]	1.069	1.434 [a]	0.820 [a]	1.02	1.095	1.226 [a]
Others	0.923	1.765 [a]	1.531 [a]	1.203 [a]	0.783 [a]	0.740 [a]	0.929	0.694 [a]
Women's work status								
Not working®								
Working	1.048	0.89	0.814 [a]	0.923 [a]	1.158 [b]	0.849 [a]	0.901	1.028
Media exposure								
Unexposed®								
Exposed	1.779 [a]	1.767 [a]	1.397c	1.596 [a]	1.694 [a]	1.64 [a]	1.462 [a]	1.607 [a]
Freedom to movement								
No®								

Yes	NA	NA	1.333 [a]	1.146 [a]	1.181 [a]	1.327 [a]	1.282 [a]	1.293 [a]
Wanted last child								
Wanted®								
Unwanted	0.847 [c]	1.013	0.822 [a]	0.962	0.807 [a]	0.879 [a]	0.606b	0.572 [a]
Region								
North®								
Central	0.426 [a]	0.537 [a]	0.431 [a]	0.335 [a]	0.606 [a]	0.488 [a]	0.803c	0.620 [a]
East	0.333 [a]	0.916	2.010 [a]	1.014	1.046	0.99	0.984	0.815 [a]
Northeast	0.486 [a]	0.563 [a]	1.446 [a]	0.779 [a]	0.975	1.130 [c]	1.21	0.929
West	1.772 [a]	3.877 [a]	2.006 [a]	2.185 [a]	1.855 [a]	2.252 [a]	2.129 [a]	2.312 [a]
South	2.597 [a]	15.081 [a]	6.686 [a]	7.862 [a]	6.653 [a]	7.249 [a]	3.706 [a]	3.452 [a]
Log likelyhood	-1188.19	-1877.5	-3692.7	-7974.8	-4592.1	-6928.3	-2916.7	-8790.63
Pseudo R2	0.2674	0.3515	0.2676	0.2976	0.2558	0.2708	0.1225	0.1456

Note: ®: Reference category; [a]P<0.01; [b]P<0.05; [c]P<0.1. NA- data not available

Table 5: Binary logistic regression model showing odds ratio for medical assistance at delivery in urban and rural India, 1992-2016

Covariates	1992-93		1998-99		2005-06		2015-16	
	Urban	Rura	Urban	Rural	Urban	Rural	Urban	Rural
Women's age at child birth								
<20 years®								
20-24 years	1.084	0.988	1.241[b]	1.182 [a]	1.159	1.152[b]	0.931	1.128
25-29 years	1.117	1.129	1.774 [a]	1.38 [a]	1.438 [a]	1.247 [a]	1.109	1.248[c]
>30 years	1.036	0.932	1.948 [a]	1.379 [a]	1.721 [a]	1.382 [a]	1.094	1.107
Birth order & interval								
First order®								
Higher birth order and interval <24months	0.593[a]	0.592 [a]	0.456 [a]	0.414 [a]	0.470 [a]	0.409 [a]	0.826	0.480 [a]
higher birth order and interval ≥24 months	0.610 [a]	0.684 [a]	0.471 [a]	0.438 [a]	0.549 [a]	0.410 [a]	0.544 [a]	0.551 [a]
Wealth quintiles								
Poorest®								
Poor	1.205	1.380 [c]	1.252	1.241 [a]	1.739 [a]	1.221 [a]	1.587[c]	1.348 [a]
Middle	0.984	1.702 [c]	1.839 [a]	1.608 [a]	2.468 [a]	1.818 [a]	1.773[b]	2.063 [a]
Rich	2.446 [a]	3.119 [a]	2.428 [a]	2.322 [a]	3.820 [a]	2.719 [a]	2.607 [a]	2.869 [a]
Richest	3.900 [a]	4.398 [a]	4.248 [a]	3.642 [a]	6.037 [a]	5.829 [a]	4.034 [a]	3.616 [a]
Women's education								
No education®								
Primary	1.431 [a]	1.399 [a]	1.695 [a]	1.415 [a]	1.718 [a]	1.407 [a]	1.487 [c]	1.226[b]
Secondary	1.744 [a]	1.609 [a]	2.300 [a]	1.742 [a]	2.109 [a]	1.590 [a]	1.944 [a]	1.422 [a]
>Secondary	3.986 [a]	3.719 [a]	4.890 [a]	2.841 [a]	5.384 [a]	2.087 [a]	2.316 [b]	2.139 [a]
Partner/husband's education								
No education®								
Primary	1.204 [c]	1.172 [c]	1.051	1.190 [a]	1.181 [c]	1.204c	1.148	1.205 [b]
Secondary	1.267 [c]	1.313 [a]	1.213b	1.251 [a]	1.166 [c]	1.318c	1.370 [a]	1.273 [a]
>Secondary	1.425 [c]	1.629[b]	1.446 [a]	1.501 [a]	1.365 [b]	1.619 [c]	2.084 [b]	1.465 [b]
Caste								
SC/ST®								
OBC	NA	NA	1.271 [a]	1.132 [a]	1.214 [b]	1.185 [b]	1.107	1.290 [a]
Others	0.741[c]	0.978	1.237 [a]	1.183 [a]	1.232 [a]	1.230 [a]	1.103	1.135
Religion								
Hindu®								
Muslim	1.711 [a]	2.808 [a]	0.801 [a]	0.789 [a]	0.755 [a]	0.705 [a]	0.577 [a]	0.533 [a]
Others	1.699 [a]	2.165 [a]	1.671 [a]	1.328 [a]	0.874	0.873[c]	0.993	0.570 [a]
Women's work status								
Not working®								
Working	1.055	0.825 [b]	0.936	0.879 [a]	1.036	0.913 [b]	0.925	0.898
Media exposure								
Unexposed®								
Exposed	1.278[c]	1.191 [b]	1.035	1.199 [a]	1.211 [a]	1.264 [a]	1.164	1.256 [a]
Freedom to movement								
No®								
Yes	NA	NA	1.211 [a]	1.138 [a]	1.069	1.101 [b]	1.105	1.041
Wanted last child								

