



Determinants of Inter and Intra caste Differences in Utilization of Maternal Health Care Services in India: Evidence from DLHS-3 Survey

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Abstract

This paper examines utilization of maternal health care services within and across social groups among married women in India using data from third round of District Level Household and Facility Survey conducted during 2007-08. Maternal health care utilization is measured through full antenatal care, safe delivery and postnatal care. Besides, selected socioeconomic and demographic factors have been included as predictor variables. Bi-variate, logistic regression and concentration curve have been employed to understand the inter-caste differences, net effect of the predictor variables on selected outcomes and intra-caste differentials respectively. Our findings show significant difference in the utilization of maternal health care services by caste, women's age at first birth, educational attainment, place of residence, economic status and region. Besides, high inequality is found among poor and non-poor in 'Other' Caste followed by Other Backward Classes. This paper concludes that Scheduled Tribe and Scheduled Caste married women bear the multiple burdens of social exclusion, poverty and womanhood in patriarchal Indian society. As a result, their conditions are worse on utilizing maternal health care services which could lead to higher maternal and child mortality rate.

Keywords: Maternal health care services, Inter and Intra caste differences, DLHS-3 Survey, Wealth Index.

Introduction

In India, during first and second five years plans (1951-56 and 1956-61), maternal and child health programme became an integral part of the family welfare programme¹. The country has incorporated safe motherhood and child health services into the reproductive and child health programme in 1996. India has adopted National Population Policy in 2000 showing Government's commitment to safe motherhood programme within the wider context of the reproductive health (Ministry of health and family welfare, 2000). India is also committed to reduce maternal mortality to 108 deaths per lakh live births by 2015 under Millennium development goal 5. The latest estimates demonstrate that during 2007 to 2009, maternal mortality ratio was 212 deaths per lakh live births showing a decline of 89 deaths per lakh live births since 2001-03². These estimates are country specific and there are wider differences when compared across states and socio-economic groups.

In Indian scenario, caste of household is very relevant characteristic showing its vulnerability and improvised level. Social stratification is one of the most important social characteristics determining health access³. Indian constitution gives equal rights to all of its citizens despite caste, class, religion, gender but caste structure is rampant throughout the country socially if not officially⁴. Indian society is ridden with high social stratification based on caste which has been categorised into four 'Varnas' (groups) historically. The caste hierarchy ranges from highest *Brahmans*, *Kshatriyas*, *Vaishyas* to lowest *Shudras*.

Scheduled Caste (SC), lowest in caste hierarchy, constitute 16% of India's population. They are not only given lowest position historically but also they are socially excluded and deprived of certain basic human rights in democratic India^{5,6}. Scheduled Tribes (ST, 8%), geographically isolated groups, are also at the bottom of social and economic ladder. Other backward class (OBC, socially and educationally backward according to Indian Constitution) and 'Other' Caste comprise 76 percent of India's Population⁷.

Women from socially and economically deprived groups face multiple levels of disparities; firstly, they belong to particular caste, class or group thus socially excluded. Secondly, they bear the burden of being a woman in male dominated society and thirdly social discrimination forces them to spend their whole life in poverty. Hence, SC and ST women are more prone to be socially and economically deprived compared with the women of 'other' caste and with the men of their caste⁸. Lower caste women lack basic education, dominant in rural areas and have relatively lower access to public health facilities⁸⁻¹². They also have little control on the resources and on important decisions related to their lives. Higher maternal mortality rate is closely linked with the poor status of women placing SC/ST women at the bottom of health development. Social settings prevent women in accessibility and utilization of maternal and reproductive care services⁴. Caste based disparities in maternal care utilization is less researched topic in India. This paper aims to explore whether caste/social class has any role in utilizing maternal health services controlling other socio-economic variables.

Materials and Methods

Data: The present study utilizes data from the third round of Districts Level Household and Facility Survey (DLHS-3) covering 601 districts from 34 states and union territories in India. DLHS-3 provides information related to the programmes under the National Rural Health Mission (NRHM). The data was collected from 720320 household from 34 states and union territories of India (excluding Nagaland). From these household 643944 all ever married women aged 15-49 years and 166260 unmarried women aged 15-24 years were interviewed. This survey also captures 548780 of currently married women with age group 15-44. Besides, it also records data on women in various social groups which includes 112001 Schedule Tribes (ST), 113157 Schedule Caste (SC), 250886 Others Backward Classes (OBC) and 155867 'Others'. The third wave of DLHS conducted in 2007-08 was the outcome of collaborative efforts of Union Ministry of Health and Family Welfare Government of India, United Nations Population Fund (UNFPA) and United Nations Children's Fund (UNICEF). The International Institute for Population Sciences (IIPS), Mumbai, India was designated as the nodal agency for conducting, monitoring, and disseminating the results of third round of District Level Household Survey.

Sampling Design: A multi-staged stratified systematic sampling design was used to create a sample, representing individual from all 34 states in India (excluding Nagaland). In each districts, 50 Primary Sampling Unit (PSUs) which are census village from rural areas and wards from urban areas were selected in the first stage by systematic Probability Proportional to Size (PPS) sampling. All villages and urban wards in the districts were stratified by household in to three strata, less than 50, 50-300 and 300+ household; The PSUs are allocated to rural and urban areas of each district proportionally to the actual rural-urban population ratios and within the rural-urban domains, the PSU are further distributed proportionally to the different sub strata in the combination of household size, percentage of the SC/ ST population and level of female literacy. In rural areas in the second stage of sampling households were drawn from selected villages (PSUs) after house listing. On the other hand in urban areas the second stage of the sampling is the selection of Census Enumeration Blocks (CEBs) followed by selection of the households in the third stage of sampling. For the selection of CEBs following the selection of wards in urban areas, the number of CEBs in each sampled ward and number of households were collected. The CEBs within the wards were numbered following a systematic pattern and a CEB was then selected by probability proportional to size. The selection of rural health facilities was linked with the sampled rural PSUs. Sampled rural PSUs were included in the Facility Survey of DLHS-3. All Community Health Centres and District Hospitals were included in the survey.

