

Original Research Article

Predictors of Utilization of Maternal and Child Health Services in India: An Analysis of District-Level Information

Rahul Srivastava¹, Sonam Bedi²

¹School of Population Health, University of Auckland, New Zealand.

²Department of Biostatistics & Health Informatics, Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow-226014, Uttar Pradesh, India.

Corresponding Author: Rahul Srivastava

Received: 15/07/2016

Revised: 27/07/2016

Accepted: 29/07/2016

ABSTRACT

Background: India has been observing high maternal mortality due to pregnancy complications. Apart from the availability of health care facilities, many women and children are deprived of these facilities.

Objectives: To assess the contribution of some of the key factors to the utilization of maternal and child health (MCH) services in India.

Data and Methods: The data of District Level Household & Facility Survey (DLHS-3) was utilized. The four components for MCH utilization at the district level e.g. practice of modern methods of contraception; antenatal care (ANC), institutional deliveries and immunization status of children were considered as the outcome variables. Binary logistic regression analysis was carried to identify the level of contribution of each of the predictors on the outcome variables.

Results: For the contraceptive practices three ANC visits, unmet need emerged as the major contributors. The ANC seeking behavior of women is significantly affected by wealth quintile, birth order, JSY beneficiaries and PHC functioning 24 hours; female literacy having the highest influence. For institutional delivery, wealth quintile, ANC visits, and birth order emerged as the significant contributors. Immunization status was significantly predicted by the female literacy status, ANC taken and birth order. The sensitivity and specificity varied from 74% to 90%; showing a very high predictive ability of the significant predictors to assess the district level performance of MCH.

Conclusion: Study highlights that participation of the community as a whole may bring substantial changes; suggesting the need and scope for information, education and communication (IEC), with a special focus in states with poor performing districts with poor literacy and wealth quintiles for sustenance and further improvisation of MCH service utilization.

Keywords: Maternal and Child Health, Institutional deliveries, Unmet need.

INTRODUCTION

Maternal and child health care (MCH) was first initiated in the early 1900s as voluntary work coordinated by the Maternal and Child Welfare Bureau under the Indian Red Cross Society. Till 1953, MCH was unevenly distributed and delivered through maternity homes and midwives. Despite the intensive emphasis on MCH in India, no serious initiatives were

visible until National Population Policy-2000 ^[1] (NPP-2000) came into existence. Nearly 70% of the Indian population lives in the rural part that are relatively poor, with low literacy and more so live in with many traditional customs and taboos than the urban population. The public health sector is the only available source of care especially to the poor. Rural pockets are mostly compounded with poverty, therefore more

concerned to the earning of their bread and butter. Because of poor literacy, high fertility and poor perceptions of MCH care, mothers do not show much concern to these services until the situation is complex. No intensive care program was continued to make them aware of the complexity of the non-utilization of MCH services. Recognizing the seriousness Government of India initiated child survival and safe motherhood ^[2] (CSSM) program in 1992 that was in due course of time renamed as reproductive and child health (RCH) program ^[3] in 1997. Under the National Health Policy-2002; 100% mothers should have antenatal care (ANC), and 80% of the deliveries must be institutional. The core strategies of RCH-II Program were to improve access to quality health services through decentralized health facilities. RCH-II aimed to provide essential obstetric care i.e. early registration, minimum three ANC checkups, prevention & treatment of anemia, immunization with tetanus toxoid (TT), institutional/safe deliveries and postnatal check-up to all the pregnant women and emergency obstetric care to the needy. Essential newborn care, immunization, and vitamin A supplementation and care during illness are main child health interventional strategies envisaged in RCH-II.

Many women and children in developing nations especially of the rural part are deprived of MCH facility. Deprivation is bilateral may be poor health care delivery services or poor utilization of these services by the beneficiaries because apart from availability and accessibility of health care facilities, it's utilization also depends on health seeking behavior population. The health-seeking behavior is directly or indirectly governed by the socio-demographic background and perceived importance of MCH services. Undoubtedly the utilization of MCH services is one of the keys to reducing infant mortality rate (IMR) and maternal mortality rate (MMR). Therefore, to reach the target of MMR and IMR as per NPP-2000, the utilization of

MCH services needs to be prompted. Given this fact, the present paper is an attempt first to identify the key contributors of utilization of MCH services based on the data available at district levels and judge the suitability of the model for the validity of the contribution of predictors obtained.

