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Use of Maternal Health Care in Rural India: Relative Importance of Socio-economic Status and Accessibility

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Considering low maternal health care utilization, particularly lack of full antenatal care and institutional delivery, this paper investigates determinants of seeking antenatal care and institutional delivery with the focus on assessing relative importance of socio-economic status and accessibility to health centerre services. Using nationally representative data from the District Level Household and Facility Survey (DLHS-3), the paper reiterates the low level of maternal health care utilization in rural India and its correlation with both socio-economic factors and accessibility to health facilities. The association is stronger with socio-economic factors than with the proximity to health facilities. Further, it is observed that self motivation fails to ensure women's resorting to maternal health care unless they are motivated or permitted by their husbands or mother in-laws.

Keywords: *maternal health care, rural India, status of women*

Introduction

Attaining improved maternal health has been one among the top priorities to the government of India since its first five year development plan (1951-56) in order to reduce both maternal and child mortality (Government of India, 1952). The target continued to reinforce year after year and it has also been reflected in recent population policy-2001 within the wider context of reproductive and child health program, and through the commitment toward achieving millennium development goal 5, i.e. reducing maternal mortality by three quarters between 1990 and 2015 (United Nations, 2003).

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Over the last few decades, although India has witnessed success in terms of reducing both maternal and child mortality, the level remains still very high as compared to any developed nation. India is still home to 63,000 maternal deaths per year which accounts almost one-fourth of all maternal deaths in the world even after the decline of mortality ratio to 230 from 390 between the year 1990 to 2008 (WHO, UNICEF, UNFPA & World Bank, 2010). Similarly, child mortality rate in India remains very high as compared to developed nations despite the fall to 18 from 33 per 1,000 children between the period 1991-92 and 2005-06 (International Institute of Population Sciences [IIPS], 1995, 2007).

Among several reasons, the lack of maternal health care utilization has been marked as an important cause for the large number of maternal deaths (Tsui, Wasserheit & Haaga, 1997; WHO 2004; WHO 2005). In India, merely 18.8 percent of pregnant women receive full antenatal care (ANC), which includes at least three antenatal checkups, one tetanus injection and 100 iron acid folic tablets. Nearly three-quarter of births continue to take place at home, most of them are performed without the assistance of a trained health worker (IIPS, 2010). In addition, there has been substantial dropout from the portfolio of maternal health care services. Only a small proportion of women completed all forms of maternal health care services - starting from ANC to institutional delivery. While 75 percent of pregnant women use any type of ANC, the institutional delivery ended up in merely 47 percent (IIPS, 2010).

The utilization of health care is influenced by many factors. Health belief model (Becker et al., 1977) suggests three sets of factors - individual perceptions, modifying factors, and likelihood of action - that influence individuals to utilizing health care facilities. Individual's perception of seriousness of the illness/disease drives towards health care use. Modifying factors comprising various socio-demographic characteristics play significant role in boosting or preventing individuals to seek health care. The likelihood of action is the result of cost-benefit analysis between seeking and not seeking health care. Studies on health seeking behavior highlight a range of potential modifying factors which increase women's propensity to seek health care. The modifying factors comprise various socio-economic and demographic factors which enhance demand for utilizing maternal health care services through mainly increasing economic ability to seek treatment (Kanitkar & Sinha, 1989; Elo, 1992; Swenson et al., 1993; Khan, Soomro & Soomro, 1994; Barlow & Diop, 1995; Ahmed & Mosley, 2002; Govindasamy & Ramesh, 1997; Das, Mishra, & Saha, 2001).

Furthermore, several studies have stressed the importance of access to and quality of health services for increasing utilization of them (Rao & Richard, 1984; Sarita & Tuominen, 1993; Kumar, Singh & Kaur., 1997; Rohde & Viswanathan, 1995). Programs that maximize quality as well as access to services enhance client satisfaction, leading to greater utilization (Koenig & Khan, 1999; Shelton & Davis, 1996; Levine et al., 1992). Access helps determine whether an individual makes contact with the provider or not, while quality of care influences a client's decision to accept and to continue using the services (Bertrand et al., 1995). Another important factor, from the supply side, is the cost of health care which is a significant barrier to service use (Bloom, Lippeveld & Wypij, 1999; Griffiths & Stephenson, 2001).