Outcome measurements: The study measures three outcome variables namely full antenatal care, safe delivery and post natal care (PNC) as indicators in utilization of maternal health care among different social groups. These three selected indicators for

utilization of maternal health care are recommended by Ministry of Health and Family Welfare, Government of India and the World Health Organization. Full antenatal care includes those mothers who had at least three antenatal care visits, at least two tetanus toxoid injections during pregnancy or received one tetanus toxoid during the pregnancy and at least one in three years prior to the pregnancy and received folic acid tablet for 90 days or more. Delivery conducted either in medical institution or home delivery assisted by doctor/nurse/Lady Health Visitor (LHV)/Auxiliary Nurse Midwife (ANM)/other health professionals are termed as safe delivery. The study considers post natal care check-up within 42 days after child birth.

Predictor variables: Socio-economic and demographic characteristics such as caste, age of the married women, age of the husband, education status of the husband and wife, age of the woman at first birth, place of residence, region and living standard are taken as predictor variables. The identification of the social groups is based on the women self reporting as 'Other' caste, SC, ST and OBC. The Central Government of India classifies certain castes/tribes based on their historical disadvantage in social and economic positions. The list is dynamic (castes and communities can be added or removed) and has changed over time depending on social and economic factors. Articles 340, 341 and 342 and subsequent amendments of the Indian Constitution identified lower-caste groups and classified them as the "Other Backward Classes", "Scheduled Castes" and "Scheduled Tribes" respectively.

Analytical Approach: To identify the inequality in Utilization of maternal health care services in social groups, bi-variate, multivariate and concentration index were performed. Bi-variate analyses are used to examine the nature of association between utilization of maternal healthcare services among social groups by selected socioeconomic and background characteristics. However, binary logistic regression was applied to explore the factors which best explain and predict the utilization of all three maternal health outcomes. Concentration curve explores the utilization of maternal health care services within social groups in India. For this analysis Statistical Package of Social Science (SPSS) version 20 have been used. Composite index covering three maternal indicators has been constructed using the following formula

$$\frac{\text{Observed value} - \text{Minimum value}}{\text{Maximum value} - \text{Minimum value}}$$

The concentration index (C) is computed using the following formula:

$$C = (p_1L_2 - p_2L_1) + (P_2L_3 - p_3L_2) + \dots + (p_{T-1}L_T - p_TL_{T-1})$$

Where, P is the cumulative percentage of the sample, ranked by economic status. L is the corresponding concentration curve ordinates. T is the number of socio-economic groups (wealth quintile).

Results and Discussion

Background Characteristics: This section shows percentage distribution of currently married women belonging to various social groups by their background characteristics (Table 1). 90 percent ST women live in rural area compared to 81 percent SC, 77 percent OBC and 69 percent women of 'other' caste group. Similarly, 57 percentage SC women are illiterate against the 29

percent 'other' caste women. 55 percent women belonging to SC have age at first birth less than 19 years in comparison of 39 percent women of 'other' caste. Regarding the wealth level, 34 percent ST women belong to poorest wealth quintile in contrast with 20 percent SC, 15 percent OBC and 6 percent 'other' caste group women. This analysis clearly explains the poor conditions of ST and SC women in comparison with 'other' caste groups.

Table-1

Percentage distribution of currently married women among social groups by backgrounds characteristics, India, DLHS-3, 2007-08

Background characteristics	ST	SC	OBC	'Other'	Total no
Residence					
Rural	90.3	81.3	77.2	69.2	494676
Urban	9.7	18.7	22.8	30.8	137235
Age of Women					
15-19	5.4	7.5	7.0	4.0	38337
20-24	16.8	18.5	17.8	14.9	107780
25-29	20.5	19.4	19.4	19.3	123594
30-34	23.7	22.0	22.2	23.6	144038
35-39	11.0	11.2	11.5	12.6	73432
40-44	12.2	12.4	12.7	14.5	82120
45-49	10.4	9.0	9.4	11.0	62610
Husband's schooling					
Illiterate	35.6	32.7	24.8	14.4	161204
Secondary school	44.0	43.5	43.8	35.8	263780
Higher Secondary	20.0	23.2	30.9	49.2	202612
Graduation	0.0	0.04	0.1	0.0	604
Above Graduation	0.4	0.5	0.5	0.4	2874
Women's Schooling					
Illiterate	55.0	56.6	49.2	29.5	294516
Secondary school	35.2	32.9	35.0	39.2	225228
Higher Secondary	9.7	10.4	15.8	31.3	110806
Graduation	0.0	0.0	0.0	0.1	180
Above Graduation	0.0	0.0	0.0	0.0	61
Women's age at first Birth					
10-19	49.3	54.9	49.7	39.2	269914
20-29	49.1	44.3	49.2	59.1	285688
30-39	1.5	0.8	1.1	1.7	7096
40+	0.0	0.0	0.0	0.0	137
Wealth Quintile					
Poorest	33.6	20.4	14.8	6.2	107519
Poorer	23.3	22.7	19.9	10.9	118799
Middle	19.4	23.6	21.8	17.0	129596
Richer	14.9	20.0	23.2	25.2	136649
Richest	8.8	13.2	20.4	40.6	139220
Region					
North	9.7	24.4	15.2	34.4	130306
North-East	37.3	5.3	4.4	8.0	71252
East	17.2	22.5	19.7	16.9	120353
West	13.5	8.0	8.2	13.6	65935
Central	17.3	23.4	30.6	18.9	152019
South	5.0	16.4	21.9	8.2	92046

Source: Authors' calculation from DLHS III

Inter and Intra caste differential in utilization of maternal healthcare services: This section examines differentials in utilization of maternal health care services within and across social groups by their background characteristics. Table 2 shows that in rural areas utilization of full antenatal care among ST women is 18 percent compared to 26 percent among 'other'

caste women. Similarly, in urban areas 8.3 percent ST women utilize ANC than 45 percent among OBC women. In context of utilization of safe delivery in rural areas, 16 percent women belonging to ST category utilize safe delivery services than 40.5 percent among OBC women.

