Paper submitted to the Population Association of America, 2013, 11-13April, New Orleans, Louisiana

Assessing Maternal Health Care Utilization in EAG States of India: Evidences from District Level Household and Facility Survey

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Abstract

Concerning the fifth Millennium development goal, India has been trying to improve the maternal health care services but the maternal mortality rate is still high, this type of death is more high approx 300 per year in EAG (Empowered Action Group) states of India. So this study has been carried out with two aims firstly to examine the variations in the utilization of maternal health care services in EAG states and secondly to examine the socio-economic determinants of MHC (Maternal Health Care) services at district levels and household levels in EAG states. For this purpose study used the data from DLHS-3 (District Level Household and Facility Survey, 2007-08) and Census of India 2001. This study utilized composite index, bivariate, correlation and binary logistic techniques for analyzing the data. Results shows that Jharkhand stands at lowest level with 0.11 score whereas Orissa stand at highest level with 0.72 score of maternal health care index (MHCI). Uttarakhand has a highest (0.95) score in socioeconomic development index (SEDI) but its MHC utilization score is lower than five EAG states. The bivariate analysis shows that effect of MHC service utilization has increased with the increasing level of SEDI across the entire social group. The correlation Score (0.27) between MHCI and SEDI at state level is positive but low which shows that factors are also influencing the utilization of MHC than the development factors. Coefficient of correlation at district level shows that electricity followed by female literacy rate and non-agricultural workforce participation are highly correlated among all development indicators with MHC services in each EAG states. Odds ratio shows that wife education leads to greater utilization of MHC services than husband education. Likelihood of going for safe delivery and taking PNC two weeks (post natal care) increases if women have received any ANC (Anti Natal Care) than those women who have not received any ANC.

Introduction

Women of reproductive age group are the most vulnerable segment of the population in terms of health issues, especially when they are going to be a mother. The maternal health refers to the health of women during pregnancy, childbirth and postpartum period. More than 350,000 women die annually from complications during pregnancy or childbirth, almost all of them 99 per cent in developing countries. The decline rate of maternal mortality is very slow but the annual decline required rate is 5.5 per cent to meet the MDG target of reducing by three quarters the maternal mortality ratio by 2015 (MDG fact sheet 2010).

Reduction of maternal mortality has been an area of concern; governments across the globe have set time bound targets to achieve it. Numerous rounds of world conferences have been carried out in this direction. In India, family planning programme was introduced during first five year plan (1951-56), it was the first official family planning program by any government across the globe. Later several plan launched by the Indian government for improving the maternal health services in the country. In spite of all these programme and efforts the situation of maternal health care (MHC) is worst and it shows variation among different parts of the country.

In India, eight states with high fertility and mortality have been termed as Empowered Action Group (EAG) states; it also called as high focused state in National Rural Health Mission (NRHM). They are namely, Bihar, Jharkhand, Madhya Pradesh, Chhattisgarh, Uttar Pradesh, Uttarakhand, Rajasthan and Orissa; all these states are lagging behind in India's overall socio-economic and demographic development. The situation of MMR in the EAG states as Bihar/Jharkhand (312), Madhya Pradesh/Chhattisgarh (335), Orissa (303), Rajasthan (388) and Uttar Pradesh/Uttarakhand (440) per lakh respectively. In terms of TFR, value is varying in the range of 3.0 to 3.9 in these states (MoHFW report 2010). These eight states account for 44.66 percent of India's population and its average urbanization percentage is 20.52 whereas India's urbanization percent is 27.8 according to 2001 census of India. These states are affected with acute poverty and account for more poor people in comparison to 26 poorest African nations altogether (Times of India, 2011).

Reduction in maternal mortality in EAG states brings important social and economic gains because the vast majority of women who dies from pregnancy related causes are in the prime of life. The death or chronic ill-health of a mother increases the probability of death and poor growth and development of her children (Filippi *et. al.* 2006). These children are 3 to 10 times more likely to die within two years than children blessed with their alive parents (UN MDG 2000). Good maternal health is crucial for the welfare of the whole household, especially children who are dependent on their mothers to provide food, care, and emotional support.

