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Immunization Coverage, Breast Feeding Practices and Diarrhoea Management in Uttar Pradesh, India: A Socio-Economic Analysis

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Abstract
Introduction
It is estimated that more than 10 millions of children die every year before attaining five years. India is home to large number of child deaths in world. The efforts are made to understand the vaccination coverage, breastfeeding practices and diarrhoea management in Uttar Pradesh, India.

Methodology
The data for this study derived from nationwide District Level Household and Facility Survey (DLHS) round-3 conducted during 2007-08. Immunization model, Multinomial Logistic Regression has been applied to understand the vaccination coverage, breastfeeding practices and diarrhoea with socio-economic factors.

Results
Results of the study revealed that vaccination varies in different regions and socio-economic condition of people in the state. The exclusive breastfeeding in Uttar Pradesh is less than 10 % that is more concern area for child health.

Conclusion
Indeed, efforts are needed to make immunization coverage available across the state. The focus on programmes of exclusive breastfeeding is the urgent need in the state.

Keywords: Immunization, Breast feeding, Diarrhoea, Uttar Pradesh, India

Introduction

It is estimated that more than 10 million children die annually around the world before they reach the five years of age. While most of these deaths are from preventable causes, most of them also occur in poor countries that often lack the resources to prevent them 50 % of all child deaths occur in just six countries: India, Nigeria, China, Pakistan, Democratic Republic of Congo, and Ethiopia (Claeson, et al., 2000). High child mortality and morbidity in developing countries are highly associated with limited access and poor quality of health care. Utilization of health services for children plays a significant role towards achieving the reduction in infant mortality. In India, several studies revealed disparities in child health outcomes across socio-economic levels and regions of the country (Cleland, & Ginneken, 1988; Pande, 2003; Kanjilal, et al. 2010; De, & Bhattacharya, 2002). Immunization is one of the most cost-effective interventions to prevent a series of major illnesses, particularly in environments where children are undernourished, and many die from preventable diseases (World Bank, 1993). Immunization coverage is good in the developing world. However, does not actually cover children from the poorest segments of society (Gwatkin, et al. 2000). In developing countries, mother's education, urban/rural residence, and household economic status are likely to affect a child's condition at birth as well as its environment, thus affecting infant and child mortality (Hobcraft, McDonald, and Rutstein, 1984; Mosley and Chen, 1984; United Nations, 1985, 1991, 1998). Immunization against common childhood diseases

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has been an integral part of mother and child health services in India.

Studies concluded that children born in India have high chances of mortality in the early years of life due to poor socio-economic conditions (Das, 1990; Marmot, 2005).Though studies on health inequalities are limited in India, a small number of studies address various dimensions of socioeconomic inequalities in child health. In India, the poorest 20 % of the population experience twice as much mortality as the richest 20 % (Peter et.al, 2002). However, some recent research indicates that, not only public health programmes and socio-economic development but also the cultural and ecological settings in which the people's life are critical in defining child health (Srinivasan et al., 2007; Singh, 2013). Income levels and child malnutrition are closely related, and it is used as a poverty indicator and poor children are at greater risk than richer children (Steboonsarang, 2005). Immunization status is one of the signs of progress towards the child health targets established under the Millennium Developmental Goals (Chowdhury et al. 2003). However reducing child mortality and child survival depends on whether efficient and sustainable interventions can be delivered to high proportions of children's and mothers (Bryce, 2003; Pathak, 2011). Breastfeeding practices have the direct relationship with child health and survival. Breastfeeding is an effective means of intervention to protecting infants from diarrhoeal disease. Infants who are not breastfed have more likely to have risk of diarrhoea than breastfed infants (Feachem, & Koblinsky, 1984; Kumar, at al. 2006; Popkin, et al, 1990; Arifeen, et al, 2001). Feeding practices in India encompasses a complex set of behavioural, cultural, socio-economic factors (Bhandari, et al., 2004). Educated mothers were more likely to feed the children than illiterate children within one hour of birth. The beneficial effects of breastfeeding depend on breastfeeding initiation, its duration, and the age at which the breastfed child is weaned (Victora, et al., 1987). Gender biased rooted society like India where girl child often neglected, and late initiation of breastfeeding is evidence in many studies (Pandey, et al. 2002; Mishra, et al., 2004).