Table-2
Percentage of women who utilized maternal health care services among social groups by backgrounds characteristics, India, DLHS-3, 2007-08

Background characteristics	Full ANC				Safe delivery				PNC			
	ST	SC	OBC	'Others'	ST	SC	OBC	'Others'	ST	SC	OBC	'Others'
Residence												
Rural	18.0	16.6	39.4	26.1	16.0	18.6	40.5	24.8	16.0	19.3	41.7	23.0
Urban	8.3	13.0	44.6	34.1	7.6	14.6	42.9	34.9	7.0	14.4	44.5	34.0
Age of Women												
15-19	16.4	20.6	42.3	20.7	13.3	23.1	43.8	19.8	13.2	23.5	46.4	16.8
20-24	12.4	17.2	44.9	25.5	11.6	18.5	44.2	25.7	11.5	19.0	45.8	23.8
25-29	12.6	14.0	41.8	31.5	12.0	15.7	40.9	31.4	11.8	16.2	42.0	30.0
30-34	15.2	12.3	37.0	35.5	13.8	14.7	37.5	34.0	13.3	15.0	39.0	32.7
35-39	22.4	11.4	33.7	32.5	17.9	15.3	36.9	29.9	17.8	15.6	38.3	28.3
40-44	29.7	10.0	30.4	29.9	23.5	14.5	36.8	25.3	23.0	14.5	38.6	23.8
45-49	39.2	9.8	32.2	18.9	28.9	13.2	37.7	20.3	29.0	15.9	37.8	17.3
Husband's schooling												
Illiterate	22.8	22.6	39.1	15.5	16.9	24.3	42.5	16.3	16.6	24.5	43.6	15.3
Secondary school	17.8	17.2	44.6	20.4	15.1	19.4	44.0	21.4	14.8	19.6	46.0	19.6
Higher Secondary	9.3	12.2	40.3	38.3	9.3	12.8	39.1	38.7	9.0	13.0	39.9	38.1
Graduation	3.9	9.1	24.0	63.0	2.8	8.1	27.2	61.8	2.4	6.9	26.9	63.7
Above Graduation	21.5	11.0	38.4	29.1	14.9	20.6	41.0	23.5	12.1	23.0	45.5	19.4
Women's Schooling												
Illiterate	21.5	21.9	39.1	17.5	15.2	23.2	44.9	16.7	14.9	23.0	46.4	15.7
Secondary school	17.6	16.9	42.7	22.8	15.0	18.1	41.7	25.1	14.8	18.6	43.4	23.1
Higher Secondary	7.7	11.1	41.7	39.6	8.0	11.2	38.8	42.1	7.7	11.2	39.4	41.7
Graduation	5.0	8.3	25.0	61.7	4.3	7.4	22.3	66.0	3.7	8.6	27.2	60.5
Above Graduation	0.0	0.0	28.6	71.4	0.0	0.0	37.5	62.5	0.0	0.0	40.0	60.0
Women's age at first Birth												
10-19	17.4	18.7	42.3	21.6	14.0	20.5	43.5	22.1	13.9	20.9	45.9	19.3
20-29	12.1	13.6	41.6	32.7	11.8	15.2	40.6	32.4	11.5	15.6	41.4	31.5
30-39	13.5	9.4	36.8	40.4	14.7	11.1	35.4	38.8	14.6	10.6	36.0	38.8
40+	15.4	23.1	35.9	25.6	24.3	16.2	33.8	25.7	20.3	11.6	40.6	27.5
Wealth Quintile												
Poorest	37.8	23.1	28.7	10.3	26.8	25.7	37.5	10.0	27.3	25.1	38.7	9.0
Poorer	23.7	23.7	38.0	14.7	18.6	23.9	43.1	14.4	18.7	23.8	44.6	12.9
Middle	17.2	21.9	42.1	18.9	14.7	22.0	43.6	19.6	14.4	22.6	45.5	17.4
Richer	12.7	14.9	46.7	25.7	11.6	16.4	44.6	27.4	10.8	17.2	46.6	25.3
Richest	7.5	9.4	41.0	42.2	6.9	10.4	38.5	44.3	6.5	10.5	39.3	43.6
Region												
North	4.4	16.7	23.5	55.5	6.0	19.5	29.4	45.0	5.4	20.3	28.4	45.9
North-East	60.9	7.5	14.9	16.7	54.3	9.2	17.2	19.4	54.4	8.8	17.1	19.8
East	12.7	17.2	33.9	36.1	8.0	20.1	42.0	29.9	9.5	21.0	40.8	28.7
West	21.8	12.5	30.7	35.0	17.2	14.4	32.6	35.9	24.9	12.1	35.9	27.1
Central	11.7	11.5	44.3	32.5	8.4	15.6	49.2	26.8	8.8	15.8	50.3	25.1
South	4.2	17.4	65.1	13.3	3.8	18.9	64.4	12.9	4.2	18.7	64.1	13.0

Source: Authors' calculation from DLHS III

This analysis also explains that as age of the women increases utilization of all maternal care services rises, however, with differentials among social groups. Generally, higher percent of 'other' and OBC caste women in all ages tend to utilize all maternal health care services in comparison with their counterpart groups. Education level has also a direct bearing on utilization of maternal care services. With rise in education level, utilization of maternal services increases with a greater pace among the OBC and 'other' caste women. In richest quintile, 7.5 percent women belonging to ST category utilize ANC than 42.2 percent women of 'other' caste group in same wealth quintile.