Wanted®								
Unwanted	1.069	0.995	1.159 [b]	0.992	0.964	0.848 [a]	0.999	0.973
Received antenatal care								
<4 visits								
4 or more visits	2.915 [a]	3.013 [a]	2.764 [a]	2.603 [a]	3.287 [a]	2.992 [a]	3.115 [a]	2.422 [a]
Region								
North®								
Central	1.581 [a]	1.05	0.913	0.665 [a]	1.087	1.013	0.591 [a]	0.839c
East	1.497 [b]	0.827	1.712 [a]	1.066	2.034 [a]	1.380 [a]	1.132	1.088
Northeast	1.573[b]	0.439 [a]	0.948	0.629 [a]	1.669 [a]	0.819 [a]	0.744	0.505 [a]
West	6.006 [a]	2.362 [a]	2.203 [a]	1.500 [a]	2.826 [a]	2.153 [a]	1.06	0.923
South	8.531 [a]	4.278 [a]	4.764 [a]	2.654 [a]	6.370 [a]	3.587 [a]	2.686 [a]	2.168 [a]
Log likelyhood	-1276.4	-2480.6	3595.5	-12130.8	-4325.9	-9164.9	-1306.3	-6554.9
Pseudo R2	0.3044	0.317	0.2581	0.2159	0.2862	0.2348	0.2168	0.1687

Note: ®: Reference category; [a]P<0.01; [b]P<0.05; [C]P<0.1. NA- data not available

Media exposure and freedom to movement were significant positive determinants of utilisation of medical assistance at delivery, regardless of the place of residence and time. We have taken antenatal care visits as a covariate for medical assistance at delivery and found that the utilisation of medical assistance at delivery was significantly more likely among women who had gone for four or more ANC visits than their counterparts, regardless of the place of residence and time. Moreover, the utilisation of medical assistance at delivery was significantly higher in west and south regions than in the northern region in urban and rural areas, regardless of the time.

Decomposition of rural-urban gap in maternal health care services utilisation

The summary of the decomposition analysis for 4 or more ANC visits and medical assistance at delivery is given in table 6. It is observed that the mean differences in 4 or more ANC visits were from 0.238 to 0.187 during 1992- 2016. Similarly, in the case of medical assistance at delivery, the mean difference was from 0.325 to 0.114 during 1992-2016 and this was significant at the 0.05 levels of significance. Results further indicate that 66- 93 % of such differences are explained by the factors included in the analysis for both the indicators. The unexplained gap might be associated with the other supply-side or structural factors that have not been covered by the data set.

Table 6: Summary table of decomposition analysis for antenatal care, medical assistance at delivery

	4 or more antenatal care visit				Medical assistance at delivery			
	1992-93	1998-99	2005-06	2015-16	1992-93	1998-99	2005-06	2015-16
Mean Urban	0.488	0.583	0.641	0.638	0.619	0.742	0.763	0.904
Mean Rural	0.250	0.226	0.319	0.451	0.294	0.333	0.424	0.790
Mean Differences	0.238	0.357	0.322	0.187	0.325	0.409	0.339	0.114
Total explained	0.179	0.303	0.261	0.175	0.214	0.300	0.275	0.106
% Explained	75.2	84.9	81.1	93.3	66.0	73.4	81.0	92.6

% Un explained	24.8	15.1	18.9	6.7	34.0	26.6	19.0	7.4

Note: Mean differences were significant at p<0.05

Table 7 and figure 7 presents the detailed decomposition of the rural-urban differential in 4 or more ANC visits by the exposure variables. The positive contribution of a covariate indicates that a particular covariate contributed to widening the rural-urban gap in 4 or more ANC visits, the negative contribution of a covariate indicates diminishing the gap. Findings suggest that about 75–93 per cent of the difference in the rural-urban gap in 4 or more ANC visits were explained by the differences in the distribution of exposure variables. The contribution of household wealth status to the rural-urban gap in ANC visits has increased during 1992-93 to 2015-16. For example, household wealth status contributed 32 per cent to the rural-urban gap in receiving the 4 or more ANC visits in 1992-93, whereas it was about 56.9 per cent in 2015-16. After the household's wealth status, women education and media exposure remain the main factors contributing to the urban-rural gap in 4 or more ANC visits. Mother age at childbirth, religion, and freedom of movement variables show negligible contribution in the urban-rural gap over time.