With the above backdrop, this paper aims to understand determinants of maternal health care utilization from both demand and supply sides. More specifically, this paper tries to understand determinants of three components of maternal health care services, that is, seeking 'any ANC', 'full ANC' and 'institutional delivery'. Further, an examination will be made with special reference to the relative importance of access to health services and socio-economic status in maternal health care utilization.

Data and Methods

Data

Data for this analysis are drawn from the District Level Household and Facility Survey (DLHS-3) on reproductive and child health carried out during 2007-08. It was designed to collect data at the district level on various aspects of health care utilization for reproductive and child health (RCH) and accessibility to health facilities. DLHS-3 is a nationally representative data collected through using multistage sampling design for all districts in India (except Nagaland). In each district, 50 primary sampling units (PSUs) which were census villages for rural areas and wards for urban areas were selected at the first stage by systematic probability proportional to size (PPS) sampling. Circular systematic sampling was adopted for the selection of households. After selecting the household, all the ever married in ages of 15-49 were selected for interview. The Survey also interviewed all the unmarried women in the selected household using separate schedule but they are not included this analysis. In total, the survey covered 720,320 households, from which 643,944 ever married women aged 15-49 years were interviewed. This analysis uses information of 177,290 women who belong to rural area and experienced pregnancy within the

last five years prior to the date of survey. The data for the urban area are excluded from the analysis owing to unavailability of the information on the distance to health facilities.

Analytical methods

The first step of analysis focuses on utilization of maternal health care - 'any ANC', 'full ANC', and 'institutional delivery'- among women with various socio-demographic characteristics. In the later part of the analysis, logistic regression models are carried out to understand the determinants of maternal health care utilization. For k explanatory variables and n number of individuals, the model expression is:

$$\log\left[p_i / 1 - p_i\right] = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + ... + \beta_k X_k$$

where p_i is the probability of occurring of any particular event. In this study, dependent variables are: using 'any ANC or not'; 'using full ANC or not'; having 'institutional delivery or not'. α is the intercept, X_i (i= 1,2…..k) are the independent variables, and β_i are the slope for each independent variable.

Explanatory variables

The explanatory variables include demographic characteristic, i.e. age; socio-economic characteristics which include religion, caste, women's education, husband's education, working status; and household wealth measured as an index of the household assets. Another explanatory variable is the distance to health center from the place of residence representing accessibility to health care services.

Results

Maternal health care utilization by socio-economic-demographic status

As expected, the extent of utilization of maternal health care services varies by various socio-economic-demographic characteristics (Table 1). The variation is observed for all forms of services - 'any ANC', 'full ANC', and 'institutional delivery'. Utilization is found to be higher among socio-economically well-off women. For example women with higher education, belonging to higher household economic status are

found to be using more maternal health care services. The utilization is also found to be varying by age and caste. While women in the youngest (15-19) and oldest (40-49) cohorts in the reproductive age group use the services relatively less as compared to women in the middle ages (20-39), Schedule Tribe (ST) women use least followed by Schedule Caste (SC) and general caste.

Table 1: Percent distribution of women's utilization of maternal health care services in rural India, by various socio-demographic characteristics, 2007-2008

Characteristics	Any ANC	Full ANC	Institutional delivery	N
Age				
15-19	74.7	12.9	43.5	12,599
20-29	73.6	16.1	40.7	119,139
30-39	62.4	11.8	29.6	40,621
40-49	47.7	06.6	18.8	4,931
Religion				
Hindu	70.6	14.6	38.5	135,870
Muslim	68.9	14.0	32.4	22,733
Christian	69.0	17.5	33.8	9,559
Others	72.2	13.4	44.0	9,118
Women's education				
Illiterate	70.7	06.5	23.9	412
Below primary	70.1	12.3	30.7	8,412
Primary	80.9	19.0	47.0	55,433
Secondary	90.2	31.3	65.7	13,288
Higher secondary & above	94.2	38.5	76.5	11,274
Husband's education				
Illiterate	66.5	05.0	16.3	326
Any primary	65.9	11.0	27.2	9,239
Complete primary	72.4	14.3	37.9	69,155
Secondary	79.1	20.5	49.9	24,209
Higher secondary & above	85.2	25.3	59.5	25,621
Caste				
Schedule tribe	63.1	12.4	27.5	34,219
Schedule caste	69.4	12.4	35.6	35,979
Others	70.1	14.6	29.1	107,092