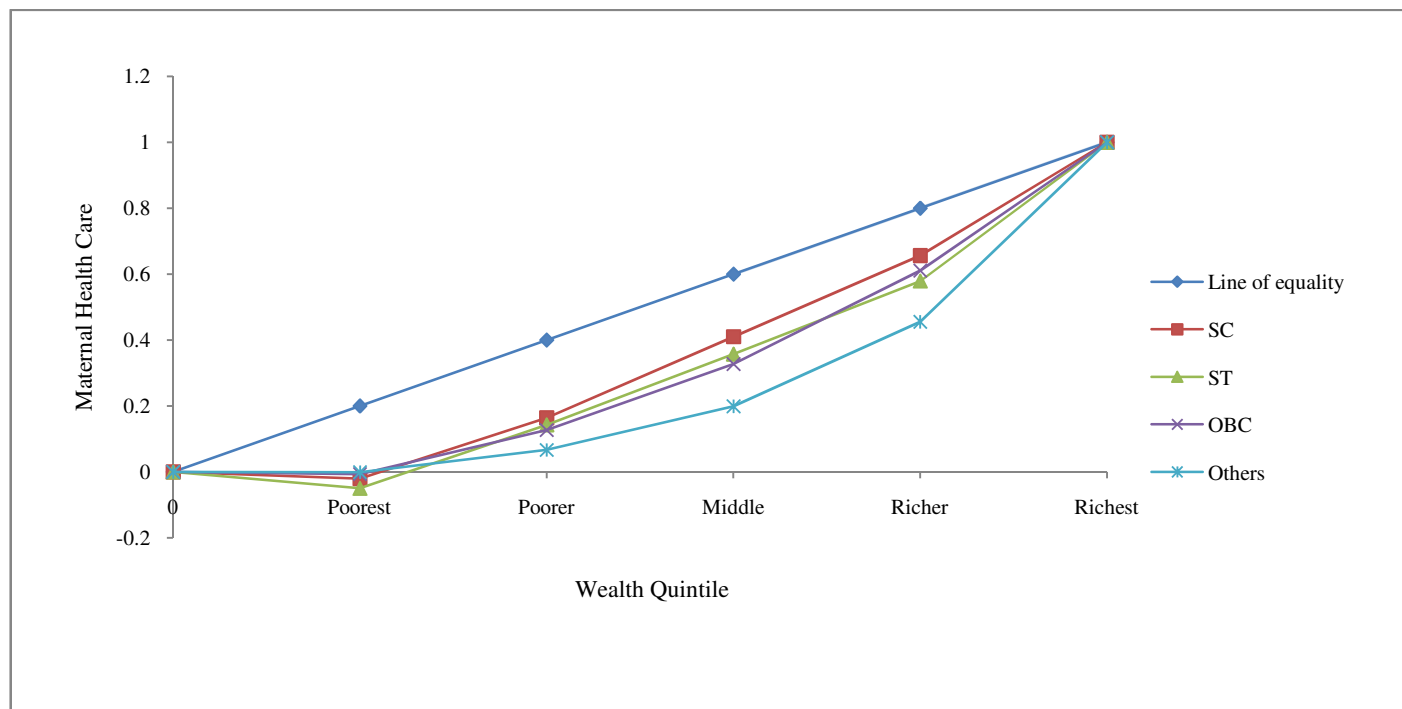
health care services rises irrespective of caste factor. However, lower difference (0.87) is found between poor and rich women belonging to SC category but this difference rises for 'other' caste women (0.97). ST women belonging to poorest category have lower chance of utilising maternal health services (-0.049) as compared to richest women of their category (0.753), though this number is very low as compared to OBC and 'other' caste women (table 3). OBC category women show lesser inequality in maternal health care utilization than the 'other' caste women but higher inequality when compared with SC and ST women (figure 1). This analysis brings out some important findings that on one hand, very low percentages of SC and ST women utilize maternal health services on the other hand maternal health inequality is low among them which shows richest women of SC and ST category are unable to compete with women of other caste groups belonging to same income level.

Table-3 finds out differences in maternal health care utilization within social groups belonging to different wealth quintile. Result shows that as wealth increases, utilization of maternal

Table-3
Composite Index (ci) of Maternal Health Care Utilization among Social Groups in India, 2007-08

Wealth Quintiles	SC (ci)	ST (ci)	OBC (ci)	Others (ci)
Poorest	-0.021	-0.049	-0.007	-0.001
Poorer	0.164	0.143	0.127	0.067
Middle	0.410	0.358	0.327	0.199
Richer	0.656	0.579	0.611	0.455
Richest	0.847	0.753	0.917	0.967