Maternal mortality is affected in these states by a range of factors, socioeconomic and cultural, such as women's status in the household and society, their educational and economic status, accessibility facility (distance, transport) and availability and quality of care (availability of staff and equipment in the health facility) (Singh *et. al.* 2011). The geography determines the accessibility of maternal health care services as well as it affects the behaviour of people regarding decision making power and life style.

Previous studies have examined the role of maternal health care services in EAG states but they ignored the potential effect of geography and comparative study of EAG states with complete picture of maternal health care. So this study attempts to explore the disparities in utilization of maternal health care in the EAG states. In concern of these issues study has two aims; first to examine the regional variations at states level in the utilization of maternal health care services and secondly study the socio-economic determinants of MHC at district levels and household levels in EAG states.

Methodology

Data Source: The third round of "District Level Household and Facility Survey (DLHS 2007-08)" is one of the largest ever demographic and health surveys carried out in India, with a sample size of about seven lakh households covering all districts of the country (excluding Nagaland). The Ministry of Health and Family Welfare (MOHFW), Government of India, initiated District Level Household Surveys (DLHS) in 1997 to provide district level estimates on health indicators to assist the policy makers and program administrators in decentralized planning, monitoring and evaluation. From the households 6, 43,944 ever married women aged 15-49 years were interviewed. The broad objective of DLHS-3 is to provide "reproductive and child health (RCH)" outcome indicators at the district level in order to monitor and provide corrective measures to the "national rural health mission (NRHM)" (DLHS-3). According to DLHS-3, state wise sample size of currently married women age group 15-44 in EAG states are Uttarakhand 4111, Rajasthan 12458, Uttar Pradesh 37846, Bihar 21460, Jharkhand 11373, Orissa 7671, Chhattisgarh 6131, Madhya Pradesh 15923 and total sample size of EAG states is 116973.

Sample size of the different state at district level is Uttaranchal (13), Uttar Pradesh (70) Bihar (37), Orissa (30), Chhattisgarh (16) Jharkhand (18), Rajasthan (32) and Madhya Pradesh (45). The new districts of Jharkhand state that emerged after the 2001 Indian Census were included with their parent districts.

The Census of India is the most reliable source of information on Population characteristics and many other socio-economic-cultural data since 1872. This study used several socio-economic data from Census of India 2001.

Outcome Variables: Study used the information on any antenatal care, safe delivery and postnatal care within two weeks (PNC 2w) received by women who had their last live/still birth since 01-01-2004 and currently married women whose last pregnancy, during 3 years preceding the survey, had terminated either as live birth or as still birth from DLHS-3. These are important indicators of maternal health care and are widely used to document the progress in the achievement of the fifth Millennium Development Goal. Any ANC: - It refers to any antenatal cares like health checkups, vaccination against tetanus, iron and folic acid prophylaxis, as well as anaemia management etc. using by women during pregnancy. Safe Delivery: - It refers to the process of childbirth that should take place in a health institution or under the supervision of a health professional. Postnatal care within two weeks (PNC 2w): - Study takes into account of PNC 2w because more than 50 percent post delivery complication rises within this period.

Exposure Variable: There are two type of exposure variable first is district level and second is household level.

1) ***District level:*** all district level variable taken from census 2001.

(a) Percent female literacy rate: - It is defined as the ratio of literate female who are 6 and above means of age and total female multiplied by 100.

(b) Percent urban: - It is defined as ratio of urban population and total population multiplied by 100.

(c) Percent non-agriculture workforce: - It is defined as the ratio of sum of the main workers and marginal workers and total workers multiplied by 100.

(d) Percent of safe drinking water: - It is defined as the ratio of sum of households with tube well, household with tap and household with hand pump to the total households multiplied by 100.

(e) Percent of household using electricity as a source of light: - It is defined as the ratio of households using electricity as a source of light and total households multiplied by 100.