Table 1 (Continued)

Characteristics	Any ANC	Full ANC	Institutional delivery	N
Work status (past 12 months)				
Working	69.5	12.6	31.3	27,835
Not working	73.9	16.3	43.5	149,455
Household wealth quintiles				
1st (poorest)	54.7	05.9	18.4	35,458
2nd	63.5	08.9	27.8	35,458
3rd	74.1	15.6	40.1	35,458
4th	83.9	22.9	54.5	35,458
5th (richest)	92.2	32.6	72.8	35,458
Total	69.9	14.2	37.1	177,290

Overall, there is significant proportion of women who drop out from the portfolio of maternal health care services. This was found across all socio-economic-demographic characteristics. While the proportion of women resort to 'any ANC' accounts reasonably high, it ended up in a very low level of using 'full ANC' and 'institutional delivery'. For example, while 54.7 percent woman belonging to lowest wealth quintiles used 'any ANC', 'full ANC' and 'institutional delivery' ended up in 5.9 percent and 18.4 percent respectively. Similarly, in the highest quintiles, while 92.2 percent women used 'any ANC', 'full ANC' and 'institutional delivery' resulted in 32.6 percent and 72.8 percent respectively.

Reasons for not using maternal health care services

There are various reasons cited by women for not using maternal health care services. The percentage distribution of women who did not seek maternal health care by various reasons is presented in Table 2. For ANC in general, five most important reasons cited by women in the sample include 'not necessary' (53.4 percent) 'cost' (24.1), 'lack of knowledge' (20.4 percent), 'distance' (16.7 percent) and 'not customary' (11.3 percent). Other reasons of minor importance are 'no time to go' (9.7 percent), 'family members did not allow' (6.7 percent), and 'poor quality service' (3.0 percent).

Table 2: Reasons for not seeking ANC and institutional delivery

Reasons	ANC	Institutional delivery
Not necessary	53.4	34.3
Not customary	11.3	7.5
Cost too much	24.1	23.4
Distance is too much	16.7	11.7
Poor quality service	3.0	4.5
Family did not allowed	6.7	6.7
Lack of knowledge	20.4	6.8
No time to go	9.7	23.7
Others	2.7	2.7
N	177,290	177,290

For 'institutional delivery', it is found that the most important reasons cited by the women for not using it is 'not necessary' (34.3 percent), followed by 'no time to go' (23.7 percent), and 'high cost' (23.4 percent). Other reasons of some significance given by the respondents include 'distance' (11.7 percent) 'not customary' (7.5 percent), 'lack of knowledge' (6.8 percent), 'family did not allow' (6.7 percent), and 'poor quality service' (4.5 percent),

It is known that opportunity cost is one of the main reasons preventing people from using health care. In general opportunity cost is positively associated with the proximity to health center. Therefore, it is expected that the close proximity to health center would enhance maternal health care utilization. The pattern of maternal health care utilization by proximity to health center is presented in Table 3. In general, the utilization increases as the distance to health center decreases. The gradient is more marked for 'institutional delivery' among all types of maternal health care utilization. While the percentage of 'institutional delivery' is 51.3 if any health center is available within the village, the percentage drops to 35.2 percent if the distance to health center is beyond 30 km. Other indicators- 'any ANC' and 'full ANC'- also show similar declining trend with lesser extent compared to 'institutional delivery' as distance to health center increases. It can be seen that 77.8 percent of pregnant women use any kind of ANC if health facility center is located within the village compared to 68.0 percent for the distance of 30+ km. Similarly, the percentage of women receiving 'full ANC' accounts for 20 percent if health center is in the village and 14 percent if it is located more than 30 km outside the village.

