Extended Abstract

Determinants of Childhood Immunisation in India and measurement of Gender Bias

By

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Introduction

Despite the growing awareness, the childhood immunisation rate in India is not yet satisfactory. Measure of children's immunization against several childhood diseases gives an indication of how much priority the children's health is given in household. It is important to determine the factors which play crucial role in children's welfare. Though childhood vaccinations are available free of cost in India, but the population of children not fully immunised is worrisome.

Immunisation programme is the essential interventions for protection of children from life threatening diseases.

In India, under the UIP, vaccines for six vaccine-preventable diseases (Tuberculosis, Diphtheria, Pertussis (whooping cough), Tetanus, Poliomyelitis, and Measles) are available free of cost to all.

This programme faces many supply side and demand side bottlenecks. In India, healthcare budget is meagre which the fact for many developing countries is. But there are problems in demand side of immunisation. Some socio economic and demographic factors play crucial role in shaping the demand for full vaccination of a child in a household. This paper focuses on demand side problem of immunisation.

Objective

This paper tries to assess influence of some demographic and socio-economic variables on full immunisation coverage of children, aged between 12-59 months in all India level and specifically in Uttar Pradesh. Specifically the analysis focuses to do the following:

• To study immunisation scenario at gender, caste, religion level across India and in Uttar Pradesh

• To study significant determinants for demands of immunisation in India and in UP.

• The study also attempts to compare the immunisation status of 2004-05 with that of 2011-12 using IHDS data.

• The paper also tries to decompose the gender gap in full immunisation among children of age one to less than five year. I want to quantify the amount of discriminating behaviour contributing to this gap in immunisation between two genders.

Data and Methodology

The data used in this paper are from the India Human Development Survey (IHDS), which was conducted in 2004-05 by the University of Maryland in collaboration with the National Council of Applied Economic Research, New Delhi, India between November 2004 and October 2005. The nationally representative data covers 1504 villages and 971 urban areas across 33 states and union territories of India. The survey covering 41,554 households was carried out through face-to-face interviews by pairs of male and female enumerators in local languages. The respondents included a person who was knowledgeable about the household economic situation (usually the male head of the household) and an ever-married woman aged 15-49. We will use IHDS, 2011-12 panel data as well to compare the latest status with the earlier wave of data.

For, explanatory variables, I have three categories – Individual specific, household specific and village specific. Indicators used in my analysis are listed in next table. I have taken mother's membership at Mahila Mandal as proxy for women empowerment.

We have used logistic regression to determine significant variables for childhood immunisation. I have estimated logistic regression equations for pooled as well as for boys and girls separately.

To analyse gender discrimination I have used Fairlie Decomposition. This is extension of popular Blinder-Oaxaca decomposition analysis. Fairlie Decomposition: Fairlie decomposition computes the nonlinear decomposition of binary outcome differentials proposed by Fairlie (1999, 2003, 2005). That is, fairlie computes the difference in Pr(Y # 0) between the two groups and quantifies the contribution of group differences in the independent variables to the outcome differential. Furthermore, fairlie estimates the separate contributions of the individual independent variables (or groups of independent variables).

Few findings

Table 1 shows the distribution of some of the covariates across the children aged between 1 to less than 5 year. Of the total boys around 49% has full vaccination coverage while among girls around 47% is fully immunised. In the context of Caste and religion, Muslims have least immunisation and ST has lowest immunisation coverage.