(f) Percent of Scheduled Caste: - It is defined as the ratio of schedule caste population and total population multiplied by 100.

(g) Percent of Scheduled Tribe: - It is defined as the ratio of schedule tribe population and total population multiplied by 100.

2) Household level:

a) Place of residence: whether women residing in rural or in an urban area. The access of good health care is very difficult in the rural area that is why mostly rural women are deprived by the maternal health care facilities.

b) Castes: since marriage is a social institution, therefore it is expected to be related with traditions, customs, taboos that prevail in a particular society. In such society where people are more traditional, caste play very important role in determining age of marriage and awareness about the pregnancy related issues.

c) Religion: Religion can be considered as an important factor in determining that how much they receive the healthcare facilities. Some of the religious orthodox related traditions are become barrier in receiving the maternal health care.

d) Education Attainment: There are several arguments available which explain the mechanism through which education shows its impact on receiving the health services, especially maternal health care. It affects the utilization of MHC directly and indirectly in both ways. It show its impact in terms of time spent in school, amount of education acquired and quality of education.

e) Wealth index: Household economic status influences the utilization of maternal health care. Sometimes due to financial problem women are not able to utilize the maternal health care.

f) Husband's education: It is also the major influencing factor on maternal health care utilization. Due to prevalence of largely male dominated society in India, sometimes male decides which health centre is good and how much care is required to women during pregnancy.

g) Marital duration: It is related to time spent by the couple together after the marriage.

Method: Study computes two composite indices for studying the variation of maternal health care in EAG states. A composite index has a number of factors, which are averaged to form a product representative of summary measure. The first index is Maternal Health Care Index **(MHCI);** it takes account of three variables such as *any ANC, safe delivery, and PNC 2w*. Another index is

Socio-Economic Development Index **(SEDI)** it takes account of five indicators such as *percent female literacy rate, percent urban and percent non-agriculture workforce, percent of safe drinking water, and percent of electricity as a source of lighting in the household*. The MHCI is used for ranking the states to know the variations in utilization of maternal health services. Scores of both the indexes are divided into three proportions of quintile labelled low, middle, and high, similarly both the indices are also divided into three category labelled low, middle and high. By the help of these quintile and category the study constructs the matrix for the comparison of region.

The methodology of computation of composite index is adopted from Human Development Report, 2010. This methodology has two steps for computation; Step 1 is the computation of the dimension index (Di) for each of the indicators considered for specific composite index. To transform a variable, say Vi, into a unit-free index between 0 and 1 (which allows different indices to be added together), the following formula is used:

$$\textbf{Dimension index} \text{ (each indicator)} = Vi - Vmin / Vmax - Vmin$$

Where, Vi is the actual value of the indicator, V*min* is the minimum and V*max* is maximum value percentage of the indicators in distribution.

Step 2 is the computation of the composite index (CI). Equal weight is given to all the indicators considered for all three composite indices. A composite index is estimated by using the following formula.

$$\textbf{Composite index} = 1/N\ (D_{i1} + D_{i2} + D_{i3} + \text{.....})$$

Where, Di is the dimension index and N is the number dimension indices considered for the composite index. Bivariate technique is used for analysing the impact of socioeconomic development on different social groups for utilizing the maternal health care services. Correlation has done by district level variable such as percentage of urbanization of district, percentage of female literacy rate of district, percent of safe drinking water of district, percent of electricity as a source of lighting in household, any ANC, safe delivery and PNC2w. Correlation shows the relation between two variables and it always lies between -1 and +1, if r = +1 the correlation is perfect and positive and if r = -1, correlation is perfect and negative. Binary logistic regression is used in case, when the dependent variable is dichotomous (i.e., 0 and 1). The predictor variables may be quantitative, categorical, or a mixture of the two. When this is done, the model is called the *linear probability* model. It is carried out with response variable and household variables.

Results and Discussion:-

Ranking of the EAG States according to MHCI score

According to composite score, Jharkhand stands at the lowest level (.11) whereas Orissa stands at the highest level (.72) in MHCI, both the states belongs to medium category of SEDI. The gap of MHCI score between these two states is very high; Orissa has 6 times more score than Jharkhand. This may be because mostly people of Jharkhand state belong to lower category of SEDI.