Table 3: Utilization of maternal health care in rural India, by distance to health center

Distance to Health facility from a Village	Any ANC	Full ANC	Institutional Delivery	N
Within a village	77.8	20.1	51.3	2,796
Up to 5 km	76.2	16.3	48.0	5,489
5-15 km	74.9	15.8	43.3	2,4701
16-30 km	72.1	14.1	39.0	44,743
30+ km	68.0	14.3	35.2	99,561
Total	69.9	14.2	37.1	177,290

Socio-economic status, distance to health center and utilization of maternal health care services

This section describes how economic status and distance to health center interact with the maternal health care utilization (Table 4). It can be seen that both economic status (here measured as wealth quintile) and distance to health center are important as far as utilization of maternal health care is concerned. While utilization reduces with the increase of distance to health facility center, it increases with the increase of household wealth. This pattern is observed in all three types of maternal health care services, any ANC, full ANC and institutional delivery. For example, when the health center is located within the village, the percentage of women in the

Table 4: Maternal health care utilization in rural India, by wealth quintiles and distance to health centre, (2007-2008)

Location of health facility	Any ANC					Full ANC					Institutional delivery				
	Wealth quintiles					Wealth quintiles					Wealth quintiles				
	1st	2nd	3rd	4th	5th	1st	2nd	3rd	4th	5th	1st	2nd	3rd	4th	5th
Within a village	93	92.4	81.7	79.1	72.6	41.9	32.3	25.7	21.4	14.1	87.7	67.6	52.1	39.2	21.7
Up to 5 km	94.7	86	76.4	65.8	62.3	35.8	20.9	15.1	8.6	6.5	75.9	61.8	46.2	36.4	25.7
5-15 km	93.6	84.8	76.4	65.9	58.9	33.1	22.2	15.4	7.9	5.3	76.8	56.5	43.2	29	20.6
16-30 km	92.4	84.7	74.2	63.9	55.7	30.7	22.2	13.9	7.7	5.0	72.9	54.2	40	27.6	17.6
30+ km	91.1	82.8	73.2	62.4	52.3	33.4	23.4	16.3	9.4	5.8	70.6	53.3	38.7	26.9	17.8

Note: 1st indicates richest and 5th indicates poorest quintiles.

1st quintile (richest) who used 'any ANC' is 93 percent and those in the 5th quintile (poorest) is 72.6 percent. Similar patterns, although with different levels, are also observed in 'full ANC' and institutional delivery.

Education as an important indicator of socio-economic status shows positive effect on maternal health care utilization. The effect is clearly observed when the distance to health facility is taken into consideration (Table 5). Women with no or lower education use maternal health care less than those with higher education although distance to health facility makes a difference for both groups. This pattern is clearly observed for all three type of maternal health care utilization.

Table 5: health care utilization in rural India, by education and distance to health center

Location of health facility	Any ANC					Full ANC					Institutional delivery				
	Education					Education					Education				
	IL	BP	PR	SE	HS	IL	BP	PR	SE	HS	IL	BP	PR	SE	HS
Within a village	85.7	77.7	85.7	89.6	94.4	35.7	19.1	25.4	35.8	50.4	35.7	37.6	50.2	70.5	85.2
Up to 5 km	65.2	73.9	83.8	92.1	95.3	13.0	18.1	19.2	29.1	41.3	39.1	39.6	55.0	73.4	81.7
5-15 km	71.1	73.9	83.5	91.7	95.6	3.9	12.9	19.2	31.6	38.8	27.6	35.9	50.9	71.1	81.5
16-30 km	70.9	72.7	81.4	91.0	95.7	4.4	11.0	17.5	31.1	37.1	22.5	32.8	47.6	66.2	78.1
30+ km	70.0	67.5	79.7	89.1	92.7	6.5	11.9	19.3	31.4	38.8	22.0	27.6	45.2	63.1	72.9

Note: L = Illiterate, BP = Any primary, PR= Complete primary, SE = Secondary, HS = Higher secondary

Who motivates use of maternal health care services?