Table1: Descriptive statistics of the some variables of the sample (children aged 12-59 months) in India

Variables	Percentage of full immunisation
N = 11,672	
Fully Immunized	48.19
Sex of the child	
Boy child- fully immunised	49
Girl child- fully immunised	47.31
Religion	
Hindu	50.32
Muslim	34.05
Christian	58.89
Sikh	66.33
Others	50
Caste	
Brahmin & others	53.72
SC	46.22
ST	40.49
OBC	47.35
Residence -Rural	65
Rural	45.96
Urban	53.51
Urban slum	48.64
Antenatal checkup	
No	23.38
Yes	57.03
Place of delivery	
Govt. clinic	58.78
Pvt. Nursing home	61.76
Home	39.62
Other	52.24
Women empowerment- fully immunised	
Member of Mahilamandal- No	46.85
Member of Mahilamandal- yes	70.33

Table 2: Reported Child Immunization (aged within 12 to 59 months) at different regions within *Uttar Pradesh, IHDS (2004-05)*

	Southern	Eastern	Central	Southern Upper Ganga	Northern Upper Ganga
	N = 58	**N = 707**	**N = 178**	**N = 298**	**N = 483**
Full immunisation	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Children (aged within 12-59 month)	44.83	31.97	21.35	21.14	18.22
Boy child	55.56	34.74	25	23.81	20.73
Girl child	35.48	28.75	16.67	18.54	15.61
Brahmin and others	50	45.16	30.77	48.61	19.43
OBC	37.5	31.16	22.62	9.26	17.22
SC	50	19.87	12.96	20.31	18.37
ST	-	8.33	0	-	0
Hindu	48.15	32.44	24.6	23.38	31.38
Muslim	0	30.41	10	12.31	4.94
Others	-	0	100	100	100

Table 3: Result of Logistic Regression for all India

Variables	Pooled sample			Boy child			Girl child		
Factor	Odds ratio	Robust S.E	Signif.	Odds ratio	Robust S.E	Signif.	Odds ratio	Robust S.E	Sign
INCOME	1.000	7E-07	**	1.000002	1.10E-06	**	1.000	0.000	
Caste_HH- others ref									
SC	0.941	1E-01		0.876	0.158		0.960	0.166	
ST	0.810	1E-01		0.752	0.154		0.846	0.183	
OBC	0.764	8E-02	**	0.827	0.123	**	0.673	0.106	**
Religion – Hindu ref									
Muslim	0.698	8E-02	***	0.562	0.095	***	0.854	0.150	
Others	1.025	2E-01		0.946	0.216		1.107	0.244	
Occupation- cultivator & allied ref									
Ag & non-ag labour	1.005	9E-02		1.061	0.138		0.961	0.125	
Artisan & petty trade	0.844	1E-01		0.710	0.136		1.026	0.223	
Business	0.950	2E-01		0.751	0.217		1.267	0.358	
Salaried	0.851	1E-01		0.785	0.175	***	0.915	0.179	
Others	0.737	2E-01		0.734	0.272		0.704	0.228	
Radio exposure- Never ref									
sometime	0.997	9E-02		1.074	0.143		0.905	0.113	
regular	0.730	1E-01	**	0.762	0.143		0.703	0.137	
News paper exposure- Never ref									
sometime	0.751	1E-01		0.668	0.143		0.851	0.188	
regular	0.776	2E-01	**	0.726	0.222		0.790	0.243	
TV exposure- Never ref									
sometime	1.776	2E-01	***	1.667	0.224	***	1.910	0.252	***
regular	1.749	2E-01	***	1.611	0.251	***	1.936	0.294	***
Mahilamandal member- yes	1.986	3E-01	***	2.126	0.496	***	1.994	0.502	***
Mother's age	1.004	9E-03		0.995	0.011		1.017	0.013	
Mother's education	1.067	1E-02	***	1.061	0.017	***	1.074	0.017	***
No. of children	0.935	3E-02		0.931	0.045		0.924	0.042	
Antenatal checkup- No ref	3.221	3E-01	***	2.920	0.413	***	3.611	0.472	***
Place of delivery- Govt. clinic ref									
Pvt. Nursing home	1.125	2E-01		1.336	0.263		0.916	0.171	
Home & others	0.918	1E-01		0.869	0.125		0.978	0.158	
Post natal checkup- never ref									
For mother	1.079	2E-01		1.458	0.429		0.744	0.189	

for baby	0.981	1E-01		0.981	0.196		0.952	0.179	
for both	0.914	1E-01		0.958	0.199		0.853	0.176	
Anganwadi centre #	0.994	1E-02		1.005	0.017		0.980	0.016	
Immunisation camp #	0.963	2E-02		0.962	0.031		0.962	0.031	