Jharkhand followed by Bihar, Uttarakhand and Uttar Pradesh gets lower score than the average score (.44) of 8 EAG states. The unexpected result comes from Uttarakhand; in terms of SEDI, it has highest score among the EAG states. Instead of this Uttarakhand occupies third last score (.24) in MHCI. It may be due to lack of accessibility in hilly areas. Rajasthan is the only state where utilization of maternal health care score is equal in respect of SEDI score, it is .62 (see table 1).

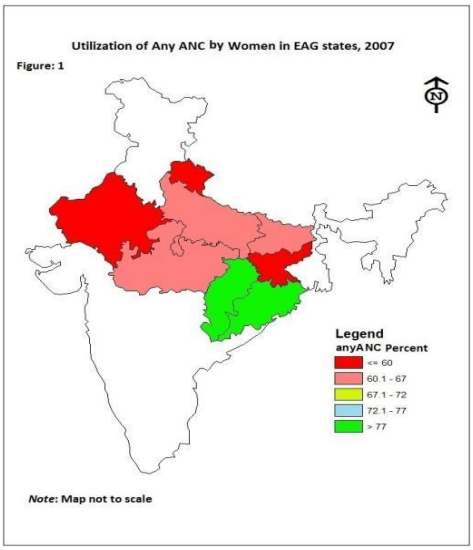
The key indicator any ANC shows that Uttarakhand has utilized lowest percent whereas Orissa has the highest percent utilization. The indicator safe delivery shows that Jharkhand has utilized lowest percent while Rajasthan has utilized highest. Similarly indicator PNC 2w shows that Bihar utilized lowest whereas Chhattisgarh utilized highest (see figure 1- 4).

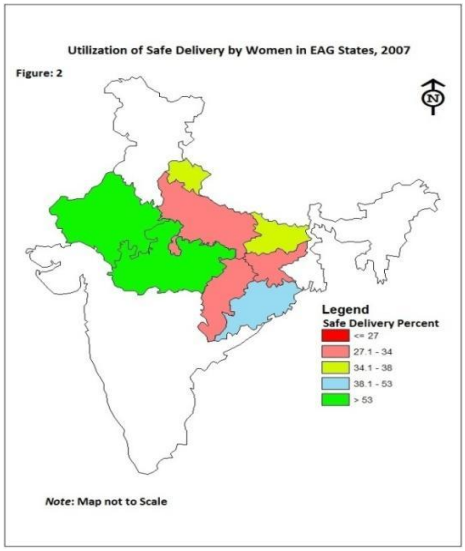
Government effort is also playing important role to encourage the utilization of health services in Orissa per capita health expenditure was 902 crores in 2004-05 whereas in Jharkhand health expenditure is only 500 crores (MoHFW, 2010). This investment shows the government initiatives in health sector to provide health facilities to common man in the states. The correlation value between MHCI and SEDI is .27 it has positive but weak relation. By this correlation coefficient value this fact has been drawn that other than development factor some other factors also influencing maternal health service.

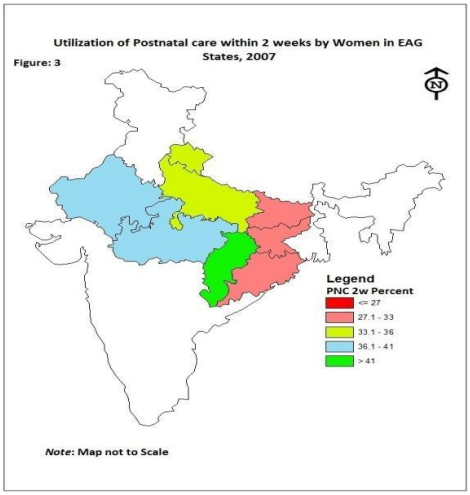
Table: 1 Ranking of the EAG States according to MHCI score.