Diarrhoea is one of the single causes for child mortality and morbidities. Poor diarrhoea management is one of the major reasons for high child mortality and morbidity (Forsberg, et al., 2007). Therefore, Diarrhoea management is one of the important simple interventions for child health. Management of children with pneumonia, diarrhoea, or malaria by health workers is the primary strategy of several child-survival programmes and of the Integrated Management of Childhood Illnesses programme (Bentley, 1988; Tulloch, J. 1999). According to National Family Health Survey-3 (NFHS) in India, 48% of children suffering from diarrhoea received oral rehydration therapy (ORT). A study conducted in Uttar Pradesh found that the overall prevalence of diarrhoea in children under five was 36%. Life-threatening symptoms that the mothers knew were watery stool (85%) and repeated vomiting (54%). Two-thirds (69%) of the mothers continued breastfeeding their children during the episode while the remaining either withheld or interrupted breastfeeding. Less than half (46.5%) of the mothers knew about oral rehydration salt solution, and only 29.8% of those knew the correct method of preparation (Shah, et al., 2011). Slum and rural India women are less aware of diarrhoea management is the

major concern to prevent the child mortality. Many studies have established evidence of mother's education and overall socio-economic and demographic factors are significant predictors for Diarrhoea management.

Uttar Pradesh has suffered from the regional disparities and inequalities from six decades after independence. It is the largest state in India and also it has the biggest population among the all states. Some of the regions of this state are very backward and the residence of largest proportion of poor in the country. It is also the largest home of the children, and many studies have reported poor child health at the state level scenario does not represent the regional scenario. There is a significant difference in the child health at the regional level. Infant mortality is very high (72 per 1000 live birth) in central and southern region of Uttar Pradesh as compare to Eastern region (56 per 1000 live birth), the overall IMR is 53 per 1000 in Uttar Pradesh. (SRS Bulletin; 2013). The demographic indicators suggest that poor child health in Uttar Pradesh. According to National Family Health Survey round-3, exclusive breastfeeding is the percent and which is very low than the national average. The immunization coverage of Uttar Pradesh also showing the bad situation of the state in all relevant indicators of the child health. Also, vast socio-economic differentials are observed within the state. In this context, the study is an attempt to find out the intra-regional, socio-economic and demographic differential in Immunization coverage, breastfeeding practices and Diarrheal management in Uttar Pradesh.

Methodology
Data source
This study is based on secondary data. The data source for this study is India's third District Level Household and Facility Survey (DLHS-3) conducted during 2007-08. It collects data from 34 states and Union Territories of India (excluding Nagaland) of 643944 ever married women aged 15-49 years, residing in 720320 households. The survey used a uniform sample design, questionnaire, field procedures to facilitate comparability across the districts and to ensure the highest possible data quality. In Uttar Pradesh, DLHS interviewed 87564 ever married women aged 15- 49years and 23110 unmarried women aged 15-24 years to obtain information on population, health, and nutrition in the state. The survey is based on a sample of 90415 household that is representative at the state level. The survey is the major source for all women and child health indicators, the information related to immunization and breastfeeding has been collected in this survey.

Methods
An immunization coverage model has been used in this study to estimate the effects of the selected background variables on immunization coverage. The measure of a child's immunization is a binary variable that indicates whether a child has been administered all the six vaccinations or not. But in this paper child's immunization has three categories 1) Full immunization. 2) Partial immunization. 3) No, immunization. Full Immunization: Children in the age group of 12-23 months who have received one vaccination of BCG, measles, and three doses each of DPT and polio(exclude polio 0) are considered as fully immunized as according to DLHS-3. No Immunization: Children in the age group of 12-23 months

who have not received any vaccination are considered as non-immunized as per DLHS-3. Partial immunization: Children in the age group of 12-23 months who have received at least one vaccination but not all the vaccination are considered to be partially immunized according to DLHS-3. Therefore, we used Multinomial Logistic Regression. Multinomial Logistic Regression is useful for situations in which we will able to classify subjects based on values of a set of predictor variables. Multinomial regression is similar to logistic regression, but it provides more specific information with different variables because the dependent variables are not restricted to two categories. The explanation of the model is as follows: For a dependent variable with K categories, consider the existence of K unobserved continuous variables, Z1, Z2…... ZK, each of which can be thought of as the "propensity toward" a category.