Although self motivation/awareness is significant in using maternal health care services, there are many other external sources of motivation that play important role toward enhancing utilization. External sources may include health professionals, relatives and any other. These sources of motivation are recorded in the survey. They include doctors, auxiliary nurse midwife (ANM), NGOs, family members including husband, mother and mother in-law. The distribution of women who received ANC and had 'institutional delivery' is presented in Table 6. It can be seen that motivation received from husband is most important for seeking both ANC (30 percent) and 'institutional delivery' (22 percent). Other important sources for using ANC include

self-motivation, auxiliary nurse midwife, relatives, mother, *Anganwari* worker, doctor, and mother-in-law. For institutional delivery, on the other hand, other important sources include relatives, auxiliary nurse midwife, self-motivation, and mother. Other sources including mother-in-law appear to be much less important in motivating the rural women to utilize maternal care services.

Table 6: Percentage distribution of rural women by sources of motivation for using ANC and institutional delivery

Sources of motivation	ANC	Institutional delivery
Doctor	11.5	09.2
Auxiliary nurse midwife	23.1	13.1
Health care professional	03.0	02.2
Anganwari worker*	13.4	06.8
ASHA **	03.6	03.0
NGO	01.3	01.3
Husband	30.0	22.3
Mother	15.8	10.1
Mother-in-law	10.8	08.8
Relative	23.0	16.4
Self	27.4	12.6
Other	0.90	0.60
N	177,290	177,290

Note: * Health workers who work under the project 'Integrated Child Development Services'
** ASHA denotes Accredited Social Health Activist, are community health workers insti tuted by the government of India's Ministry of Health and Family Welfare (MoHFW) as part of the National Rural Health Mission (NRHM).

Multivariate Analysis

Considering the binary nature of dependent variables - seeking 'any ANC or not, seeking 'full ANC' or not', and having 'institutional delivery or not'- logistic regression models are used to understand determinants of maternal health care utilization. Before executing logistic regression, correlation matrix has also been performed to check multico llinearity across variables included in the model. It is observed that there is significant multicollinerity among women' s education, husband' s

education and household wealth. Nevertheless, none of the variables have been dropped from the model since the aim here is to understand exclusive impact of these variables when other confounding factors are controlled. The results of logistic regression analysis are presented in Table 7. It can be seen that all the socio-economic-demographic variables appear significant in influencing utilization of maternal health care services.

In general, utilization decreases with the increase of age, but increases with the increase of socio-economic status. Husband' s education is also found to be important for increased maternal health care utilization, although it has a weaker association as compared to women's education. A strong association is observed between household economic status measured in terms of household's wealth index and maternal health care services. Compared to the women in the poorest quintile, women belonging to the richest quintile are 4.43 times more likely to use 'any ANC', 2.58 times to use 'full ANC', and 4.62 times to use 'institutional delivery'. The distance to health facility has statistically significant association with the maternal health care utilization, but the gradient remains very flat as compared to education and economic status. Therefore, this analysis indicates varying degree of association between socio-economic status and health infrastructure with the utilization of maternal health care services where socio-economic status shows greater association. Another important point observed in the analysis is the significant association between sources of motivation and completion of full course of maternal health care services. Women are more likely to receive 'full ANC' and have 'institutional delivery' if they are motivated by their husband and relative (mainly mother-in-law). The analysis shows that husband's motivation works much better than self-motivation or other relatives' as far as using 'full ANC' and 'institutional delivery' are concerned.

Table 7: Results of logistic regression analysis showing likelihood of using maternal health care services among rural women in India, by socio-economic status, source of motivation and distance to health infrastructure

Characteristics	Any ANC	Full ANC	Institutional delivery
Age (Ref. 15-19)			
20-29	0.82*	1.16*	0.73*
30-39	0.61*	1.06*	0.63*
40-49	0.45*	1.04	0.55*

Table 7 (Continued)