Table 7: Contribution of each factor in urban-rural differentials in utilization four or more ANC visits in India, 1992-2016

Covariates	1992-93		1998-99		2005-06		2015-16	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Women's age at child birth	0.000	0.897	0.002	0.000	0.001	0.029	0.002	0.025
Birth order and birth interval	0.004	0.000	0.006	0.000	0.004	0.000	0.001	0.130
Wealth status	0.058	0.000	0.140	0.000	0.127	0.000	0.100	0.000
Women's education	0.056	0.000	0.089	0.000	0.061	0.000	0.027	0.000
Partner's education	0.015	0.002	0.009	0.005	0.013	0.000	0.003	0.454
Caste	0.007	0.009	0.003	0.000	0.004	0.000	-0.002	0.259
Religion	-0.003	0.012	0.001	0.096	-0.002	0.000	0.000	0.859
Women's work status	-0.001	0.559	0.003	0.081	-0.004	0.021	0.001	0.235
Media exposure	0.029	0.000	0.017	0.000	0.029	0.000	0.025	0.000
Wanted last child	-0.001	0.018	0.000	0.001	0.001	0.000	0.001	0.008
Mobility			0.007	0.000	0.001	0.201	0.003	0.002
Region	0.016	0.000	0.026	0.000	0.026	0.000	0.016	0.000

Table 8: Contribution of each factor in urban-rural differentials in utilisation of medical assistance at delivery in India, 1992-2016

Covariates	1992-93		1998-99		2005-06		2015-16	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Women age at child birth	0.000	0.875	0.002	0.000	0.000	0.848	0.000	0.524
Birth order and birth interval	0.002	0.002	0.006	0.000	0.005	0.000	0.005	0.000
Wealth status	0.096	0.000	0.108	0.000	0.096	0.000	0.040	0.000
Women's education	0.031	0.000	0.067	0.000	0.060	0.000	0.025	0.000
Partner's education	0.007	0.099	0.014	0.000	0.007	0.031	0.011	0.001
Caste	0.002	0.358	0.003	0.005	0.004	0.001	-0.001	0.407
Religion	-0.005	0.000	-0.001	0.190	-0.002	0.000	-0.003	0.001

Women's work status	-0.002	0.553	0.000	0.930	-0.002	0.499	0.001	0.462
Media exposure	0.014	0.011	0.004	0.512	0.010	0.016	0.008	0.193
Wanted last child	0.000	0.735	0.000	0.455	0.000	0.076	0.000	0.916
Four or more ANC visits	0.049	0.000	0.078	0.000	0.078	0.000	0.018	0.000
Freedom to Movement			0.004	0.001	0.000	0.755	0.000	0.448
Region	0.019	0.000	0.015	0.000	0.017	0.000	0.001	0.029

Figure 7: Percentage contribution of each covariate to the rural–urban gap in four or more ANC visit in India, 1992 -2016