Source: Authors' calculation from DLHS III



Source: DLHS III

Figure-1
Maternal Health Care Utilization among Social groups in India, 2007-08

Determinants of Maternal Health care Utilization: The results of binary logistic are reported in table-4, two separate model of each maternal health care indicator regressed (Model I, unadjusted full antenatal care utilization by social groups, and Model II adjusted same type of health care services utilization of social groups with some key background characteristics used for explanatory variables. Similar model followed for other health care services such as safe delivery and post natal care respectively). Model I shows significant effect of utilization of full antenatal care on the social groups. The likelihood of utilising full ante natal care services is higher among women of OBC caste groups (CI = 1.27-1.36) than ST caste but women belonging to 'other' caste group utilized maternal services two times (CI = 1.79-1.92) more than ST women. Model two is for adjusted full antenatal care utilization with some key socio-economic background characteristics. Moreover, the adjusted odd of receiving full antenatal care among women who belong to 'other' caste (OR= 0.98, CI= .85-.93) is higher compared to ST women. Similarly women belonging to urban area utilized more full antenatal care services than rural area (OR= 1.09, CI= 1.05-1.30). Adolescent women (15-19) are more likely to utilize full antenatal care than women of 20-24 (OR= 0.99, CI= .93-1.05), and 25-29 age groups (OR= 0.99, CI= .93-1.05). Those women whose husband are graduate utilized full antenatal care three time more (OR= 2.41, CI= 1.47-3.12) than the women who have illiterate husbands. Women's education exerts a significant and positive effect on utilization of full antenatal care. Women who are graduate utilize six times more full ante natal care services (OR= 3.62, CI= 1.95-6.74) than uneducated women. Those women whose age at first birth is above 40 utilized seven times higher full antenatal care services (OR= 3.66, CI= 1.77-7.58) compared to adolescent age group women. Women from richer and richest wealth quintile are nearly two (OR= 2.20, CI= 1.99-2.24) and three times (OR= 3.02, CI= 2.84-3.20) more likely to use full antenatal care respectively compared to women from the poorest wealth quintile. Utilization of full antenatal care is less likely in north-east (OR= 0.89, CI= .84-.94) and central region (OR= 0.52, CI= .50-.55) than northern region of India.

Results for multivariate analysis shown in Model I and Model II explain that selected predictor variables have significant effect on utilization of safe delivery care among the social groups. Women belonging to OBC and 'other' caste utilize two (OR = 1.77, CI = 1.73-1.81) and three times more likely (OR= 3.00, CI = 2.92-3.02) than women from ST caste. Model II shows safe delivery care utilization with some key explanatory variables. Moreover, the adjusted odd of receiving safe delivery care among women who associate with 'other' caste (OR= 1.48, CI= 1.43-1.45) is higher compared with the ST women. Similarly women belonging to urban area utilize more likely safe delivery care than the women living in rural area (OR= 1.78, CI= 1.73-1.84). The likelihood of accepting

higher safe delivery care services is better among adolescent women (15-19) than the women aged 20-24 (OR= 0.68, CI= .65-.71), and 25-29 (OR= 0.52, CI= .49-.54) years. Women whose husband are Graduate utilize safe delivery care three times higher (OR= 1.99, CI= 1.22-3.23) compared to women who have illiterate husband. Women's education significantly plays a major role in utilization of safe delivery care services, women who are highly educated (graduation) utilize five times higher safe delivery care services (OR= 2.28, CI= 1.04-5.02) than uneducated women. Women whose age at first birth is above 40 years utilize 15 times more likely safe delivery care services (OR= 7.28, CI= 3.47-15.28) compared to women from adolescent age group. Women from richer and richest wealth quintile are nearly three (OR= 2.57, CI= 2.48-2.66) and six times (OR= 5.65, CI= 5.41-5.91) more likely to use safe delivery care compared to women from the poorest wealth quintile. In western and southern Indian states, utilization of safe delivery services is found two (OR= 1.95, CI= 1.87-2.04) and five times more likely (OR= 4.97, CI= 4.75-5.02) than north Indian states.

Our models also examine use of postnatal care and its determinants among women associated with different social classes. The findings show place of residence, women' education, social group, husband's education, age at first birth, wealth quintile and region are significant factors affecting postnatal care utilization. Model I adjusted post natal care utilization among social group. The results show that women from OBC and 'other' caste group, the odds of utilising post natal care services are two (OR= 1.74, CI= 1.69-1.78) and three times (OR= 2.55, CI= 2.48-2.62) more likely than women from ST group. The adjusted odd of post natal care utilization among 'other' caste (OR= 1.27, CI= 1.22-1.31) is more likely compared to ST women. Place of residence also plays significant effect on utilization of post natal care. Women from urban area utilized (OR= 1.43, CI= 1.39-1.4) better post natal care services than rural area. Women who have educated husband (graduation) utilized two times (OR= 1.37, CI= .90-2.09) more likely post natal care services compared to women whose husband are uneducated. Women who have graduation degree, utilized post natal care services three times (OR= 1.92, CI= .93-3.98) more likely than uneducated women. Women whose age at fist birth is 35-39 and above 40 utilized postnatal care services three times (OR= 2.67, CI= 2.42-2.93) and nine times (OR= 4.59, CI= 2.30-9.15) more likely compared to the women age 15-19. Post natal care utilization among women from richest wealth quintile is five times (OR= 4.61, CI= 4.41-4.48) more likely than women from poorest wealth quintile. In western and southern region of India, utilization of postnatal care services is two times (OR= 2.10, CI= 2.00-2.21) and five times (OR= 5.18, CI= 4.96-5.40) more likely than northern region of India respectively.

Table-4

Binary Logistic Model showing Odds Ratio (OR) and 95% Confidence interval (CI) for receiving full antenatal care, safe delivery and post natal care among social groups in India, DLHS-3 (2006-07)