Mathematically, the relationship between the Z's and the probability of a particular outcome is described in this formula.

$$P_{ik} = e^{zik} / (e^{zi1} + e^{zi2} + ... + e^{zi3})$$

Where,
p_{ik} is the probability the ith case falls in category k
z_{ik} is the value of the k_{th} unobserved continuous variable for the ith case

Z_k is also assumed to be linearly related to the predictors.
$$z_{ik} = b_{k0} + b_{k1}x_{i1} + b_{k2}x_{i2} + ... + b_{kJ}x_{iJ}$$

Where,
x_{iJ} is the j_{th} predictor for the ith case

is the jth coefficient for the kth unobserved variable J is the number of predictors.

The independent variable used for the analysis is mother's age which has been categorized into three parts namely 15-24, 25-34 and 35-49. The place of residence consists of rural and urban place of residence. The education of the respondent has been taken into consideration for the analysis which consists of non-literate, less than 10 years of schooling and 10 or more than 10 years of schooling. Religion is divided into three categories which are Hindu, Muslim, and Others. Caste includes three categories, Schedule Caste (SC), Schedule Tribes (ST), Other Backward Class (OBC) and others. Wealth Index is considered in five parts, Poorest, second, middle, fourth and richest. The Uttar Pradesh is divided in to four regions namely, East, West, Central and South. East region contain 28 districts, west region have 27 districts, central part of the Uttar Pradesh. is very important because it contain the capital of the state and also the industrial capital of the state (Kanpur), consist of 9 districts and the southern part of the Uttar Pradesh has only 6 districts at the time of survey.

Response variable
- Vaccination: Immunization of children (Full/Partial/No).
- Timing and Place of childhood check-ups
  a) Receive check-ups within 24 hours of birth,
  b) Government Hospital, Private Hospital.

- Initiation of Breastfeeding
  a) Children received colostrum/khees b) within one hour of birth. c) After one hour but within 24 hour of birth. **d)** After 24 hour of birth.
- Place of childhood Vaccinations
  a) Government health facility. b) Private health sector.
- Knowledge about danger signs of Pneumonia: (Yes/ No).
- Practices regarding Diarrohoea management: Given Salt & Sugar, Plain water, Home
- Remedy, Only Breast Feeding.

Predictor variables
- Place of residence: Place of residence (Urban/ Rural).
- Social group/ethnicity: SC/ST, OBC, Others.
- Religion: Hindu, Muslim, and Others.
- Age of mother: Age of mother is divided in to three categories (15-24years/25-34 years/35-49years)
- Years of Schooling/Education: Education of the mother (Non literate, Less than 10 years, 10 or more years).
- Wealth index: Wealth quintile of household (Poorest, Poorer, Middle, Richer, Richest).
- Region: East, West, Central, and South

Acronyms/ Abbreviations
DLHS: District level household and facility survey, NFHS: National Family Health Survey, UP: Uttar Pradesh, MDGs: Millennium Development Goal, OBC: Other Backward Class, SC: Scheduled Caste, ST: Scheduled Tribe.

Results
Table 1 represents the percent distribution of the immunization coverage among children in the age group 12-23 months in Uttar Pradesh by selected socio-economic and demographic characteristics. The table provides the immunization coverage in to three categories: full immunization, partial immunization and no immunization. There is a highly significant effect of mother's education, religion, caste, wealth index, place of residence and region on the immunization coverage. The age of mother does not show significant effect on child immunization. Looking at regional differences within state the West region of Uttar Pradesh shows low coverage (27%) as compare to the East region which shows the highest coverage 34.20 %. In the caste groups, SC/ST shows the minimum coverage of immunization i.e. 28.04 % and the others (general) category shows maximum coverage 36.83 %. As far as religion is concern Muslims are at bottom only 22 % children's received full immunization, Hindus are more likely to be immunized than any other category in the religion, among them 32 % are fully immunized. The percentage of full immunization increases as the wealth index increases. In the wealth index, the richest category shows the high coverage (52.90%) and the poorest category show the lowest coverage (19.90 %) in Uttar Pradesh. The percentage of partial immunization decreases as women's education level increases.