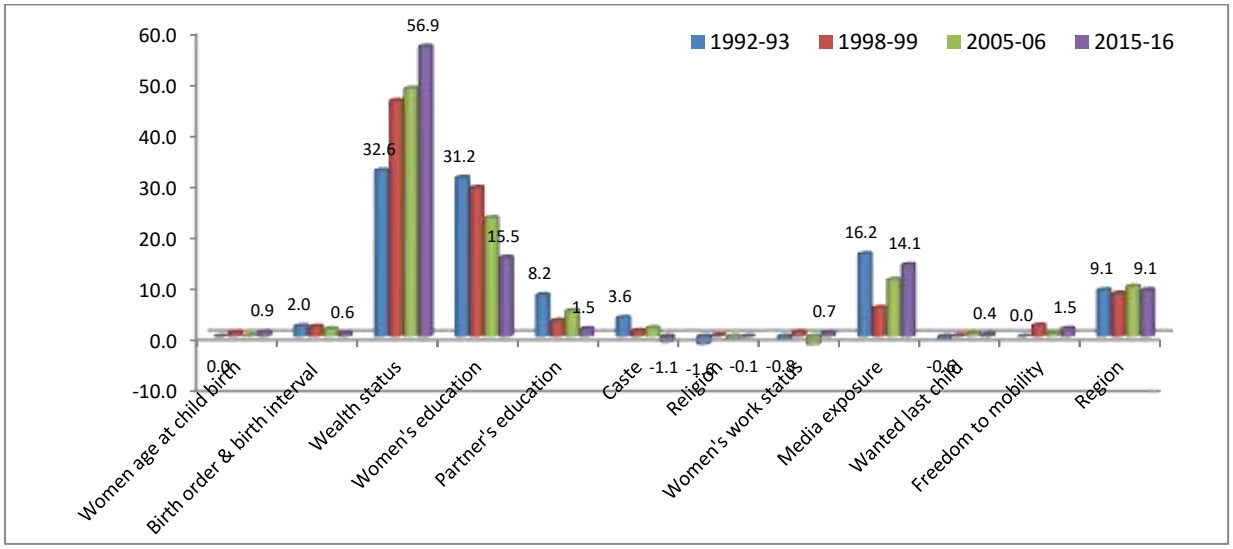
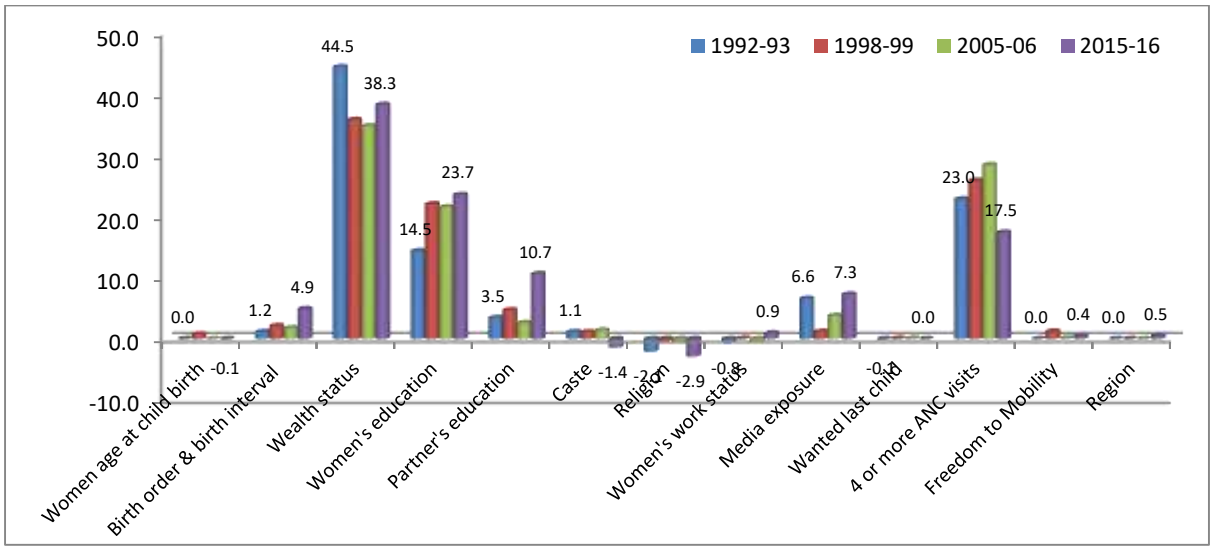


Figure 8: Percentage contribution of each covariate to the rural–urban gap in medical assistance at delivery in India, 1992 -2016



Similarly, table 8 & figure 8 also depicts the detailed decomposition results of the rural-urban differentials in medical assistance at delivery by the exposure variables. The magnitude of the contribution of exposure variables differed over the four NFHS surveys; though the direction of contribution remained the same for most variables. The household wealth, women

education and four and more ANC visits are the main contributing factors to the rural-urban gap in maternal health care services. Interestingly, the contribution of birth order and birth interval, mother education, parental education and media exposure to the rural-urban gap in medically assistance at delivery has been increased in 2015-16 compared with 1992-93. Religion and caste negatively contribute to the rural-urban gap, means these factors are narrowing the rural-urban gap in medical assistance at delivery. Further freedom to movement and region variable play a minor role in the rural-urban gap in both the survey periods.

Summary and discussion

Maternal healthcare is a major challenge to the global public health system, especially in developing countries. It is commonly used as an indicator of socio-economic development and the well-being of society. The present study systematically investigated the factors that underline and explain the rural-urban gap in maternal health care services utilization. Further, this study has also recognized the changing dynamics of the contribution of socio-economic and demographic factors (from NFHS 1992–93 to NFHS 2015–16) and thus has identified important variables that can significantly contribute to further reducing the rural-urban gap in maternal health care services in India.

The main objective of this paper was to disaggregate the effect of the determinants in explaining the gap in antenatal care and medically assistance at delivery care services in India. For that, non-linear decomposition analysis has been used to explain the urban-rural gap in maternal health care services utilization. The main quality of this decomposition is, it allows us to quantify the proportion of the gap attributable to the differences in the distribution of the determinants.

The finding shows a large urban-rural differential in the utilization of maternal health care services in India. The utilization of maternal health care services is higher in the urban area compared to the rural area. The pattern remains consistent across the selected background characteristics over the period of time. The findings of the study are similar to that the previous studies, which revealed the socio-economic and demographic characteristics play an important role in the urban-rural gap in maternal health care utilization (Rahman et al., 2008; Pathak et al., 2010; Addai, 2000). However, accessibility and affordability of the health care services also are the major factors that are creating the urban-rural divide. But, due to the unavailibality of data could not include those factors in this study. The lower use of health care services in

the rural areas may be due to a number of obstacles such as the cost of care, low awareness of health-promoting behaviour and the transportation cost. The lack of motivation among health providers and poor communication between healthcare providers and patients is also among the important hurdles in the utilization of maternal health care services by the rural areas in India.