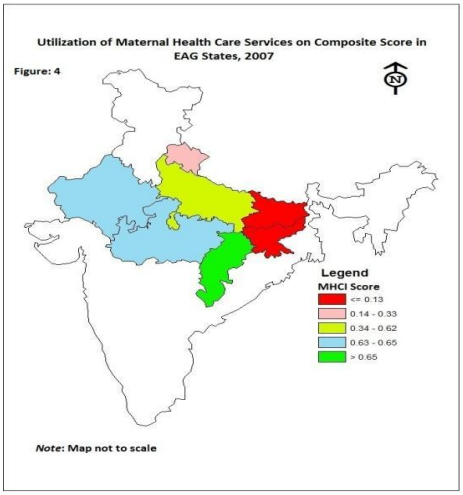
S. No.	State	SEDI	MHCI
1	Jharkhand	0.34	0.11
2	Bihar	0.19	0.13
3	Uttarakhand	0.95	0.24
4	Uttar Pradesh	0.59	0.33
5	Rajasthan	0.62	0.62
6	Madhya Pradesh	0.70	0.65
7	Chhattisgarh	0.53	0.69
8	Orissa	0.47	0.72

Note: MHCI- Maternal health care index, SEDI- Socio-Economic development index.









Utilization of maternal health care services by social groups with different Categories of SEDI

The society is called developed when the deprived social groups or caste received all the facilities of development. In EAG states scheduled caste and scheduled tribes are deprived class and behind from the development. Present table 2 to 4 shows that how much utilization of maternal health care is increased when the social and economic development level changes. The analysis of all tables is carried out by different key indicators of maternal health care.

Tables show that between all the social groups ST is more deprived group. This group is not much benefited by the social and economic development, it means that within the community social and economic development is not well and they not only lived with their old traditions but also believed on the traditional medicinal practices. In EAG states ST population is distributed in different proportion but more or less the social status and economic condition is same across the states. Majority of ST population found in rural areas among all the EAG states have main occupation as cultivation. The literacy rate is low especially female literacy which is very low in comparison to other social group. The mean number of children ever born per ever married ST woman is 4 due to which the growth rate of this caste group is high than national decadal growth rate between 1991-2001 (census, 2001).

These tables also show that overall scenario of social groups, in EAG states, the social groups are not much benefited by social and economic development and the change in utilization rate has not increased with the level of development. The higher category of development utilized more maternal health services, it means that those people who belong to high category of development utilized high maternal health services among all the social groups but this utilization percent is not much higher than low development categories.

Table: 2, Percent of women Population belong to different caste group utilized MHC services by the Socio-economic development Index (SEDI).

Antenatal Care		**SEDI**	
Caste of the Women	*Low*	*Medium*	*High*
Scheduled caste	53.5	56.6	65.4
Scheduled tribe	52.4	52.7	63.1
OBC	59.6	62.4	68.3
Others	67.9	72.7	77.1

Table: 3, Percent of women Population belong to different caste group utilized MHC services by the Socio-economic development Index (SEDI).			
Safe Delivery		**SEDI**	
Caste of the Women	*Low*	*Medium*	*High*
Scheduled caste	24.6	31.6	37.7
Scheduled tribe	21.6	29.0	30.5
OBC	28.3	36.3	44.3
Others	41.7	53.5	60.4

Table: 4, Percent of women Population belong to different caste group utilized MHC services by the Socio-economic development Index (SEDI).			
PNC 2w		**SEDI**	
Caste of the Women	*Low*	*Medium*	*High*
Scheduled caste	21.9	25.7	37.2
Scheduled tribe	21.3	26.2	30.3
OBC	25.2	29.3	45.1
Others	34.4	41.0	55.7

Correlation at districts level

Table 5 shows the correlation matrix of three indicators of maternal health care and five indicators of socioeconomic development in the districts of EAG states. In this matrix, PNAW, female literacy rate and electric lighting are significantly positive correlated with the any ANC, safe delivery and PNC 2w, through this matrix we can also analyze that female literacy rate as a major determinant than other development indicators for utilizing the maternal health care service. Percent SC and ST indicators are negatively or weak correlated with any ANC, safe delivery and PNC 2w. The overall scenario of percent SC and ST indicator shows that this caste group is less related with maternal health care services.