Table: 1 Percent distribution of children with level of immunization by background characteristics in U.P. (2007-08).

| Characteristics | Immunization | | | Total## | χ^2-Value/ P-Value |
	Full	Partial	No		
Age of Mother					
15 thru 24	29.4	67.4	3.2	4797	5.35 / (0.253)
25 thru 34	30.8	65.5	3.7	5909	
35 thru 49	30.4	66.6	3.0	1422	
Residence					
Rural	29.3	67.2	3.5	10306	132/ (0.00)
Urban	35.3	61.9	2.9	1822	
Mother's Education					
Non literate	22.0	73.7	4.3	35	349 / (0.00)
< 10 Years	37.2	60.0	2.7	3212	
> 10 years	57.4	41.9	0.6	8881	
Religion					
Hindu	32.2	64.4	3.4	9746	339/ (0.00)
Muslim	21.7	74.8	3.4	2324	
Others	36.8	55.7	7.4	58	
Caste/Tribes					
SC/ST	28.0	67.2	4.8	2790	306/ (0.00)
OBC	28.6	68.1	3.3	6908	
Others	37.1	60.5	2.4	2430	
Wealth Index					
Poorest	19.9	74.9	5.2	2991	200 / (0.00)
Second	24.4	71.9	3.5	3116	
Middle	29.7	66.9	3.5	2529	
Fourth	38.1	59.5	2.3	2011	
Richest	52.9	46.0	1.2	1481	
Region					
West	27.0	69.5	3.6	4823	306/ (0.00)
Central	29.4	66.6	4.0	1597	
South	26.8	67.8	5.4	983	
East	34.2	32.9	2.7	4725	
Uttar Pradesh (15-49)	30.3	66.2	3.4	12128	

Note: chi square test was used to test the differences. Test indicated significant association of the background characteristics with Immunization coverage. Mother's education, religion, caste, wealth index and the region are highly significant with the Immunization coverage. ## Unweighted cases

Table 2 reveals the percent distribution of children whose mother initiated breast after birth by selected background characteristics. Little less than 15 % women had initiated breastfeeding within one hour of birth. Almost 18 % women started breast feeding after one hour but within 24 hour of birth. The largest proportion of the women (68 %) started breastfeeding after 24 hour of birth. In rural Uttar Pradesh, only 15 % women had initiated breast feeding within one hour of birth and 67.85 % women started breastfeeding after 24 hour. As the wealth status of women increases from poorest to richest, the percentage of breast feeding within one hour increases from 11 % to 24 % in the respective categories. The percentage of breast feeding is higher among Hindus (14%) as compare to Muslims (12 %). The eastern Uttar Pradesh shows the greater proportion of children who receive the Colostrums/khees immediately after birth. All the background characteristics show the significant effect on initiation of breast feeding.

Table: 2 Percent distribution of children whose mother initiated breastfeeding after birth by background characteristics in U.P. (2007-08)

| Background Characteristics | Received Colostrum /Khees | Initiation of breastfeeding | | | χ^2-Value/ P-Value |
		Within 1 Hour of Birth	Within24 Hour of Birth	After 24 Hour of Birth	
Age of Mother					
15-24	54.5	16.3	18.3	65.47	84.44/(0.00)
25-34	55.3	15.4	18.0	66.59	
35-49	53.5	10.9	15.4	73.75	
Residence					
Rural	55.6	14.9	17.2	67.9	99.24/(0.00)
Urban	50.3	17.5	21.3	61.2	
Mother's Education					
Non literate	61.8	11.6	15.4	73.0	24.09/(0.00)
< 10 Years	54.4	18.5	19.9	61.6	
> 10 years	54.9	28.1	26.2	45.8	
Religion					
Hindu	55.7	16.0	17.6	66.4	45.66/ (0.00)
Muslim	51.4	12.4	18.9	68.7	