The result reveals that the urban-rural gap in maternal health care services utilization is attributed mainly due to the differences in the distribution in the determinants. The result of the analysis found that the main factor that determined the maternal health care utilization in the rural area is the wealth status of the household. The unequal distribution of maternal education and wealth status has tended to widen the rural-urban gap in maternal health care utilization. However, the contribution of these factors in the rural-urban gap of maternal health care services utilization has declined from NFHS-1 to NFHS-3. This is in line with previous studies that confirm the unequal distribution of wealth by rural-urban residents (National Sample Survey Office, 2011). According to the 66th round of the national sample survey office, the per capita expenditure in urban areas was almost 88 per cent higher than the rural area on average. Some studies have also found that the rural-urban gap in income or consumption either did not narrow or increase marginally after the mid-eighties (Fan et al., 2005; Cali & Chongsuvivatwong, 2007). In terms of the distribution of health care services and resources, the rural areas are marginalized. Moreover, urban populations usually have better access to schools and enjoy better quality education (Fan et al., 2005). Partner education is another factor that is significantly associated with the rural-urban gap in maternal health care services utilization. In urban areas, the distribution of educated population is higher than in rural areas due to urban areas being rich in terms of education resources or facilities.

Interestingly, religion and mother's work status is reducing the rural-urban gap in maternal health care utilization. The rural-urban gap would have been much larger if working women were not as prevalent in rural areas. Previous studies also suggest that non-working women are more likely to receive maternal health care services than working women (Navaneetham & Dharmalingam, 2000; Chauhan & Jungari, 2020). A similar, pattern is also observed in the case of media exposure and region variable. Typically, the urban population has more exposure to media than rural area women because the urban population is well connected with the new technologies and electricities. And also, media exposure is associated with relatively greater household wealth and education status both of which are favourable for better utilization of health care services. It is also observed that the region of residence is

positively associated with the contribution in the overall gap of the utilization of maternal health care services. In the use of antenatal care, the region's contribution in the rural-urban gap is increasing, whereas, in medically assistance at delivery the percentage contribution is declining. This may be due to southern and western region states being socio-economically well developed, even rural areas too. States from these regions are well connected with health care facilities new technologies than states from other regions. The significant contribution of caste may be attributed to a higher concentration of deprived caste groups (also known as SC/ST) in a poor living environment as compared to the remaining population. In contrast, other caste groups are characterized by a relatively better socio-economic status than the SC/ST and OBC population and are thus more likely to use maternal health care services. The freedom of movement of women has a significant role in the rural-urban gap in maternal health care services utilization in India. This might be because women who belong to the urban area are having more freedom of movement. Previous studies also highlighted that more women autonomy significantly increase the utilization of maternal health care services (Singh et al., 2012; Bloom, 2001).

Conclusion and Policy Implications

The findings of this study have important policy implications. First, the persistence of considerable rural-urban maternal health care utilization differentials in India suggests the failure of social and health policies to ensure sustainable health progress for all population groups. The results recommend that in addition to strengthening MCH programmes in rural areas, significant efforts must also be made to improve household wealth and female and male education. It should be noted, however, that despite an overall health advantage, huge differences exist between urban poor women and better-off women in access to maternal health care services. Therefore, these findings emphasize that there is an urgent need for targeting poor mothers in both rural and urban areas for providing the continuum of care during ANC and childbirth. Unless the rural-urban gap is bridged, it is impossible to achieve SDG-3. Therefore, there is a need to pay more attention to rural areas, particularly those lagging behind in terms of socio-economic development indicators.

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Appendix

Table A: Sample distribution (in %) of 4 or more ANC visits in urban and rural India, 1992-2016