Objectives: To assess the contribution of some of the key factors to the utilization of MCH services in India.

MATERIALS AND METHODS

The District Level Household & Facility Survey (DLHS), 2007-08 is the third series of district-level household survey, carried in all 602 districts (in all 28 states and 6 union territories of India) and published by the International Institute for Population Sciences (IIPS) designated as the nodal agency by the Ministry of Health, Government of India. The broad objective of DLHS-3 was to provide RCH outcome indicators expressed in percent at the district level to monitor and provide the corrective measures to National Rural Health Mission (NRHM). From the DLHS-3 reports the outcome indicators, as well as their predictors at the district levels, were considered. Outcome variables were practice of modern methods of contraception, seeking minimum of three ANC, institutional deliveries conducted and immunization status of children. The predictor variables were female literacy, wealth quintiles, marriage age below the age of 18 years, mothers with birth order more than 2, reporting unmet need, minimum 3 ANC, institutional delivery, availed Janani Suraksha Yojana (JSY) benefit, villages within 3 kilometers (km) from Sub center, primary health center (PHC) functioning 24 hours. Some of the outcome variables were also considered as the predictors to some other outcome variable as per conceptual frame ([Table-1](#)). For easy understanding all outcome and predictors were dichotomized considering the median level as cut-off values into better and poor performing districts ([Table 2](#) & [3](#)). To describe the regional variation of various components of

MCH utilization and their predictors, the states with more than 50% of poor performing districts were also analyzed by grouping them as below:

1. Jammu & Kashmir, Himachal Pradesh, Punjab, Uttarakhand, Haryana, Delhi and Chandigarh.
2. Rajasthan, Uttar Pradesh, Madhya Pradesh, Bihar.
3. Sikkim, Arunachal Pradesh, Manipur, Mizoram, Tripura, Meghalaya, Assam.

4. West Bengal, Jharkhand, Orissa, and Chhattisgarh.
5. Gujarat, Daman & Diu, Dadra & Nagar Haveli, Maharashtra, Goa and Lakshadweep.
6. Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Pondicherry, Andaman & Nicobar

The numbers of the district covered in respective regions under DLHS-3 were 89, 184, 75, 87, 67 and 100 respectively.

Table 1: Predictors considered for various outcome variables

Outcome Indicators	Possible Predictors
Practice of contraception	Female literacy, Wealth quintiles, Marriage age < 18 years, Birth order > 2, ANC, Institutional delivery, Sub centre distance, PHC timings, JSY beneficiaries, Unmet need of contraception
Antenatal care	Female literacy, Wealth quintiles, Marriage age < 18 years, Birth order > 2, Sub centre distance, PHC timings, JSY beneficiaries
Institutional deliveries	Female literacy, Wealth quintiles, Marriage age < 18 years, Birth order > 2, ANC, Sub centre distance, PHC timings, JSY beneficiaries
Immunization status of children	Female literacy, Wealth quintiles, Marriage age < 18 years, Birth order > 2, ANC, Institutional delivery, Sub centre distance, PHC timings, JSY beneficiaries

Statistical analysis

Firstly the district level indicators were dichotomized as the binary variables by considering the overall country median level of performance of each outcome and predictor variables. These were as follows:

Table 2: Cut-off values for outcome indicators

Outcomes	Median
Practice of Contraception	51.6%
ANC	52.6%
Institutional deliveries	48.0%
Immunization status of children	57.9%

Table 3: Cut-off values for predictor variables

Predictors	Median
Female literacy	64.6%
Wealth quintiles	13.6%
Birth order	62.2%
Sub center distance	72.1%
Girls married below the age of 18 years	19.6%
PHC timings	55.4%
JSY beneficiaries	10.8%
Unmet need	18.4%