Characteristics	Any ANC	Full ANC	Institutional delivery
Religion (Ref. Hindu)			
Muslim	1.15*	1.23*	0.86*
Christen	0.79*	1.09**	0.76*
Others	0.81*	0.66*	1.06**
Women's education (Ref. Illiterate)			
Below primary	0.91	1.54*	1.29**
Primary	1.31**	1.99*	1.90*
Secondary	2.16*	3.12*	2.91*
Higher secondary & above	3.24*	3.96*	4.20*
Husband's education (Ref. Illiterate)			
Below primary	1.04	1.77**	1.58**
Primary	1.04	1.68	1.62**
Secondary	0.92	1.55	1.58**
Higher secondary & above	1.00	1.36	1.53**
Household wealth quintiles (Ref. Poorest)			
Second	1.28*	1.24*	1.39*
Middle	1.82*	1.68*	1.95*
Fourth	2.81*	2.09*	2.85*
Richest	4.53*	2.58*	4.62*
Sources of motivation for ANC (Ref. Health workers)			
Relatives	--	1.01	1.31*
Self		0.96	1.02
Husband		1.77*	1.88*
Others		1.00	1.23*
Distance to health facility (Ref. within village)			
Up to 5 km	0.67*	0.60*	0.83*
5-15 km	0.66*	0.60*	0.75*
16-30 km	0.59*	0.56*	0.64*
31+ km	0.53*	0.56*	0.61*
Constant	3.99*	0.05*	0.26*
N= 177,290			

Note: * denotes $p < 0.01$; ** denotes $p < 0.05$
-- Information has not been collected for any ANC

Discussion and Conclusions

Results of this study reiterate the fact that the utilization of maternal health care in rural India is still low. India needs to go a long way to reach the ambitious target of using 'full ANC' and 'institutional delivery' set in the millennium development goals (MDG). The main problem lies in the dropping out of women from the port folio of maternal health care services, starting from ANC to 'institutional delivery'. While a reasonably high proportion of women (around 70 percent) uses ANC, the proportions reduce fairly abruptly among those who receive 'full ANC' and eventually have 'institutional delivery'.

As obviously seen in the analysis above, socio-economic status of a women and accessibility to health facilities play important role for the utilization of maternal health care services. Among many influencing factors, education, particularly, women's education, household's economic status and accessibility to health facility are found to be effective to influence utilization. However, household wealth and education are found to be relatively more important than the proximity to health center. This evidence stands stronger when other confounding factors of maternal health care utilization are controlled. This finding strengthens the existing knowledge from previous studies that 'socio-economic status of an individual is relatively more important than the proximity to health center as far as utilization of maternal health care services in India is concerned (Kesterton et al., 2010).

Cost of health care appears to be another important hurdle for accessing maternal health care services. About 23-24 percent of women gave the high cost as a reason for not using ANC and having 'institutional delivery'. This is not unpredictable considering the very high delivery cost incurred for maternal health care services, particularly for 'institutional delivery' (Borghi et al., 2006; Kesterton et al., 2010). Although there is no available recent authentic estimate on 'institutional delivery' cost, a study based in Mumbai among poor socio-economic groups estimated that it is as high as Rs. 1,039 compared to Rs. 160 for home delivery (Balaji, Dilip & Duggal, 2003; Kesterton et al., 2010).

Self-motivation and knowledge are the factors believed to increase health care utilization. However, these are not sufficient as far as utilization of maternal health care is concerned. External motivations received from husband, relatives or health professionals are found to be very important, and amongst these, motivation from husband and mother-in-law stands in the fore front. The motivations received from

husband, health professional and relatives (mainly mother-in-law) are likely to have stronger impact on accessing services than self-motivation. This simply implies that decision to use health care does not lies in the hands of rural women alone. They need to seek permission before seeing health care from their husband/mother in-laws. The autonomy of rural Indian women is so low that their self-motivation or health professionals' advice fails to ensure seeking maternal health care services unless and until women are permitted to seek health services. Male involvement in reproductive health is a widely discussed and advocated topic towards increased maternal health care. International studies covering many regions show that reproductive health programs are likely to be more effective for women when men are involved in some way (Mbizvo & Bassett, 1996). A woman is likely to make more ANC visits if her husband attend an informational session at the clinic as observed in a study in Mumbai (Bhalerao et al., 1984).

In conclusion, it can be noted that strengthening health care infrastructure, i.e. increasing supply of health care services, is essential for enhancing health care utilization. But increasing supply does not mean provision of health infrastructure only; rather it must ensure how to reach people. Efforts must be striking all three sets of factors - individual, modifying and likelihood of action - as suggested by Becker et al. (1977) to boost up utilization. Further, parallel efforts of strengthening health care infrastructure and making health care services affordable must be placed in order to ensure universal maternal health care. The focus should be given towards increasing the demand for health care through providing women's higher education and improved socio-economic status besides making health center accessible.

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