Backgroud characteristics	1992-93		1998-99		2005-06		2015-16	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Age at birth								
<20	16.4 (1402)	22.7 (5302)	16.5 (1239)	23.4 (5024)	14 (1415)	20.5 (3369)	9 (3302)	12.8 (11956)
20-24	40.4 (3455)	36.8 (8619)	40.9 (3070)	38.3 (8215)	42.6 (4315)	40.5 (6645)	42.6 (15684)	45.6 (42546)
25-29	27.5 (2356)	23 (5376)	28.2 (2117)	23.8 (5110)	29.6 (2996)	23.9 (3919)	33.6 (12356)	27.7 (25872)
>30	15.8 (1351)	17.6 (4109)	14.5 (1088)	14.5 (3116)	13.8 (1399)	15.2 (2496)	14.9 (5465)	13.9 (12958)
Birth order & interval								
First order	30.2 (2576)	25 (5840)	33.2 (2489)	25.7 (5514)	35.5 (3579)	27.4 (4492)	41.3 (15134)	34.9 (32486)
Higher birth order and interval <24months	19.9 (1696)	18.8 (4401)	18.8 (1405)	18.5 (3955)	19.1 (1926)	20.4 (3349)	15.9 (5837)	19.5 (18166)
higher birth order and interval ≥24 months	50 (4263)	56.2 (13130)	48 (3598)	55.8 (11956)	45.4 (4583)	52.2 (8559)	42.8 (15680)	45.5 (42329)
Wealth								
Poorest	3.6 (306)	24.5 (5743)	1.7 (129)	25.5 (5468)	4.7 (471)	32.2 (5292)	4.1 (1511)	32.1 (29982)
Poor	6.2 (527)	24.3 (5688)	4.5 (337)	24.5 (5264)	4.7 (791)	27.2 (4465)	8.7 (3212)	26.8 (25046)
Middle	9.7 (832)	22.7 (5321)	9.2 (693)	22.9 (4915)	4.7 (1581)	20.7 (3395)	17.9 (6585)	20.9 (19508)
Rich	22.7 (1943)	19.2 (4501)	24.7 (1853)	18.2 (3914)	4.7 (3083)	13.9 (2284)	31.5 (11609)	13.4 (12525)
Richest	57.9 (4957)	9.2 (2152)	59.9 (4502)	8.9 (1904)	4.7 (4198)	6 (992)	37.7 (13889)	6.7 (6271)
Mother's Education								
No education	38.7 (3307)	72 (16794)	30.4 (2282)	62.1 (13330)	25.7 (2606)	55.7 (9151)	14.2 (5224)	32.4 (30264)
Primary	13.1 (1118)	11.8 (2752)	14.8 (1110)	14.8 (3169)	12.1 (1221)	14.3 (2352)	10.3 (3805)	14.6 (13576)
Secondary	30.3 (2586)	13.7 (3184)	33 (2478)	18.8 (4035)	37.3 (3778)	23.8 (3909)	52.5 (19330)	45.5 (42478)
>Secondary	17.9 (1530)	2.6 (595)	21.8 (1639)	4.3 (921)	24.9 (2519)	6.2 (1015)	23 (8448)	7.5 (7014)
Paternal education								
No education	19.9 (1700)	41 (9539)	14.6 (1093)	33.4 (7147)	15.2 (1528)	32.7 (5301)	9.6 (655)	19.5 (3099)
Primary	23.1 (1968)	24.9 (5785)	14 (1048)	18.5 (3963)	12.3 (1233)	15.9 (2571)	10.1 (690)	15 (2395)
Secondary	38.8 (3309)	29.3 (6821)	38.8 (2908)	34.4 (7359)	51.9 (5214)	44.4 (7201)	55.7 (3791)	54.3 (8650)
>Secondary	18.2 (1552)	4.8 (1122)	32.6 (2443)	13.7 (2941)	20.6 (2065)	7.1 (1148)	24.5 (1670)	11.2 (1775)
Cast								
SC/ST	13.5 (1152)	25.3 (5911)	20.3 (1527)	32 (6874)	22 (2153)	34 (5362)	23.7 (8326)	36.9 (33243)
OBC	NA	NA	30.2 (2268)	32.8 (7033)	38.5 (3768)	42.6 (6726)	45.8 (16130)	45.4 (40901)
Others	86.6 (7412)	74.7 (17494)	49.5 (3718)	35.2 (7559)	39.6 (3874)	23.4 (3693)	30.5 (10745)	17.7 (15921)
Religion								
Hindu	75 (1782)	74 (3862)	71.2 (5346)	81.6 (17523)	72.8 (7371)	80.4 (13202)	71.5 (26302)	81.5 (76031)
Muslim	9.7 (230)	10.1 (525)	22.2 (1664)	13.8 (2961)	21.5 (2172)	15.3 (2511)	23.1 (8485)	13.9 (12971)
Others	15.4 (366)	15.9 (832)	6.7 (502)	4.6 (981)	5.7 (580)	4.4 (715)	5.5 (2020)	4.6 (4329)
Women's work status								
Not working	85.4 (7308)	68.9 (16118)	84.3 (6331)	66.4 (14248)	84.9 (8580)	69.2 (11349)	88.8 (6045)	84.5 (13465)
Working status	14.6 (1250)	31.1 (7278)	15.7 (1182)	33.6 (7213)	15.1 (1523)	30.8 (5042)	11.2 (762)	15.5 (2464)
Media exposure								
Unexposed	26.3 (2251)	62.6 (14656)	16.5 (1236)	54.9 (11774)	18.6 (1882)	54.6 (8967)	11.8 (4351)	41.3 (38568)
Exposed	73.7 (6313)	37.4 (8749)	83.6 (6277)	45.2 (9691)	81.4 (8242)	45.4 (7461)	88.2 (32456)	58.7 (54763)
Freedom to movement								
No	NA	NA	75.9 (5703)	86.9 (18648)	45.7 (4571)	59.4 (9612)	30 (1834)	36.5 (5108)
Yes	NA	NA	24.1 (1810)	13.1 (2812)	54.3 (5426)	40.6 (6571)	70 (4281)	63.5 (8896)
Wanted last child								
Wanted	74.5 (6373)	77.6 (18110)	77.9 (5845)	79.5 (17035)	79.7 (8068)	78 (12808)	95.9 (35305)	95.4 (88950)
Unwanted	25.5 (2184)	22.5 (5243)	22.1 (1657)	20.5 (4389)	20.3 (2053)	22 (3612)	4.1 (1494)	4.6 (4324)
Region								
North	13.4 (1150)	11.4 (2667)	15.5 (1162)	11.8 (2535)	14.4 (1454)	12.3 (2019)	16 (5905)	12.2 (11371)
Central	23.4 (2007)	31.7 (7426)	23.3 (1752)	30.5 (6554)	23.5 (2376)	31 (5097)	21 (7740)	28.6 (26706)
East	15.8 (1349)	24.2 (5655)	12.2 (915)	25.4 (5460)	15.3 (1549)	28.9 (4754)	15 (5524)	29.8 (27780)
Northeast	2.3 (196)	4.8 (1111)	1.7 (128)	4.1 (869)	2.3 (229)	4.5 (743)	1.9 (691)	4.4 (4148)
West	21.1 (1803)	10.7 (2504)	22.9 (1723)	10.5 (2248)	21.3 (2157)	9.8 (1608)	19.6 (7206)	10.1 (9436)
South	24 (2059)	17.3 (4042)	24.4 (1834)	17.7 (3799)	23.3 (2359)	13.4 (2207)	26.5 (9741)	14.9 (13889)
Total	100 (8564)	100 (23405)	100 (7513)	100 (21465)	100 (10124)	100 (16428)	100 (36807)	100 (93331)