The indicators e.g. practice of modern methods of contraception, ANC services, institutional deliveries, immunization status of children, female literacy, wealth quintiles, JSY benefit availed, and PHC functioning 24 hours in the districts if above the country median level were considered as the better performer districts; while the indicators e.g. marriage below the age of 18 years, mothers with birth order more than 2, reporting

unmet need and villages within 3 km from sub-centers if below the country median level were considered as better performer districts. Firstly the bi-variable binary logistic regression analysis was carried to find the unadjusted odds ratio (risk), subsequently; the predictors significant in bi-variable analysis were then taken into the multivariable binary logistic regression analysis. To judge the model suitability under the predictors considered the classification tables for each of the outcome variable was also obtained. The beta coefficients (β), odds ratio (OR) were calculated for all predictors with respective 95% confidence intervals (CI) on OR and p-values (Sig.) at 5% level of significance. IBM-SPSS version 18.0 was used for carrying out all the analysis.

RESULTS

The immediate basic goal of the NPP (2000) was to increase the contraceptive practices by reducing the unmet need and reaching 100% ANC, 80% institutional deliveries and universal immunization for safe motherhood and child. The efforts made by the government may not be effective unless community conceives its importance. So it is imperative

to understand the dynamics of both governments as well as the community.

[Table-4](#) indicates the percent of poor performing districts by the division of regions. Almost all the districts in region 1 were poor for wealth quintile (97.8% districts), girls marriage (92.1% districts) and JSY program (91.0% districts); 24 hours PHC functioning was also lacking in 70.8% of the districts in this region. In region-2, more than 90% districts were poor performing for ANC services and immunization of children; while more than 80% for institutional delivery, female literacy and birth order < 3; poor performance for unmet need and contraceptive practices was also found in nearly 70% of the districts in this region; for rest of the outcome and predictors, districts of this region were either nearly 50% or less. In region-3, poor performing districts for contraceptive practices were more than 80%. While between 70% to 80% for immunization of children and girl's marriage and 64% each for institutional deliveries and wealth quintiles; 58.7% and 54.7% districts of this region were also poor performing for ANC services and unmet need for contraceptives. In region-4 the poor performance was seen for contraceptive practice, institutional deliveries and unmet need of contraceptives in 77.0%, 75.9%, and 72.4% districts respectively; the poor performance was also recorded for ANC services, female literacy and giving birth < 3 in between 50% to 60% of the districts in this region. In region 5, between 65% to 75% districts were poor performing for wealth quintile, girl's marriage age, JSY program and distance of sub centers from the village. More than 80% districts of region-6 were poor performing for wealth quintile; while "between" 60% to 70% for girl's marriage age and 24 hours PHC functioning in their respective areas.

While considering the predictors of contraceptive practices as shown in [Table-5\(a\)](#), the significant contributors emerged were female literacy, wealth quintiles, marriage age, birth order, ANC, Institutional

delivery, JSY beneficiaries and unmet need for contraception. Unmet need was the major contributor to the practice of contraception; contraception practice was 23.55 (CI: 14.12-39.28) times more in districts with the better condition of unmet need as compared to those of poor ([Table-5\(b\)](#)). The districts with better performance of institutional deliveries, ANC and JSY benefits had 3.23 (CI: 1.73-6.02), 2.43 (CI: 1.32-4.46) and 1.75 (CI: 1.03-2.98) times better contraceptive practices compared to poor-performing districts. The sensitivity and the specificity of the model with these predictors were 90% and 84.4% respectively ([Table-5\(c\)](#)). The overall predictive ability of the model was 87.2%.