Covariates	Full Antenatal care		Safe Delivery		Post Natal care	
	Model I	Model II	Model I	Model II	Model I	Model II
Caste						
ST (ref)						
SC	1.0*** (.98-1.09)	**0.73 (.70-.77)	1.46** (1.42-1.5)	1.34** (1.29-1.39)	1.46** (1.42-1.50)	1.20** (1.16-1.24)
OBC	1.31** (1.27-1.36)	0.73** (.70-.76)	1.77** (1.73-1.81)	1.36** (1.32-1.41)	1.74** (1.69-1.78)	1.18** (1.14-1.22)
Others	1.85** (1.79-1.92)	0.89** (.85-.93)	3.0** (2.92-3.02)	1.48** (1.43-1.45)	2.55** (2.48-2.62)	1.27** (1.22-1.31)
Residence						
Rural (ref)						
Urban		1.09** (1.05-1.3)		1.78** (1.73-1.84)		1.43** (1.39-1.4)
Age of Women						
15-19 (ref)						
20-24		0.99*** (0.93-1.05)		0.68** (.65-.71)		0.80** (.77-.84)
25-29		0.99*** (0.93-1.05)		0.52** (.49-.54)		0.69** (.66-.72)
30-34		0.93*** (0.87-1.0)		0.47** (.45-.49)		0.66** (.63-.69)
35-39		0.83** (0.77-0.91)		0.42** (.39-.44)		0.60** (.56-.63)
40-44		0.72** (0.63-.83)		0.34** (.31-.37)		0.50** (.46-.55)
45-49		0.71** (.54-.93)		0.30** (.26-.36)		0.44** (.37-.51)
Husband's schooling						
Illiterate (ref)						
Secondary		1.18** (1.13-1.24)		1.26** (1.22-1.29)		1.19** (1.16-1.23)
Higher Secondary		1.25** (1.19-1.31)		1.42** (1.37-1.47)		1.19** (1.15-1.23)
Graduation		2.14** (1.47-3.12)		1.99** (1.22-3.23)		1.37** (.90-2.09)
Above Graduation		1.12*** (.87-1.45)		1.13*** (.96-1.32)		1.17* (1.0-1.37)
Women's Schooling						
Illiterate (ref)						
Secondary		1.91** (1.84-1.98)		1.53** (1.50-1.57)		1.38** (1.35-1.42)
Higher Secondary		2.91** (2.78-3.05)		2.72** (2.62-2.83)		2.10** (2.02-2.18)
Graduation		3.62** (1.95-6.74)		2.28** (1.04-5.02)		1.92* (.93-3.98)
Above Graduation		1.04*** (.33-3.32)		0.52*** (.19-1.38)		0.54*** (.20-1.45)
Women's age at first Birth						
10-19' (ref)						
20-29'		1.32** (1.28-1.36)		1.57** (1.54-1.61)		1.33** (1.30-1.36)
30-39'		2.20** (1.99-2.24)		3.66** (3.31-4.06)		2.67** (2.42-2.93)
40+		3.66** (1.77-7.58)		7.28** (3.47-15.28)		4.59** (2.30-9.15)
Wealth Quintile						
Poorest (ref)						
Poorer		1.19** (1.12-1.26)		1.27** (1.23-1.31)		1.21** (1.17-1.25)
Middle		1.64** (1.55-1.73)		1.70** (1.64-1.76)		1.59** (1.54-1.64)
Richer		2.14** (2.03-2.27)		2.57** (2.48-2.66)		2.32** (2.24-2.40)
Richest		3.02** (2.84-3.20)		5.65** (5.41-5.91)		4.61** (4.41-4.81)
Region						
North (ref)						
North-East		0.89** (.84-.94)		1.03* (.99-1.08)		0.79** (.76-.82)
East		1.26** (1.2-1.32)		0.95** (.92-.98)		0.87** (.84-.90)
West		2.54** (2.43-2.65)		1.95** (1.87-2.04)		2.10** (2.00-2.21)
Central		0.52** (.50-.55)		0.71** (.69-.73)		0.87** (.84-.89)
South		6.74** (6.46-7.03)		4.97** (4.75-5.20)		5.18** (4.96-5.40)

Discussion: Maternal deaths across the world (especially in developing and under-developed countries) are most common phenomena. Due to large-scale programmatic interventions over the past two decades maternal mortality rates have gone down. However, the progress remains slow and uneven, both across and within the countries¹³. India is one of the fast economically developing countries in the world but on health parameters its performance is worse compared with countries in the South and East Asian region that have similar income levels and rates of economic growth⁹. Incidence of higher maternal mortality has been a greater challenge to Indian health policy makers and planners. The MMR in India remains unacceptably high, accounting for one-fifth (19%) of the global maternal deaths¹⁴. This magnitude clearly suggests that India's progress towards reducing maternal mortality will be crucial in the global achievement of the Millennium Development Goals (MDG-5). A recent estimate shows maternal mortality ratio (MMR) in India is 212 deaths per lakh live births but this ratio differs from region to region. It is as high as 390 in Assam and as low as 81 in Kerala². Most of these deaths are directly related to haemorrhage (30%), anaemia (19%), infection (16%), obstructed labour (10%), and complications of abortion (8%)¹⁴. These can be preventable with key health interventions like provision of antenatal care and medically assisted delivery¹⁵⁻¹⁸. In India, although the national surveys show improvement in the utilization of maternal health care services, the level of utilization remains under-achieved¹⁹. Women from lower social ladder are more deprived of utilizing these services due to their lower social and economic status.

This paper is an attempt to show differentials in utilizing maternal health care services between and within social groups keeping other variables constant. Our findings clearly exhibit unequal utilization of maternal health care services among social groups in India. Schedule Tribes women utilize comparatively lower level of full antenatal care (14%), safe delivery (38%) and post natal care (34%) than 'other' caste women which utilized 21% full ante natal care, 66% safe delivery and 60% post natal care. National Sample Survey (NSS) data reveals that women belonging to lower caste (SC, ST) have relatively lower access to health services compared with women of 'other' caste²⁰. According to National Family Health Survey, the probability of receiving any type of ANC is lowest among ST and SC women^{4,21}. This social exclusion is common throughout the country. A comparative study conducted in four southern states of India shows that women belonging to SC/ST in Karnataka, Kerala and Tamil Nadu are less likely to deliver their babies in health care institutions. In fact, these backward classes are unable to utilize other maternal health services as compared to 'other' caste²². However, this may be due to residential segregation or availability of health facilities²³. Another study examining differentials in antenatal care in both northern and southern states explains that antenatal care is significantly better in south Indian states compared with north Indian states especially among disadvantaged women²⁴. Results from Jharkhand shows that maternal health care is very