Note: The numbers distribution of the sample is given in the parentheses. NA- data was not collected on the particular subject.

Table B: Sample distribution (in %) of medical attendance at delivery in urban and rural India, 1992-2016

Backgound characteristics	1992-93		1998-99		2005-06		2015-16	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Age at birth								
<20	17.5 (1720)	23.9 (6432)	18.3 (1562)	24.9 (6097)	15.3 (1753)	21.8 (4108)	9.9 (4148)	13.7 (15040)
20-24	41.1 (4047)	37.1 (9978)	41.7 (3554)	38.6 (9450)	43 (4923)	41.1 (7746)	43.5 (18266)	46.4 (50775)
25-29	26.7 (2629)	22.2 (5968)	26.4 (2256)	22.9 (5613)	28.7 (3282)	22.9 (4310)	32.6 (13658)	26.8 (29294)
>30	14.7 (1449)	16.7 (4499)	13.6 (1160)	13.6 (3333)	13 (1482)	14.3 (2690)	14 (5887)	13.2 (14401)
Birth order & interval								
First order	31.8 (3121)	26.4 (7075)	35.4 (3013)	27.2 (6646)	37.5 (4272)	29.2 (5490)	43.4 (18116)	37 (40369)
Higher birth order and interval <24months	20.3 (1987)	19.4 (5192)	19.2 (1633)	19.4 (4731)	19.2 (2183)	21.1 (3974)	15.9 (6640)	19.7 (21453)
higher birth order and interval ≥24 months	48 (4705)	54.3 (14569)	45.4 (3864)	53.5 (13069)	43.4 (4942)	49.7 (9355)	40.8 (17036)	43.3 (47266)
Wealth								
Poorest	3.5 (347)	24.3 (6525)	1.7 (145)	25.2 (6177)	4.9 (556)	32 (6036)	4.3 (1800)	32.6 (35743)
Poor	6.2 (612)	24.2 (6498)	4.4 (379)	24.4 (5984)	8.1 (928)	27.3 (5144)	9.1 (3824)	27 (29524)
Middle	9.7 (956)	22.8 (6137)	9.6 (817)	23 (5628)	16.1 (1846)	20.8 (3928)	18.2 (7652)	20.8 (22818)
Rich	23 (2263)	19.5 (5248)	25.3 (2161)	18.5 (4527)	30.7 (3510)	14.1 (2648)	31.7 (13282)	13.2 (14415)
Richest	57.6 (5667)	9.2 (2470)	59 (5031)	8.9 (2178)	40.2 (4600)	5.8 (1096)	36.7 (15401)	6.4 (7009)
Mother's Education								
No education	39.2 (3852)	71.7 (19204)	30.9 (2635)	61.9 (15147)	26.6 (3042)	55.7 (10500)	14.9 (6231)	33.2 (36337)
Primary	13.4 (1312)	11.9 (3185)	15.3 (1306)	15 (3666)	12.2 (1394)	14.5 (2724)	10.6 (4442)	14.7 (16121)
Secondary	30.3 (2976)	13.9 (3724)	33.1 (2822)	18.9 (4637)	37.4 (4277)	23.8 (4487)	52.4 (21996)	45 (49242)
>Secondary	17.1 (1682)	2.5 (671)	20.7 (1765)	4.2 (1033)	23.8 (2727)	6.1 (1141)	22.1 (9291)	7.1 (7810)
Paternal education								
No education	20.1 (1969)	40.7 (10882)	14.6 (1242)	33.3 (8142)	15.6 (1768)	32.4 (6038)	9.9 (764)	19.8 (3692)
Primary	23.6 (2316)	24.8 (6631)	14.5 (1233)	18.3 (4474)	12.7 (1437)	15.8 (2945)	10.6 (813)	15.1 (2817)
Secondary	39 (3818)	29.6 (7903)	39.4 (3353)	34.6 (8440)	52 (5894)	44.7 (8315)	55.5 (4264)	54.4 (10147)
>Secondary	17.3 (1699)	4.9 (1297)	31.5 (2680)	13.8 (3374)	19.8 (2240)	7.1 (1326)	24 (1840)	10.7 (1998)
Cast								