Others	42.5	17.0	20.0	62.9	
Caste/Tribes					
SC/ST	56.4	15.8	17.6	66.6	284.20/(0.00)
OBC	55.0	13.5	16.6	69.9	
Others	52.2	20.0	21.7	58.2	
Wealth Index					
Poorest	55.2	10.8	14.0	75.2	20.08/(0.00)
second	54.2	12.7	14.0	73.3	
Middle	54.6	14.6	17.9	67.5	
Fourth	56.0	17.8	20.3	62.0	
Richest	53.6	23.7	26.0	50.3	
Region					
West	41.7	10.4	16.7	72.9	924.33/(0.00)
Central	47.5	18.8	18.0	63.2	
South	43.4	31.5	21.8	46.7	
East	71.8	15.5	18.0	66.5	
Uttar Pradesh	54.90	14.0	17.4	68.5	

Note: chi square test was used to test the differences. Test indicated significant association of the background characteristics with Initiation of breastfeeding. Mother's education, religion, caste, wealth index and the region are highly significant with the Initiation of breastfeeding.

Table 3 provides the percent distribution practices diarrhoea management practices by background characteristic. The common practices followed by women for treatment of children who had diarrhoea, was to give salt and sugar solution (21.88%), Plain water (67.0 %), The practices regarding diarrhoea management is following almost similar increasing pattern among all the predictor variables, like mother's age, residence, mother's education, caste and other variables. Muslims has a slightly high proportion of practices (salt and sugar solution (24 %) and plain water (71 %) regarding diarrhoea management). They had higher practices in giving salt and sugar and Plain water. The women's education is very important factor in management of diarrhoea. The increasing level of education the diarrhoea management skill also increases. In the wealth index as the wealth status of women improves their percent distribution regarding diarrhoea management also increases in all the practices whatever they do in the diarrhoea management.

Table: 3. Percent distribution of women and their Common Practices regarding Diarrhoea Management by background characteristics in U.P. (2007-08).

Characteristics	Salt & Sugar	Plain water	Home Remedy	Breast Feeding
Age of Mother				
15-24	19.6	63.3	14.8	36.4
25-34	23.2	68.9	18.2	28.7
35-49	25.4	74.1	18.4	26.0
Residence				
Rural	20.7	66.7	16.6	31.9
Urban	29.3	68.7	17.3	31.1
Mother's Education				
Non literate	19.4	68.0	14.6	31.2
< 10 Years	23.7	65.9	19.5	32.6
> 10 years	32.7	63.6	22.5	33.4
Religion				
Hindu	21.4	66.0	16.9	32.4
Muslim	23.7	70.7	15.9	29.7
Others	19.6	62.6	26.9	18.6
Caste/Tribes				
SC/ST	20.5	62.5	16.2	32.4
OBC	20.5	68.6	16.4	32.0
Others	27.2	67.6	17.9	30.9
Wealth Index				
Poorest	17.9	69.1	14.5	30.6
second	17.9	66.5	14.5	31.2
Middle	21.5	65.8	16.3	33.2
Fourth	26.2	64.3	19.9	32.9
Richest	31.0	69.2	20.9	31.4
Region				
West	19.5	65.2	17.3	38.0
Central	29.8	67.2	14.2	21.9
South	12.8	68.6	17.2	24.5
East	23.7	69.1	16.7	28.2

Note: The table shows the weighted percentage of the response variable with respect to the predictor variable.

Table4 showing the percent distribution of children by place of vaccination in the age group 12-23 months in Uttar Pradesh, according socio-economic and demographic characteristics. In Uttar Pradesh 68 % women preferred the government facility for the child vaccination whereas only 5 % of women received child vaccination from private facility and 27 % women received from other facility. There is slightly difference in percentage in the rural (67.86%) and urban (69.32%) place of vaccination that go for the government facility. While the percentage of private facility is three times high in urban areas (12%) compare to rural areas (only 4%). The education plays a very important role for utilizing the available health facility. The woman who has more than 10 years of schooling utilized private place of vaccination 6 times more as who are no literate (3%). In caste group, the other category shows little less than 5 times more private place of vaccination than SC/ST group (2.97%). The richer women prefer the private facility for place of vaccination (17%) as compare to poor women (1.62%). The Eastern Uttar Pradeshshows the highest percentage of utilization of government facility for the vaccination (70.29%) and Southern Uttar Pradesh shows lowest percentage (57.13%).The West region shows slightly higher percentage of private facility (6.36%) than other regions. The South region utilizes more other facility (40%) than others.