Note: *** p< 0.01, ** p< 0.05

[Similar table as above is computed for **Uttar Pradesh** as well]

Immunisation coverage among children of Scheduled caste, and Other Backward Caste has much lower vaccination rate compared to Brahmin and these are statistically significant. There is consistently positive relationship between immunisation and mother's education. It is also clear from the regression coefficient that impact of mother's education on full vaccination is almost same for girl and boy child. So, we can infer that mother's education narrows down gender gap in immunisation. Children of educated mothers are more likely to be immunised than children of uneducated mothers.

Media exposure (Radio and TV) has a significantly positive effect on immunisation. The chance of full immunisation is higher when mothers' have regular media exposure compared to children whose mothers are not. The likelihood of vaccination increases with regular exposure to mass media, especially TV. In Uttar Pradesh also these two media are coming out as highly significant.

Antenatal care during pregnancy is positively associated with childhood immunisation.

Table 4*: Fairlie Decomposition of gender gap* in child immunisation for all India

Covariates	Coefficient	Significance
Income of Household	0.0006	
Caste	0.0008	
Religion	0.0000	
Occupation of HH	-0.0018	
Exposure to Radio	0.0003	
News paper reading	-0.0002	
Watching TV	0.0000	
Mahilamandal member- yes	0.0009	***
Mother's age	0.0001	
Mother's education	0.0032	***
No. of children	0.0025	***
Postnatal checkup	0.0012	**
No. Of Anganwadi centre	0.0001	
No. of immunisation camp	-0.0001	

**Similar table as above is computed for Uttar Pradesh as well

Table 5: Aggregate Fairlie decomposition result for all India [Y refers to full immunization]

Terms of decomposition	P(Y=1|Boy) - P(Y=1|Girl)	Percentage
Total gap	0.01088	
Explained	0.00748	68.81 (%)
Unexplained	0.00339	31.18(%)

Table 6: Aggregate Fairlie decomposition result for Uttar Pradesh [Y refers to full immunization]

Terms of decomposition	P(Y=1|Boy) -P(Y=1|Girl)	Percentage
Total gap	0.03963	
Explained	0.02483	62.65 (%)
Unexplained	0.01480	37.35(%)

These decomposition results indicate towards the discrimination against girl child. Unexplained part is simply the difference between average probability of the girls being fully immunised, had they been treated as boys and sample proportion of fully immunised girls. While doing decomposition I have used Boys as reference and have used the coefficient of boy's regression equation as weight. 31.18% of the immunisation gap is accounted for different treatment for girls which is unexplained or unmeasured. The underlying cause may be the discrimination against girl child.

In Uttar Pradesh, 37.35% of immunization gap between boys and girls can be attributed to **discrimination** which is clearly quite higher than national figure.

This study will also analyse the immunisation scenario using 2011-12 IHDS data and compare them with 2004-05 data. It will give us clear idea if India has considerably improved in recent years.

CONCLUSION

While the state is committed to well-being of children, it seems that some social factors have retarding effect which limits some children's access to health services.

The presence of inequities among genders, religions, caste, poor strategies for the targeting of basic needs by the state, inadequate information systems have created scenarios that have potentially negative implications for children's health care. Though state's intervention is essential for improving the welfare of children, the ultimate responsibility for accessing such services lies with the households.

Policies and programmes in other sectors such as education, welfare, industry, labour, information, environment, etc. should also take the public health into considerations. To achieve the goal of UIP in India, the policy makers should also give more importance in female education through Education for All.

Also building better infrastructure to provide antenatal care, increasing mass awareness regarding vaccination through electronic mass media will be also effective for improving immunisation coverage