low among ST women as compared with non ST women²⁵. Poor utilization of maternal health care, high prevalence of malnutrition and anaemia is more common among tribal women²⁶. A study conducted in Uttar Pradesh shows that utilization of maternal health services is low both among upper and lower caste women, however, probability of utilization is higher among upper caste women while considering contraceptive use, ante-natal check-ups, trained birth attendant and tetanus toxoid health services²⁷. Even in a relatively egalitarian state Kerala, caste differentials are also found in maternal health care utilization²⁸. Besides caste; wealth, education, cost, availability, order of pregnancy also determine maternal health²⁹. This study has also identified several others determinants that exert significant influence on the utilization of maternal health care among various social groups such as women's age, place of residence, women's education, husband's education, age at the first birth, wealth index and regions. NFHS-3 findings reveal that mother's education, standard of living and child's birth order are strongly correlated with institutional deliveries and role of caste becomes irrelevant and not significant controlling other variables constant³⁰. An all India study shows that differentials among social class in utilization of health care services and nutrition is on account of socio-economic factors though in some states such as Madhya Pradesh, Gujarat and Orissa, differentials persist after controlling socio-economic variables³¹. The results from this study clearly explain that maternal education and wealth index are the significant covariates of maternal health care utilization among Schedule tribe and Schedule cast women after controlling for others selector covariates. Most of the studies conducted in developing countries have found that maternal education is one of the most significant factors in determining utilization of maternal health care, after controlling for others factors²⁸. Women's education is a major instrument which empowers women and helps them in inculcating greater confidence to take decisions about their health.

Standard of living is another important determinant found in the study which creates caste differentials in utilization of maternal health services. A study based on deprivation of basic amenities at household level shows that state of abject and moderate deprivation is found mainly in STs followed by SCs³². Another study done in two villages of Orissa depicts lower utilization of basic health services by lower caste primarily owing to lower income, education and poor medical facilities³³. Place of residence is another important factor determining maternal health care utilization. Scheduled caste women living in rural areas are more prone to consume poor maternal services like 12.4 % full ante-natal care, 32% safe delivery and 30.4 % post natal care as compared to women living in urban areas of the same caste which show 32% full ante-natal care, 75% safe delivery and 62.2% post natal care. Actually, exposure to urban life and interaction with other communities for a longer period reduces the likelihood of caste factor in maternal health care utilization³⁴. In India, due to cultural and regional diversity, socioeconomic, religious and demographic differentials are well

documented³⁵⁻³⁸. Most of the studies focus on Hindu-Muslim differentials in fertility and family planning³⁹⁻⁴². It is widely known that caste is a proxy for lower socio-economic status. Their health is not purely determined by medical facilities but also due to their social and economic structure. Lower caste persons, of them majority are poor, migrate to distant places in search of work. In due course, they lose many benefits offered to poor such as BPL cards. They are also deprived from clean water, sanitation, nutrition, housing, employment, education, health care⁴³.

Conclusion

This paper concludes making strong recommendation not only to improve maternal health care services among women of lower social class by improving their economic status and accessibility of health services but also lowering down maternal health inequality among 'other' and OBC caste women. However, policies concerned with maternal health should focus more on women belonging to lower caste, uneducated and rural areas.

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References

1. International Institute for Population Sciences and Macro International, National Family Health Survey (NFHS-3), 2005-06: India: Volume I. Mumbai: IIPS (2007)
2. Sample Registration System, Special Bulletin on Maternal Mortality in India 2007-09. New Delhi: Office of Registrar General of India (2011)
3. Mukherjee S., Haddad S. and Narayana D., Social class related inequalities in household health expenditure and economic burden: evidence from Kerala, South India, *Int J Equity Health*, **10**(1), 1-13 (2011)
4. Sanneving L., Trygg N., Saxena D., Mavalankar D. and Thomsen S., Inequity in India: the case of maternal and reproductive health, *Global Health Beyond 2015* **1**, 1-31, (2013)
5. Baraik V.K. and Kulkarni P.M., Health status and access to health care services- Disparities among social groups in India, *Indian Institute of Dalit Studies*, Working Paper Series, **1**, 5-61, (2006)
6. Mohindra K.S., Haddad S., Narayana D., Women's health in a rural community in Kerala, India: do caste and socioeconomic position matter?, *Journal of Epidemiology and Community Health*, **60**, 1020-1026, (2006)
7. Registrar General of India, Census of India Final Population Tables, New Delhi: Office of the Registrar General of India, (2001)
8. Borooah V.K., Sabharwal N.S. and Thorat S., Gender and Caste based inequality in health outcomes in India, *Indian Institute of Dalit Studies*, Working Paper Series, **6**, 5-16, (2012)
9. Baru R., Acharya A., Acharya S., Kumar A.K.S. and Nagaraj K., Inequities in Access to Health Services in India: Caste, Class and Region, *Economic and Political Weekly*, **45**, 49-58, (2010)
10. Deaton A. and Dreze J., Food and Nutrition in India: Facts and Interpretations, *Economic and Political Weekly*, **44**, 42-65, (2009)
11. Claeson M., Bos E.R., Mawji T. and Pathmanathan I., Reducing child mortality in India in the new millennium, *Bulletin of the World Health Organization*, **78**, 1192-1199, (2000)
12. Submanian S.V., Smith D. and Subramanyam M., Indigenous health and socioeconomic status in India, *PLoS Medicine*, **3**(10), e421, (2006)
13. Filippi V., Ronsmans C., Campbell O.M.R., Graham W.J., Mills A., Borghi J., Koblinsky M. and Osrin D., Maternal health in poor countries: the broader context and a call for action, *The Lancet*, **368**, 1535-41, (2006)
14. WHO, UNICEF, UNFPA, The World Bank estimates, Trends in maternal mortality: 1990 to 2010, (2010)
15. Adam T., Lim S.S., Mehta S., Bhutta Z.A., Fogstad H. and Mathai M., et al., Cost effectiveness analysis of strategies for maternal and neonatal health in developing countries, *British Medical Journal*, **331**, 1107-1110, (2005)
16. McCaw-Binns A., Lagrenade J. and Ashley D., Under-users of antenatal care: A comparison of non-attenders and late attenders for antenatal care with early attenders, *Social Science and Medicine*, **40**, 1003-1012, (2007)
17. Bhatia J.C., Levels and causes of maternal mortality in southern India, *Studies in Family Planning*, **24**(5), 310-318, (1993)
18. Griffith P., Stephenson R., Understanding users' perspectives of barriers to maternal health care use in Maharashtra, India, *Journal of Biosocial Science*, **33**(3), 339-359, (2001)
19. Pathak P.K., Singh A. and Subramanian S.V., Economic inequalities in maternal health care: prenatal care and