Table: 4 Percent distribution of children received vaccination by Place of Vaccination, according to selected background characteristics in U.P. (2007-08)

Characteristics	Government Facility	Private Facility	Others	Chi-^{2} value/ P-Value
Residence				
Rural	67.9	3.7	28.4	848.1 / (0.00)
Urban	69.3	12.7	17.9	
Mother's Education				
Non literate	66.8	2.6	30.6	34.15/ (0.00)
< 10 Years	70.8	5.3	23.9	
> 10 years	68.7	17.6	13.7	
Religion				
Hindu	68.1	4.9	27.0	204.40/ (0.00)
Muslim	68.3	5.3	26.4	
Others	60.8	31.8	7.3	
Caste/Tribes				
SC/ST	69.3	3.0	27.7	455.44 / (0.00)
OBC	67.7	4.2	28.1	
Others	67.8	10.2	22.0	
Wealth Index				
Poorest	65.0	1.6	33.4	42.17/ (0.00)
Second	66.6	2.0	31.4	
Middle	68.8	3.5	27.7	
Fourth	72.7	4.8	22.5	
Richest	68.1	16.8	15.2	
Region				
West	67.9	6.4	25.7	287.32/ (0.00)
Central	68.6	4.8	26.6	
south	57.1	2.9	39.9	
East	70.3	4.5	25.2	
Uttar Pradesh (15-49)	68.1	5.1	26.9	

Note: chi square test was used to test the differences. Test indicated significant association of the background characteristics with child health indicators. All the independent variables are highly significant.

Table 5 represent the percent distribution of Exclusive Breastfeeding to children in Uttar Pradesh, by socio-economic and demographic characteristics. The breast feeding practices in educated women who have more than ten years of schooling shows a higher percentage (12.39%) compare to non-literate women (5.75%). According to wealth index the women who lie in richest category shows higher percentage of exclusive breastfeeding (10.38%) than other, poorest category shows less percentage(6%). of exclusive breast feeding. South and Central region shows more exclusive breastfeeding in the state (12.05% and 10 respectively) compare to the East (8%) and West (4.5%) region. The overall percentage of exclusive breast feeding in Uttar Pradesh is 8.44 %.

Table: 5 Percent distribution of children who received Exclusive Breastfeeding by background characteristics in U.P. (2007-08).

Characteristics	No	Yes	χ^2-Value/ P- Value
Age of Mother			
15-24	92.3	7.7	13.49 / (0.001)
25-34	92.8	7.2	
35-49	94.5	5.5	
Residence			
Rural	92.6	7.4	5.70 / (0.017)
Urban	93.8	6.2	
Mother's Education			
Non literate	94.3	5.8	178.98 / (0.00)
< 10 Years	91.5	8.5	
> 10 years	87.6	12.4	
Religion			
Hindu	92.2	7.8	42.22 / (0.00)
Muslim	95.0	5.0	
Others	91.3	8.7	
Caste/Tribes			
SC/ST	91.9	8.1	44.01 / (0.00)
OBC	93.7	6.3	
Others	91.0	9.0	
Wealth Index			
Poorest	93.9	6.1	73.05 / (0.00)
second	93.3	6.7	
Middle	92.9	7.1	
Fourth	93.3	6.7	
Richest	89.6	10.4	
Region			
West	95.4	4.6	217.68 / (0.00)
Central	90.0	10.0	
South	88.0	12.1	
East	92.1	7.9	
Uttar Pradesh	**91.6**	**8.4**	

Note: chi square test was used to test the differences. Test indicated significant association of the background characteristics with Breastfeeding Practices. Religion, caste, and the region are highly significant with the Breast feeding Practices. The residence shows the 10 % level of significance.

Table 6 represent the Multinomial Logistic Regression Between response variable (immunization) and the predictor variables (age of mother, residence, mother's education, religion, caste, wealth index, and the region).The response variable has three categories full immunization, partial immunization and no immunization. Here no immunization is considered as the reference category. The mother's education, religion, caste, wealth status and region show significant effect on the response variable