SC/ST	13.5 (1326)	25.2 (6776)	20.7 (1767)	32.1 (7851)	22.2 (2458)	34.1 (6173)	23.8 (9548)	37 (39167)
OBC	NA	NA	30.1 (2567)	32.7 (7999)	38.8 (4296)	42.6 (7723)	46.1 (18514)	45.6 (48233)
Others	86.5 (8519)	74.8 (20102)	49.2 (4199)	35.3 (8643)	39.1 (4326)	23.3 (4228)	30.2 (12116)	17.4 (18452)
Religion								
Hindu	75.5 (2119)	73.9 (4488)	70.6 (6020)	81.7 (20001)	72.4 (8282)	80.3 (15136)	71 (29800)	81.4 (89176)
Muslim	9.3 (261)	9.9 (604)	22.7 (1940)	13.8 (3386)	22 (2521)	15.3 (2876)	23.6 (9902)	14 (15318)
Others	15.2 (425)	16.2 (982)	6.7 (573)	4.5 (1106)	5.6 (637)	4.5 (841)	5.4 (2257)	4.6 (5016)
Women's work status								
Not working	85.8 (8438)	69.6 (18695)	84.6 (7218)	66.9 (16372)	85.4 (9743)	70 (13169)	89.2 (6855)	84.8 (15825)
Working status	14.2 (1400)	30.4 (8171)	15.4 (1315)	33.1 (8117)	14.7 (1673)	30 (5644)	10.8 (827)	15.2 (2840)
Media exposure								
Unexposed	26.6 (2621)	62.5 (16795)	17 (1450)	54.7 (13387)	19.5 (2226)	54.8 (10322)	12.3 (5164)	42.2 (46165)
Exposed	73.4 (7224)	37.5 (10083)	83 (7083)	45.3 (11106)	80.5 (9214)	45.3 (8531)	87.7 (36795)	57.8 (63345)
Freedom to movement								
No	NA	NA	76 (6488)	86.9 (21287)	46 (5199)	59.9 (11125)	31.2 (2153)	36.8 (6048)
Yes	NA	NA	24 (2045)	13.1 (3200)	54 (6104)	40.2 (7462)	68.8 (4752)	63.2 (10380)
Wanted last child								
Wanted	72.5 (7129)	76.1 (20398)	76.1 (6479)	78.2 (19116)	78.2 (8943)	76.6 (14434)	95.6 (40116)	95.1 (104094)
Unwanted	27.5 (2706)	23.9 (6420)	24 (2040)	21.8 (5331)	21.8 (2493)	23.4 (4410)	4.4 (1835)	4.9 (5353)
ANC visits								
<4 visits	52.6 (5176)	78.4 (21064)	44.9 (3806)	77.4 (18846)	38.3 (3833)	72.8 (11849)	33.2 (12374.39)	55.1 (52069.68)
4 or more visits	47.4 (4669)	21.6 (5813)	55.1 (4669)	22.6 (5492)	61.7 (6183)	27.2 (4425)	66.8 (24929.48)	44.9 (42466.18)
Region								
North	13.5 (1330)	11.6 (3123)	15.3 (1309)	12.1 (2963)	14.4 (1645)	12.5 (2358)	16.1 (6742)	12.2 (13330)
Central	23.5 (2315)	31.9 (8574)	23.4 (2000)	30.9 (7561)	24.2 (2768)	31.4 (5928)	21.5 (9009)	29.2 (32011)
East	15.6 (1539)	23.6 (6349)	11.8 (1005)	24.7 (6050)	15.3 (1751)	28.5 (5367)	14.7 (6172)	29.6 (32391)
Northeast	2.3 (227)	4.9 (1304)	1.7 (142)	4 (973)	2.2 (251)	4.4 (831)	1.8 (748)	4.2 (4638)
West	21.3 (2093)	11 (2946)	23.5 (2004)	10.8 (2654)	20.9 (2394)	9.9 (1862)	19.5 (8193)	10 (10958)
South	23.8 (2342)	17.1 (4582)	24.3 (2073)	17.5 (4292)	23 (2630)	13.3 (2507)	26.4 (11096)	14.8 (16181)
Total	100 (9845)	100 (26878)	100 (8533)	100 (24493)	100 (11440)	100 (18853)	100 (41959)	100 (109510)

Note: The numbers distribution of the sample is given in the parentheses. NA- data was not collected on the particular subject.

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