The predictors that emerged as significant contributors to avail a minimum of three ANC ([Table-6\(a\)](#)) were the female literacy, wealth quintiles, marriage age, order of birth, PHC functioning and JSY program. Literacy showed better performance in seeking ANC. The minimum three ANC was 3.05 (CI: 2.00-4.66) times higher among districts with better female literacy than those of poor. Mothers of better performing districts i.e. availing JSY benefits are 1.63 times (CI: 1.07-2.49) more likely to take a minimum of three ANC than those not availing JSY benefits ([Table-6\(b\)](#)). Lesser is the birth order of the mother, higher (OR=2.61, CI: 1.70-4.01) is the likelihood of taking ANC checkups compared to higher birth ordered women. While contrary to this, mothers living with better wealth quintiles and where PHC functions 24 hours were less likely to avail a minimum of the ANC. The likelihood to avail complete ANC was lesser by approximately three times (OR=0.30, CI: 0.19-0.46) in districts with better wealth quintiles than the poor and by almost half (OR= 0.53; CI: 0.35-0.78) where PHC functioning 24 hours is better than those of poor. The model sensitivity and specificity was 79.4% and 74.4% respectively ([Table-6\(c\)](#)). The overall predictive ability of the model was 76.9%.

Table 4: Regions with more than 50% of poor performing districts for the outcome and predictors of MCH

Characteristics	Region					
	1	2	3	4	5	6
Contraceptive Practice		72.2%	81.3%	77.0%		
ANC services		95.7%	58.7%	50.6%		
Institutional delivery		80.4%	64.0%	75.9%		
Immunization of children		90.8%	76.0%			
Female literacy		84.8%		60.9%		
Wealth quintile	97.8%		64.0%		68.7%	83.0%
Girls married below 18 year	92.1%		77.3%		64.2%	63.0%
Giving birth to more than 2		82.1%		55.2%		
Unmet need		73.4%	54.7%	72.4%		
JSY beneficiaries	91.0%	51.1%			74.6%	
Villages within 3 km from Sub centre		50.5%			70.1%	
PHC functioning 24 hours	70.8%			50.6%		68.0%

Table 5(a): Profile of districts according to practice of contraception: results of bi-variable binary logistic regression model

Factors	Practice of contraception		β	Sig.	OR	95% CI (OR)
	Better (301)	Poor (301)				
Female literacy status						
Better	66.1%	33.9%	1.35	0.000	3.86	2.76-5.42
Poor	33.6%	66.4%	Reference			
Wealth quintile						
Better	30.1%	69.9%	-1.69	0.000	0.19	0.13-0.26
Poor	70.0%	30.0%	Reference			
Marriage < 18 years						
Better	36.5%	63.5%	-1.10	0.000	0.33	0.24-0.46
Poor	63.5%	36.5%	Reference			
Births of order >2						
Better	69.4%	30.6%	1.61	0.000	5.00	3.54-7.07
Poor	31.1%	68.9%	Reference			
Unmet need for contraception						
Better	86.0%	14.0%	3.64	0.000	38.03	23.98-60.30
Poor	14.0%	86.0%	Reference			
Minimum three ANC was taken						
Better	75.7%	24.3%	2.28	0.000	9.76	6.72-14.16
Poor	24.3%	75.7%	Reference			
Institutional delivery conducted						
Better	76.3%	23.7%	2.31	0.000	10.12	6.96-14.71
Poor	24.1%	75.9%	Reference			
JSY benefit availed						
Better	58.7%	41.3%	0.70	0.000	2.01	1.45-2.78
Poor	41.4%	58.6%	Reference			
Sub center distance						
Better	53.3%	46.7%	0.27	0.103	1.31	0.95-1.780
Poor	46.7%	53.3%	Reference			
PHC functioning 24 hours						
Better	47.2%	52.8%	-0.23	0.166	0.80	0.58-1.10
Poor	52.8%	47.2%	Reference			

Table 5(b): Predictors associated with practice of contraception: results of multivariable binary logistic regression model

Factors (Ref: Poor performing districts)	β	Sig.	OR	95%CI (OR)
Female literacy status	0.37	0.208	1.45	0.81-2.57
Wealth quintile	-0.22	0.501	0.81	0.43-1.519
Marriage < 18 years	-0.11	0.718	0.89	0.48-1.652
Births of order >2	-0.01	0.992	1.00	0.55-1.81
Unmet need for contraception	3.16	0.000	23.55	14.12-39.28
Minimum three ANC was taken	0.89	0.004	2.43	1.32-4.46
Institutional delivery conducted	1.17	0.000	3.23	1.73-6.02
JSY benefit availed	0.56	0.038	1.75	1.03-2.98
Constant	-2.97	0.000	0.05	