immunization.4.1. Full immunization relative to No-immunization.1) Education of mothers emerged as important predictor for Immunization. In the mother's education variable non literate is considered as the reference category. If we increase women's education by one unit it means we shift to non-literate to < 10 years of schooling, the relative risk for preferring full immunization relative to no immunization would be expected to increase by 1.57 times given the other variable in the model are held constant. So given one unit increase in women's education, non-literate to < 10 years, the relative risk of being full immunization would be 1.57 times more likely when the other variables in the model are held constant. And secondly, a one unit increase in women's education < 10 years to > 10 years, the relative risk of being full immunization would be 3.16times more likely when the other variables in the model are held constant.2) The religion shows the significant effect on immunization. In the religion category Hindus are considered as a reference category. If we increase one unit in religion, it means we shift to Hindus to Muslims, the relative risk for preferring full immunization relative to no immunization would be expected to decrease by 0.55 times given the other variable in the model are held constant.3) In immunization coverage the caste has also shows significant impact on full immunization. In caste, SC/ST is considered as reference category. If we increase one unit change in the caste,SC/ST shifted to OBC, the relative risk for preferring full immunization relative to no immunization would be expected to increase by 1.17 times given the other variable in the model are held constant. And secondly, If we increase one unit change in the caste,OBC shifted to Others, the relative risk for preferring full immunization relative to no immunization would be expected to increase by 1.56 times given the other variable in the model are held constant.4) The wealth status of women has also impact on immunization coverage. In the wealth index variable poorest wealth indexes the reference category. If we increase one unit change in the wealth index, poorest shifted to second stage, the relative risk for preferring full immunization relative to no immunization would be expected to increase by 1.59 times given the other variable in the model are held constant. And secondly, if we increase one unit change in the wealth index, second shifted to middle, the relative risk of being full immunization would be 2.14 times more likely when the other variables in the model are held constant. And if we increase wealth index by one unit, middle shifted to fourth, the relative risk of being full immunization would be 3.07 times more likely when the other variables in the model are held constant. Now finally if we increase one unit in the wealth index, fourth shifted to richest,, the relative risk of being full immunization would be 8.46 times more likely when the other variables in the model are held constant.5) Uttar Pradesh has divided in to four regions. The region has significant effect on immunization. If we increase region by one unit it means we shifted to West region to Central region, the relative risk of being full immunization would be 1.34 times more likely when the other variables in the model are held constant.4.2. Partial immunization relative to No immunization1) Education is a factor which has impact on immunization. In the mother's education variable non literate is considered as the reference category. If the we increase women's education by one unit it means we shift to non-literate to < 10 years of schooling, the relative risk for preferring partial immunization relative to no immunization would be expected to increase by 1.13 given the other variable in the model are held constant. So given a one unit increase in women's education, non-literate to < 10 years, the relative risk of being partial immunization would be 1.13 times more likely when the other variables in the model are held constant. And secondly, a one unit increase in women's education < 10 years to > 10 years, the relative risk of being partial immunization would be 1.21times more likely when the other variables in the model are held constant.2) The religion shows the significant effect on immunization. In the religion category Hindus are considered as a reference category. If we increase one unit in religion, it means we shift reference category to Muslims, the relative risk for preferring partial immunization relative to no immunization would be expected to increase by 1.02 times given the other variable in the model are held constant.3) In immunization coverage the caste has also shows significant impact on immunization. In caste, SC/ST is our reference category. If we increase one unit change in the caste,SC/ST shifted to OBC, the relative risk for preferring partial immunization relative to no immunization would be expected to increase by 1.24times given the other variable in the model are held constant. And secondly, If we increase one unit change in the caste,OBC shifted to Others, the relative risk for preferring partial immunization relative to no immunization would be expected to increase by 1.40 times given the other variable in the model are held constant.4) The wealth status of women has also impact on immunization coverage. In the wealth index variable poorest is the reference category. If we increase one unit change in the wealth index, poorest shifted to second stage, the relative risk for preferring partial immunization relative to no immunization would be expected to increase by 1.18 times given the other variable in the model are held constant. And secondly, if we increase one unit change in the wealth index, second shifted to middle, the relative risk of being partial immunization would be 1.21 times more likely when the other variables in the model are held constant. And if we increase wealth index by one unit, middle shifted to fourth, the relative risk of being partial immunization would be 1.23 times more likely when the other variables in the model are held constant. Now finally if we increase one unit in the wealth index, fourth shifted to richest, the relative risk of being partial immunization would be 6.58 times more likely when the other variables in the model are held constant.