Table: 5, Correlation Matrix showing relationship between MHC indicators and SED indicators at district level (N=261).			
	Any ANC	***Safe Delivery***	***PNC 2w***
PNAW	.168**	.415**	.427**
Percent Female literacy	.252**	.539**	.408**
Percent urbanization	.104	.417**	.460**
Safe Drinking Water	.155*	-.101	.137*
Electricity Lighting	.155*	.564**	.466**
SC Percent	-.098	.069	-.107
ST Percent	.124*	-.039	.002
Note: *-Significant at 5 percent level; **-Significant at 1 percent level; PNAW- Percent Non-agriculture Workforce; PNC 2w- Postnatal care within 2 weeks, MHCI- Maternal Health Care index Indicators.			

It is observed that those states whose literacy rate is good use mor maternal health care services as compared to the least literacy rate states. For instance, Jharkhand shows significantly high positive correlation with the utilization of MHC services. In case of Madhya Pradesh, the correlation coefficient is showing positive relationship between female literacy rate and MHC. Orissa and Bihar shows safe delivery is significantly high positive correlation with female literacy rate (see table 5.1).

Table: 5.1, Correlation of MHCI with Percent of Female Literacy Rate								
MHCI	**Uttarakhand**	**Rajasthan**	**Uttar Pradesh**	**Bihar**	**Jharkhand**	**Orissa**	**Chhattisgarh**	**Madhya Pradesh**
Any ANC	.463	-.007	.041	-.189	.821**	.203	.411	.625**
Safe Delivery	.511	.363*	.482**	.865**	.792**	.828**	.438	.481**
PNC 2w	.559*	.127	.375**	.443**	.773**	.491**	.322	.517**

The indicator electricity as a source of lighting in household is another indicator which is significantly strong correlated with maternal health care services in Jharkhand and Uttarakhand state. Other states like Chhattisgarh and Madhya Pradesh show that their MHC services are moderately positively correlated with electric lighting. Over all electric lighting is positively correlated with maternal health care services in each state (see table 5.2). This relation shows that electricity is very effective means to change the life style of the people.

Table: 5.2, Correlation of MHCI with Percent of Household using electricity as a source of light								
MHCI	**Uttarakhand**	**Rajasthan**	**Uttar Pradesh**	**Bihar**	**Jharkhand**	**Orissa**	**Chhattisgarh**	**Madhya Pradesh**
Any ANC	.440	.419*	.320**	-.204	.671**	.221	.675**	.614**
Safe Delivery	.922**	.513**	.575**	.642**	.836**	.690**	.522*	.611**
PNC 2w	.890**	.433*	.493**	.395*	.771**	.457*	.559*	.539**

Similarly those states having less agricultural practice use more MHC services as compared to those state who are more involved in agricultural practices. For instance, the MHC services like Safe delivery, PNC 48h and PNC 2w have showed significantly strong positive correlation between non-agricultural workforce participation in Uttarakhand and Jharkhand. Other states also show positive correlation between MHC services and non-agricultural workforce participation (see table 5.3).

Table: 5.3, Correlation of MHCI with Percent Non Agricultural Workforce								
MHCI	**Uttarakhand**	**Rajasthan**	**Uttar Pradesh**	**Bihar**	**Jharkhand**	**Orissa**	**Chhattisgarh**	**Madhya Pradesh**
Any ANC	.487	.284	.146	-.062	.504*	.214	.083	.299*
Safe Delivery	.899**	.239	.512**	.535**	.683**	.721**	.178	.509**
PNC 2w	.879**	.228	.526**	.494**	.604**	.394*	.026	.471**

The indicator percent urban population has significantly strong positive correlation with MHC services in Jharkhand. In case of Uttarakhand, the MHC services like Safe delivery and PNC 2w shows strong positive correlation between percent urban (see table 5.4).