Table 5(c): Classification table of observed and predicted through the model

Observed	Predicted		
	Poor	Better	Percent correct
Poor	254	47	84.4
Better	30	271	90.0
Overall percentage			87.2

Table 6(a): Profile of districts according to antenatal care services: results of bi-variable binary logistic regression model

Factors	Antenatal care		β	Sig.	OR	95% CI (OR)
	Better (301)	Poor (301)				
Female literacy status						
Better	71.1%	28.9%	1.82	0.000	6.15	4.32-8.76
Poor	28.5%	71.5%	Reference			
Wealth quintile						
Better	26.5%	73.5%	-2.05	0.000	0.13	0.09-0.19
Poor	73.7%	26.3%	Reference			
Marriage < 18 years						
Better	31.2%	68.8%	-1.58	0.000	0.21	0.15-0.29
Poor	68.8%	31.2%	Reference			
Births of order >2						
Better	71.4%	28.6%	1.80	0.000	6.05	4.26-8.61
Poor	29.2%	70.8%	Reference			
JSY benefit availed						
Better	55.3%	44.7%	0.43	0.009	1.53	1.11-2.11
Poor	44.7%	55.3%	Reference			
Sub center distance						
Better	47.7%	52.3%	-0.19	0.254	0.83	0.60-1.14
Poor	52.3%	47.7%	Reference			
PHC functioning 24 hours						
Better	40.5%	59.5%	-0.77	0.000	0.47	0.34-0.64
Poor	59.5%	40.5%	Reference			

Table 6(b): Predictors associated with mothers seeking a minimum of three ANC check-ups: results of multivariable binary logistic regression model

Factors (Ref: Poor performing districts)	β	Sig.	OR	95% CI (OR)
Female literacy status	1.12	0.000	3.05	2.00-4.66
Wealth quintile	-1.22	0.000	0.30	0.19-0.46
Marriage < 18 years	-0.41	0.081	0.67	0.42-1.05
Births of order >2	0.96	0.000	2.61	1.70-4.01
JSY benefit availed	0.49	0.024	1.63	1.07-2.49
PHC functioning 24 hours	-0.64	0.002	0.53	0.35-0.78
Constant	-0.16	0.566	0.85	

Table 6(c): Classification table of observed and predicted through the model

Observed	Predicted		
	Poor	Better	Percent correct
Poor	224	77	74.4
Better	62	239	79.4
Overall percentage			76.9

Table 7(a): Profile of districts according to institutional deliveries conducted: results of bi-variable binary logistic regression model

Factors	Institutional deliveries		β	Sig.	OR	95% CI (OR)
	Better (301)	Poor (301)				
Female literacy status						
Better	68.1%	31.9%	1.56	0.000	4.78	3.39-6.74
Poor	30.9%	69.1%	Reference			
Wealth quintile						
Better	25.8%	74.2%	-2.08	0.000	0.12	0.09-0.18
Poor	73.7%	26.3%	Reference			
Marriage < 18 years						
Better	32.6%	67.4%	-1.43	0.000	0.24	0.17-0.34
Poor	66.8%	33.2%	Reference			
Births of order >2						
Better	75.1%	24.9%	2.21	0.000	9.08	6.28-13.14
Poor	24.9%	75.1%	Reference			
Minimum three ANC was taken						
Better	81.4%	18.6%	3.00	0.000	20.01	13.24-30.26
Poor	17.9%	82.1%	Reference			
JSY benefit availed						
Better	54.7%	45.3%	0.40	0.015	1.49	1.08-2.06
Poor	44.7%	55.3%	Reference			
Sub center distance						
Better	49.3%	50.7%	-0.03	0.871	0.97	0.71-1.34
Poor	50.0%	50.0%	Reference			
PHC functioning 24 hours						
Better	42.2%	57.8%	-0.60	0.000	0.55	0.40-0.76
Poor	57.1%	42.9%	Reference			