Table-6: Multinomial Logistic Regression between Immunization Coverage and the Background Characteristics.

Full Immunization				Partial Immunization			
Characteristic	RR	z	p>z	Characteristic	RR	z	p>z
Age of Mother				Age of Mother			
15 thru 24 ®				15 thru 24 ®			
25 thru 34	1.005	0.11	0.916	25 thru 34	0.908	-0.69	0.493

35 thru 49	1.053	0.69	0.492	35 thru 49	1.032	0.45	0.654
Residence				**Residence**			
Rural®				Rural®			
Urban	0.997	-0.03	0.973	Urban	0.971	-0.42	0.676
Mother's Education				**Mother's Education**			
Non literate ®				Non literate ®			
< 10 Years	1.565***	7.81	0.00	< 10 Years	1.125	-0.64	0.522
> 10 years	3.155***	10.05	0.00	> 10 years	1.206***	3.7	0.00
Religion				**Religion**			
Hindu ®				Hindu ®			
Muslim	0.547***	-9.6	0.00	Muslim	1.028	0.48	0.628
Others	0.749	-0.91	0.362	Others	0.637	-1.48	0.14
Caste/Tribes				**Caste/Tribes**			
SC/ST ®				SC/ST ®			
OBC	1.170***	2.89	0.004	OBC	1.236***	4.27	0.00
Others	1.563***	5.95	0.00	Others	1.397***	4.74	0.00
Wealth Index				**Wealth Index**			
Poorest ®				Poorest ®			
Second	1.590***	7.57	0.00	Second	1.182***	3.08	0.002
Middle	2.141***	11.32	0.00	Middle	1.205***	3.06	0.002
Fourth	3.074***	14.86	0.00	Fourth	1.229***	2.95	0.003
Richest	8.460***	19.21	0.00	Richest	2.026***	6.58	0.00
Region				**Region**			
West ®				West ®			
Central	1.336***	4.17	0.00	Central	0.883*	-1.94	0.052
South	0.908	-1.17	0.241	South	0.834**	-2.45	0.014
East	0.908***	12.39	0.00	East	1.153***	2.82	0.005

Note: ®: Reference category; Significance level: ***1%, **5%, *10%. The reference category in the dependent variable is: "No Immunization".

Discussion

The study results clearly showed the socio-economic and regional differences in immunization coverage, breastfeeding practices, and diarrhoea management in Uttar Pradesh. It is important to note here that, many previous studies also reported same results (Khan, 1990; Brennan, et al. 2004). However, this study provided three crucial factors that are important for child health with socio-economic and demographic factors in state of Uttar Pradesh. The study noted that initiation of breast feeding after child birth within one hour is very less in whole state of Uttar Pradesh and the differentials with socio-economic factors across the state. Late initiation of breastfeeding may affect the child health in several ways. Lack of awareness among the communities regarding early initiation of breastfeeding is crucial challenge to address in recent years. Study showing that more than 50% of given plain water for diarrhoea. Diarrhoea management within household is important for child survival. Poor diarrhoea management practices could lead to infant and child mortality, previous study by (Joshi, et, al, 2011) found that socio-economic condition of household is significantly associated with the Diarrhoea management. Improvement in diarrhoea management will lead the child protection. The study conducted in India found that even low adherence to standard treatment guidelines of ORS and zinc prescribing for acute diarrhoea management in children below 12 years (Pathak, et al. 2011).

Conclusion

Child health and child survival before completing five years is crucial period. The full immunization, initiation of early breastfeeding and diarrhoea management are important components of good child health. The study results clearly showed the socio-economic and regional differences in immunization coverage, breastfeeding practices, and diarrhoea management in Uttar Pradesh. The regional differences within state of Uttar Pradesh are more concern in three areas of this study component. Immunization coverage differs according to mother's educational attainment. Mothers with higher educational attainment has more likely to immunize their children as compare to less educational attainment. The wealth quintile also influences the immunization. With the increase in wealth quintile, the immunization coverage also increases. Little less than 70 % women use government facility for the vaccination of the child. In U.P. only 55 % children receive colostrums. Little less than 10 % women have exclusive breastfeeding to the child in U.P. The largest proportion of the women (68 %) started breastfeeding after 24 hour of birth.

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