- skilled birth attendance in India, 1992–2006, *PLoS ONE*, **5(10)**, e13593, (2010)
20. National Sample survey Organisation, Morbidity Health care and the condition of aged, Report no. 507, New Delhi, Ministry of Statistics and Programme Implication, Government of India, (2006)
21. Nayar K.R., Social exclusion, caste and health: A review based on the social determinants framework, *Indian Journal of Medical Research*, **126**, 355-363, (2007)
22. Navaneetham K. and Dharmalingam A., Utilization of maternal health care services in southern India, *Social Science and Medicine*, **55(10)**, 1849–1869, (2002)
23. Appasamy P., Guhan S., Hema R., Manbi M., and Vaidyanathan A., Social exclusion from a welfare rights perspective: the case of India, India: Madras Institute of Development Studies, (1995)
24. Rani M., Bonu S. and Harvey S., Differentials in the quality of antenatal care in India, *International Journal for Quality in Health Care*, **20(1)**, 62-71, (2008)
25. Agrawal P.K. and Agrawal S., To what extent are the indigenous women of Jharkhand, India living in disadvantageous conditions: findings from India's National Family Health Survey, *Asian Ethnicity*, **11(1)**, 61-80, (2010)
26. Maiti S., Unisa S. and Agrawal P.K., Health Care and Health among Tribal Women in Jharkhand: A Situational Analysis. *Stud. Tribes Tribals*, **3(1)**, 37-46, (2005)
27. Saroha E., Altarac M. and Sibley L.M., Caste and maternal health care service use among rural Hindu women in Maitha, Uttar Pradesh, India, *Journal of Midwifery and Women's Health*, **53(5)**, e41–47, (2008)
28. Mohindra K.S., Haddad S., Narayana D., Women's health in a rural community in Kerala, India: do caste and socioeconomic position matter?, *Journal of Epidemiology and Community Health*, **60**, 1020–1026, (2006)
29. Hazarika I., Factors that Determine the Use of Skilled Care During Delivery in India: Implications for Achievement of MDG-5 Targets, *Maternal and Child Health Journal*, **15**, 1381–1388, (2011)
30. Sugathan K., Vinod M. and Retherford R.D., Promoting Institutional Deliveries in Rural India: The Role of Antenatal-Care Services. National Family Health Survey Subject Reports, Number 20, International Institute for population sciences and east west centre, *Honolulu*, (2001)
31. Roy T.K., Kulkarni S. and Vaidehi Y., Social inequalities in healthy and nutrition in selected states, *Economic and Political Weekly*, **39(7)**, 677-683, (2004)
32. Srinivasan K. and Mohanty S.K., Deprivation of Basic Amenities by Caste and Religion: Empirical Study Using NFHS Data, *Economic and Political Weekly*, **39(7)**, 728-735, (2004)
33. Sa S.N. and Gummadi S., Utilization of maternal and child health care services by rural SCs and STs in India: A study of two villages of India, *Carmelight*, **9(1)**, (2012)
34. Dilip T.R. and Mishra U.S., Social divide in maternal health care use in rural India: the relative impact of education and economic status, Online [<http://iussp2009.princeton.edu/download.aspx?submissionId=90364>], International Population Conference, Marrakech, Morocco, date accessed on 19 Jan 2014, (2009)
35. Shariff A., Socio-economic and demographic differentials between Hindus and Muslims in India, *Economic and Political Weekly*, **30(46)**, 2947–2953, (1995)
36. Basant R., Social, Economic and Educational Conditions of Indian Muslims, *Economic and Political Weekly*, **42(10)**, 828–832, (2007)
37. Barooah V.K., Iyer S., Vidya, Veda and Varna: The influence of religion and caste on education in rural India, *Journal of Development Studies*, **41(8)**, 1369–1404, (2005)
38. Robinson R., Indian Muslims: The varied dimensions of marginality, *Economic and Political Weekly*, **42(10)**, 839–843, (2007)
39. Bhagat R.B. and Praharaj P., Hindu-Muslim fertility differentials, *Economic and Political Weekly*, **40(5)**, 411–418, (2005)
40. Bhat P.N.M. and Zavier A.J.F., Role of religion in fertility decline: The case of Indian Muslims. *Economic and Political Weekly*, **40(5)**, 385–402, (2005)
41. Kulkarni P.M. and Alagrajan M., Population growth, fertility and religion in India, *Economic and Political Weekly*, **40(5)**, 403–410, (2005)
42. Basant R., Social, Economic and Educational Conditions of India Muslims, *Economic and Political Weekly*, **42(10)**, 828–832, (2007)
43. Jacob K.S., Caste and inequalities in health, *The Hindu*, August 22, (2009)