Table 7(b): Predictors associated with mothers seeking institutional delivery: results of multivariable binary logistic regression model

Factors (Ref: Poor performing districts)	β	Sig.	OR	95% CI (OR)
Female literacy status	0.32	0.210	1.38	0.83-2.28
Wealth quintiles	-0.94	0.000	0.39	0.23-0.66
Marriage < 18 years	0.09	0.748	1.09	0.64-1.86
Births of order >2	1.45	0.000	4.27	2.63-6.93
JSY benefit availed	0.06	0.815	1.06	0.66-1.70
PHC functioning 24 hours	-0.08	0.735	0.92	0.59-1.46
Minimum three ANC was taken	2.32	0.000	10.22	6.36-16.41
Constant	-1.63	0.000	0.20	

Table 7(c): Classification table of observed and predicted through the model

Observed	Predicted		
	Poor	Better	Percent correct
Poor	248	55	81.8
Better	54	245	81.9
Overall Percentage			81.9

Table 8(a): Profile of districts according to immunization status of children: results of bi-variable binary logistic regression model

Factors	Immunization status of children		β	Sig.	OR	95% CI (OR)
	Better (301)	Poor (301)				
Female literacy status						
Better	69.4%	30.6%	1.66	0.000	5.243	3.71-7.42
Poor	30.2%	69.8%	Reference			
Wealth quintile						
Better	29.5%	70.5%	-1.75	0.000	0.173	0.12-0.25
Poor	70.7%	29.3%	Reference			
Marriage < 18 years						
Better	34.2%	65.8%	-1.31	0.000	0.271	0.19-0.38
Poor	65.8%	34.2%	Reference			
Births of order >2						
Better	70.4%	29.6%	1.71	0.000	5.499	3.88-7.80
Poor	30.2%	69.8%	Reference			
Minimum three ANC was taken						
Better	82.4%	17.6%	3.09	0.000	21.895	14.39-33.31
Poor	17.6%	82.4%	Reference			
JSY benefit availed						
Better	54.7%	45.3%	0.37	0.023	1.452	1.05-2.00
Poor	45.4%	54.6%	Reference			
Institutional delivery conducted						
Better	75.6%	24.4%	2.24	0.000	9.412	6.49-13.64
Poor	24.8%	75.2%	Reference			
Sub center distance						
Better	47.4%	52.6%	-0.21	0.192	0.808	0.59-1.11
Poor	52.7%	47.3%	Reference			
PHC functioning 24 hours						
Better	42.9%	57.1%	-0.58	0.000	0.563	0.41-0.78
Poor	57.1%	42.9%	Reference			

Table 8(b): Predictors associated with immunization status of children: results of multivariable binary logistic regression model

Factors (Ref: Poor performing districts)	β	Sig.	OR	95% CI(OR)
Female literacy status	0.66	0.007	1.93	1.19-3.12
Wealth quintile	-0.37	0.173	0.69	0.41-1.18
Marriage < 18 years	0.04	0.896	1.04	0.61-1.75
Births of order >2	0.61	0.017	1.85	1.12-3.05
JSY benefit availed	0.11	0.629	1.12	0.71-1.77
PHC functioning 24 hours	-0.08	0.738	0.93	0.60-1.44
Minimum three ANC was taken	2.28	0.000	9.76	5.91-16.12
Institutional delivery conducted	0.52	0.054	1.68	0.99-2.85
Constant	-1.89	0.000	0.15	

Table 8(c): Classification table of observed and predicted through the model

Observed	Predicted		
	Poor	Better	Percent correct
Poor	248	53	82.4
Better	55	246	81.7
Overall percentage			82.1

The significant predictors to institutional delivery identified were female literacy status, wealth quintile, marriage age, birth order, availed minimum three ANC, JSY beneficiaries and PHC timings (Table-7(a)) in the bi-variable analysis. ANC showed the maximum influence to go

for institutional deliveries followed by birth order and wealth quintile ([Table-7\(b\)](#)). The likelihood of institutional delivery was 10.22 times (CI: 6.36-16.41) higher in better performing districts for ANC than those of poor. Lower was the birth order higher was the institutional delivery seeking behavior among women (OR=4.27; CI: 2.63-6.93). Surprisingly, wealthier mothers were less likely to opt for institutional deliveries compared to poorer mothers (OR=0.39; CI: 0.23-0.66). The sensitivity and specificity of the model with these three significant predictors to institutional delivery were 81.9% and 81.8% respectively ([Table-7\(c\)](#)). The overall predictive ability of the model was 81.9%.