Table: 5.4, Correlation of MHCI with Percent of Urbanization								
MHCI	**Uttarakhand**	**Rajasthan**	**Uttar Pradesh**	**Bihar**	**Jharkhand**	**Orissa**	**Chhattisgarh**	**Madhya Pradesh**
Any ANC	.396	.202	.018	-.274	.729**	.113	.065	.392**
Safe Delivery	.909**	.256	.359**	.582**	.825**	.422*	.184	.638**
PNC 2w	.845**	.196	.459**	.304	.762**	.334	-.018	.501**

Table 5.5 shows that in Uttarakhand and Chhattisgarh, correlation between utilization of safe drinking water and maternal health care service is significantly strong correlated. It is also observed that in

Rajasthan and Madhya Pradesh safe drinking water is significantly positively correlated with maternal health care services.

Table: 5.5, Correlation of MHCI with Percent of Household using Safe Drinking Water

MHCI	Uttarakhand	Rajasthan	Uttar Pradesh	Bihar	Jharkhand	Orissa	Chhattisgarh	Madhya Pradesh
Any ANC	.575*	.585**	.126	.167	.253	.428*	.800**	.374*
Safe Delivery	.752**	.411*	-.119	-.399*	.039	-.037	.264	.463**
PNC 2w	.782**	.572**	.315**	-.261	-.064	.111	.684**	.421**

Results of logistic regression:

Odds Ratio of response variable are showing the significance with every predictor variable. The any ANC in Orissa is 9 time higher similarly in Chhattisgarh the value of odd is 7 times high than Uttarakhand. Maternal health care in terms of safe delivery in Rajasthan and Madhya Pradesh are 4 times more likely to take place than that in Uttarakhand. All the states are significantly more likely to go for PNC 2w than Uttarakhand.

Women residing in the urban are more likely to use the maternal health care facilities such as any ANC (16% more likely), safe delivery (68% more likely) and PNC 2w (36% more likely) than their counterparts. Women in the age group 35 – 49 years are 18 % less likely to utilize any ANC than those in the age group 15 to 24 years. Likelihood of safe delivery decreases with the increase in age of women. With the increase in the age of women utilization of PNC 2w increases significantly.

The educated women are more likely to use the maternal health care facilities. Utilization of any ANC increases 3 times and safe delivery increases 2 times for those who are educate 10 or more years than illiterate women.

Utilization of maternal health care shows positive and significant effect by husband's education. Utilization of ANC (38%), safe delivery (54%) and PNC 2w (25%) increases with the increase for those women having husbands with 10 or more years of education.

Those women who are married for longer duration are less likely to utilize the maternal health care services. Looking in the utilization of facilities caste wise we came across some interesting findings. Those women belonging to scheduled tribes are less likely to utilize the maternal health care facilities than the SC women.

The religion of the household head has impact on maternal health care utilization. Those women belonging to Muslim, Christian and others religion are showing comparatively less likeliness to utilize maternal health services than Hindu; this fact shows that these categories are deprived with maternal health services due to several socio-cultural and economic reasons.

Utilization of maternal health care services increases significantly with the increase in the wealth index of household. Those women belonging to richest wealth index are 2 times more likely to utilize maternal health care services then those women belonging to poorest wealth index.

Women receiving any ANC are taken as independent variable for the last two models. Where we found that likelihood of going for safe delivery (2.64 times) and taking PNC 2w (2.54 times) increases if women have received any ANC than those women who have not received any ANC (see table 6).

Table: 6, Odds ratio for key indicators of Maternal Health Care according to selected background characteristics in EAG States, 2007.