Female literacy, wealth quintiles, birth order, marriage age of female, JSY beneficiaries, ANC, institutional deliveries, PHC functioning hours came out to be significant predictors in bi-variable analysis for immunization status of children ([Table-8\(a\)](#)). The mothers who went for ANC check-ups, were about 9 times (OR= 9.76; CI: 5.91-16.12) more likely to immunize their children than mothers who didn't ([Table-8\(b\)](#)). Similarly among literate mothers, likelihood to immunize their children was nearly twice (OR=1.93; CI: 1.19-3.12) high than illiterate mothers. Lesser was the birth order of a child, more was the likelihood to be immunized (OR=1.85; CI: 1.12-3.05). Surprisingly, distance of sub center from the village and 24 hours functioning of PHC did not any influence on immunization status of the children. The sensitivity and specificity of the model derived by the significant predictor's i.e. female literacy, birth order and ANC were 81.7% and 82.4% respectively ([Table-8\(c\)](#)). The overall predictive ability of the model was 82.1%.

DISCUSSION

MCH impact is assessed through physical growth & development and morbidity & mortality. High IMR and MMR have been the major concern in India. Utilization of health care services is

determined by awareness, availability, accessibility, affordability and acceptability by the target population. The goal of the nation to achieve the replacement level of fertility is dependent on contraceptive prevalence for which 60% effective couple protection rate is to be achieved (NPP-2000). The acceptance of contraceptive is also regulated by the desire of children along with sex preference and survival of the children. The unmet need, the indicator of accessibility, of contraceptive to some extent in almost all states and very high in some states clearly indicates the poorer performance of service providers and must be targeted with great emphasis as it has the direct effect on the fertility. India has been observing more than 30% underweight new born mainly due to close spacing compounded with poor maternal care during pregnancy. Poor immunization compliance to six preventable diseases is another cause of high Infancy death. More frequent births leads to undernourished mothers & further increases likelihood of pregnancy complications resulting into many maternal deaths in absence of care. The survival of both mother and child can be ensured to a large extent by delivering ANC care, TT vaccination, institutional deliveries and child immunization against six preventable diseases. The major chunk (70% of the Indian population) lives in the rural area that is relatively poor, with low literacy and more so live in with many traditional customs and taboos. The public health sector is the major available source of care especially those of poor. Because of poor literacy, high fertility and poor perceptions of MCH care, mothers do not show much concerned to these services until the situation is complex.

The analysis of DLHS-3 revealed that more than 70% of the districts of Region 2, 3 and 4 were very poor for the contraceptive practices ([Table-5](#)); while more than 50% for the ANC services and utilization of institutional deliveries. Poor immunization of children was also observed in regions 2 and 3 as more than 75%

districts were the poor performer. More importantly, 2, 3, 4 regions constituting the major part of the country population were poor performers. Early marriage and availing JSY benefits were much lacking (> 90%) in region 1. These must be the priority of the states as well as the central government to achieve the national goal.

Unmet need was the major contributors for the practice of contraception indicating, as stated in NPP (2000) immediate goal, must be targeted on the priority basis. The unmet need is more observed in the poor and illiterate community that is a major population residing in the country. The districts with better performance of ANC, institutional deliveries and JSY had better contraceptive practices, indicating these services must be geared up to fulfill the target for contraceptive practices as well as for mother and child well-being. Though, it is uncertain to explain whether contraceptive users who may be literate are utilizing ANC services or ANC lead them to contraceptive practice.

Literacy showed better performances in seeking antenatal care. For rural Indians, especially the poor with high fertility and poor perceptions to MCH care, public health sector is the only available/affordable source of care. But people are mostly illiterate, ignorant and less aware to MCH services. It's not possible to make mothers literate in the short time, but these can be properly educated through information, education and communication (IEC) activity about the benefits of ANC care through the health personnel. This may bring the substantial dent to ANC services to fulfill the national goal. Mothers of order < 3 and availed JSY benefit are more likely to take a minimum of three ANC than those of higher birth orders and not availing JSY benefits. Obviously, these are the mothers of better literacy who have lesser desire of children and in want of well-being of the new born, avail the services. The likelihood to avail complete ANC was lesser in districts with better wealth quintiles and where PHC functioning hours are higher, than those of

poor performing districts. It is, because well-off couples probably availed the benefits from private health institutions rather than government bodies.

The likelihood of institutional deliveries was about ten times higher in better performing districts for ANC than those of poor. It is obvious, influenced by their literacy and motivation during ANC services to go for institutional deliveries. Lower was the birth order (<3) higher were the institutional deliveries. These are literate mothers desiring lesser children and knowing the benefits of ANC for better health of both mother and newborn baby. While mothers of wealthy districts were less likely to opt for institutional deliveries, probably these mothers are availing private health institutions. NFHS-3 [4] findings had concluded that parity of women have significant influence on utilization of ANC services by women living with poor wealth quintiles. A study conducted in urban slums i.e. poor wealth quintile pocket, in Dhaka [5] and New Delhi [6] also supported the present findings.

The analysis clearly indicated that the mothers who went for anti-natal check-ups were more likely to immunize their children as they knowing the benefits of ANC and were well motivated for better care of newborn. Literacy plays an important role in all the dimensions of life; because of this mothers are well conversant with the advantages of the immunization of their children. The analysis also indicated that literate mothers likely to immunize their children nearly two times higher than illiterates. Lower was the birth order of a child, more was the likelihood to be immunized, again in consensus with the literacy status of a mother. Nath B, et al. [7] and Islam MR et al. [5] in their studies had noted that apart from caste and family type, socioeconomic status and exposure to mass media also had a significant effect on the immunization status of the child.

CONCLUSION AND RECOMMENDATIONS

The study highlights the participation of community and health administrators as a whole to bring substantial changes; suggesting the need and scope for IEC campaign, with a special focus on poor performing states with poor literacy and wealth quintiles for sustenance and further improvisation of MCH service utilization. Future efforts should focus on establishing the community as the focus of updated and well-equipped services. Community volunteers will need to spread awareness and knowledge of family planning and MCH care. Programs must reduce poverty, expand schooling, empower women and girls, and treat domestic violence as a health issue.

REFERENCES

1. National Population Policy-2000, National Commission on population, Ministry of Health and Family Welfare, Government of India, (http://populationcommission.nic.in/Publication/11_1.aspx).
2. Vora KS, Mavalankar DV, Ramani KV, et al. Maternal Health Situation in India: A Case Study. *J Health Popul Nutr.* 2009 Apr; 27(2): 184-201.
3. Government of India (1996): Manual on Target-free Approach in Family Welfare Programme (New Delhi: Ministry of Health and Family Welfare, Government of India).
4. National Family Health Survey India, 2005-06 NFHS-3. International Institute for Population Sciences, Mumbai & ORC Macro; 2007. Vol. 1. 588p.
5. Islam MR, Rahman MM, Rahman MM. Immunization Coverage among Slum Children: A Case Study of Rajshahi City Corporation, Bangladesh. *MEJFM.* 2007; 5(6):17-20.
6. Hazarika I. Women's Reproductive Health in Slum Populations in India: Evidence from NFHS-3. *J Urban Health.* 2010 March; 87(2): 264-277.
7. Nath B, Singh JV, Awasthi S, et al. A study on determinants of immunization coverage among 12-23 months old children in urban slums of Lucknow district, India. *Indian J Med Sci.* 2007; 61:598-606.

How to cite this article: Srivastava R, Bedi S. Predictors of utilization of maternal and child health services in India: an analysis of district-level information. *Int J Health Sci Res.* 2016; 6(8):291-300.