	ANC	Safe Delivery	PNC 2w
Background characteristics	***Exp(B)***	***Exp(B)***	***Exp(B)***
State			
Uttarakhand®			
Rajasthan	2.07***	4.88***	2.20***
Uttar Pradesh	2.95***	1.35***	1.61***
Bihar	2.98***	2.17***	1.42***
Jharkhand	2.60***	1.61***	2.00***
Orissa	9.89***	3.60***	1.18***
Chhattisgarh	7.73***	1.39***	2.37***
Madhya Pradesh	2.73***	4.25***	2.09***
Place of residence			
Rural®			
Urban	1.16***	1.68***	1.36***
Age group			
15-24®			
25-34	1.00	.93***	1.09***
35-49	.82***	.95	1.17***
Husband education attainment			
Non-literate®			
Less than 5 year	1.15***	1.04	1.12***
5-9 years	1.25***	1.24***	1.17***
10 or more year	1.38***	1.54***	1.25***
Education attainment			
Non-literate®			
Less than 5 year	1.29***	1.15***	1.18***
5-9 years	1.51***	1.28***	1.17***
10 or more year	2.87***	2.22***	1.62***
Marital duration			
Less than 5 years®			
5-9 years	.79***	.67***	.75***
10-14 years	.68***	.57***	.63***
15 or more years	.62***	.55***	.57***
Caste of the women			
Scheduled caste®			
Scheduled tribe	.84***	.73***	.86***
OBC	1.08***	1.07***	1.04**
Others	1.15***	1.32***	1.16***
Religion of the HH head			
Hindu®			
Muslim	.91***	.80***	1.03
Christian	1.17**	.71***	.60***
Others	1.08	.82***	.85***
Wealth index quintiles			
Poorest®			
Second	1.25***	1.23***	1.17***
Middle	1.47***	1.46***	1.36***
Fourth	1.92***	1.73***	1.59***
Richest	3.15***	2.98***	2.38***
Received Any ANC			
No®			
Yes		2.64***	2.54***
-2 Log likelihood	137724.644	124183.940	131740.429
N	116973	116973	116973

Note:- ®- Reference Category; ***p < 0.01, **p < 0.05, PNC 2w- Postnatal Care within 2 weeks, HH- House hold, OBC- Other Backward Caste.

Conclusion

From above findings we can conclude that factors of development affect the utilization of maternal health care services as it is reflected in ranking of the states for instance those states stands at low level of MHCI which have also lower level of SEDI score. But the correlation coefficient value at state level shows that development is not the only factor which affects the utilization, some other factors like physiography of region, river, forest etc also influence to encourage or discourage the utilization of maternal health care services. SC and ST social groups hav less utilized the MHC services because of some socio-economic factors like belonging to rural areas, their low education level etc. These factors affect the utilization of MHC services because rural areas have under developed health facilities and low education status which leads to unawareness about the health issues. The early marriage is prevalent and mean number of children is high (4) in these social groups because of above socioeconomic reasons (census report 2001). Female literacy followed by electricity as a source of lighting in household are most correlated development indicators which affect the utilization of maternal health services. Literacy is directly linked with awareness about health but the electric lighting is indirectly linked with health. Use of electricity allows people to utilize other means like T.V. radio , etc, making them aware about the health care services and needs. Jharkhand is highly correlated with female literacy and electric lighting. Odds ratio shows that women's education attainment is more associated than the Husband's education attainment with maternal health care service indicators. It means that wife education is more important than the husband education for utilization of maternal health services. Urban women are more likely to utilize MHC service as compared to their counterpart's women who belong to rural area i.e. because of lack of accessibility and availability of health services in the rural area. Utilization of maternal health care services is increases with the rising level of wealth index; richest women utilize more and better maternal health care services because of affordability. Further, it has been found that those who have received any ANC they are more than 2 times likely to utilized safe delivery and postnatal care within two weeks because of better knowledge provided by health facilitator about pregnancy complication and health risk with regular follow up.

Study concludes that in some EAG states maternal health care utilization is still very low, the correlation between MHCI and SEDI also shows low and week relation. Therefore to increase the maternal health care utilization, there should be more focus on under developed state for the development of maternal health care. There should be reach of electricity in every household because they can use modern facilities and become aware about the health. This will help government in reducing the maternal mortality and morbidity to improve the maternal health care utilization in the EAG states.

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