Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 5, Issue, 06, pp.1511-1515, June, 2013

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

ISSN: 0975-833X

REVIEW ARTICLE

ECONOMICS OF HEALTH CARE: A CROSS SECTION ANALYSIS OF CHILD IMMUNIZATION IN DARJEELING

***Maumita Ghosh**

Department of Economics, Southfield College, Darjeeling

ARTICLE INFO

Article History:
Received 05th March, 2013
Received in revised form
10th April, 2013
Accepted 19th May, 2013
Published online 15th June, 2013

Key words:
Universal immunization programme,
Child immunization,
Logistic regression.

ABSTRACT

Immunization Programmes aim to reduce morbidity and mortality among the children due to vaccine preventable diseases. Vaccination against some of the most fatal diseases is one of the most cost-effective interventions of modern time. Following successful eradication of Smallpox by effective vaccination in 1975, the expanded programme of immunization was launched in India in 1978 to control other vaccine preventable diseases. Initially six diseases were selected for vaccination: Diphtheria, Pertussis, Tetanus, Poliomyelitis, Typhoid and Childhood Tuberculosis. Even after 65 years of independence in India there are a huge number of people in rural areas who live in abject poverty are lacking of health services and their children are also suffering from various vaccine preventable diseases.Considering the extent of inconsistencies and instabilities in immunization coverage, it is very important to know the gaps in coverage. Keeping in mind these evidences, the main *objective* of this study is to identify the most vulnerable groups for immunization coverage and to identify the gaps in immunization coverage with respect to socio-cultural and socio-economic variables. In this paper we will describe in detail the child immunization status of some selected blocks in Darjeeling district.

INTRODUCTION

There is no doubt that even after 65 years of independence in India there are a huge number of people in rural areas who live in abject poverty are lacking of health services and their children are also suffering from various vaccine preventable diseases. It has been found that there is a lack of access to health services and low rates of participation in vaccination coverage not only among poor households, but also among minorities and people living in rural and remote areas and even in the urban slum areas. Although Universal Immunization Programme was introduced in India in 1985-86 for complete immunization of the children, several reports like Lodha *et al*. (2000) focused that the prevalence of diphtheria in North India is also high. There is concern on the incidence of caste/ethnicity differences in immunisation coverage (Nath, Singh, and Awasthi *et al.*, 2007). For instance, Muslim children were clearly worse off in this regard. In addition, children belonging to SC/ST were found to be less likely to be fully immunised compared to upper caste children. However mere stress on the issue of caste and ethnicity is is rather narrow as it covers only some static aspects without putting focus on issues like parental education, specifically the mother's education (Desai and Alva, 1998). Studies have also shown evidence of gender inequities in child immunization coverage. It has been observed that (Pande, 2003) both girls and boys with only surviving siblings of the opposite gender are in a better position than other children. Conversely, children with two or more surviving siblings of the same gender are worse off in terms of their health outcomes.

Darjeeling as the study area

The data from the Human Development Report of West Bengal, 2004 reveals that the ranking of Darjeeling regarding Health Index, Education Index, Income Index as well as HDI rank is much ahead of other North Bengal districts namely, Jalpaiguri, Kooch Bihar, Uttar and Dakshin Dinajpur, Maldah. In health and education it stands 5th to Kolkata and in Income Index it stands 3rd just after Kolkata and Howrah. Darjeeling ranks 4 in HDI in West Bengal and its education Index and Health index separately are higher than other North Bengal districts. So it is expected that in this district people's response towards some basic health related matters will be positive.

Hence we may proceed with the hypotheses that

(a)Parents are more focused about their children's health and those children are better off in the immunization scale.
(b)Higher the differences in socio-economic features across the households, greater is the difference in immunization status of the children

In this context the basic objectives of the analysis are

(1) To identify the most vulnerable groups for immunization coverage and
(2) To identify the gaps in immunization coverage with respect to various socio-cultural and socio-economic variables.

Data and Methods

In this backdrop it seems imperative to analyze the issue of child immunization in two blocks of Darjeeling districts covering selected villages. For the purpose of the study, total four villages were selected each from two blocks, namely, Naxalbari and Matigara block of Darjeeling district of West Bengal. The study is based on entirely primary data collected from field survey. For the purpose of collection of data a mix of convenience and random sampling was adopted. The official age for vaccination is from birth to one year of infant stage. Infants crossing this age are not refused for vaccination in a field situation. As a result, the coverage for 12-23 months old children is higher than that for 0-11 months. So for the purpose of the study children of one to two years have been selected. At the time of survey mother's/ family members have been asked to show the vaccination card for each child and in case of non- availability of the card we had to depend on the mother's report. A total of 200

Corresponding author: Maumita Ghosh
Department of Economics, Southfield College, Darjeeling

households have been interrogated and we have found total 245 children from these households whose age comes under the required age group. Very few children, we have found, who were not at all vaccinated by any of the required four vaccines namely, three doses of OPV and DPT and one dose each of Measles Vaccine and BCG. In many cases children are partially vaccinated, therefore, we have considered three cases; fully vaccinated, partially vaccinated and no vaccination. The cases we have found are partially immunized children who have not taken, for example, the second dose of DPT and the like. Logistic regression (binary) analysis has been used to examine the likelihood of the full immunization of children in terms of the various factors. The outcome variable is the immunization status. The dependent variable takes a value of 1 or 0 depending on whether the child is fully immunized or not.

Observations

The survey was based mainly on the child health. We tried to find the diffusion of child immunization in these two blocks and the factors on which child immunization is dependent. Table 1 shows the sex wise distribution of 245 children of the study area. Out of 245 children 132 (53.88%) are male children and 113 (46.12%) are female children.

Table 1. Sex wise Distribution of Male and Female Children in Darjeeling

(1)	Male Child (2)	Female Child (3)	Total (4)
No	132	113	245
%	53.88	46.12	

Source: field survey

Out of total 245 children of the targeted age group, a total of 64.89% children are fully vaccinated with four major vaccines and 35.1% children are either not vaccinated or partially vaccinated. Out of 64.89% fully immunized children 67.42% are boys and 61.95% are girls. There are 3 children (1 boy and 2 girls) out of 245 who are not at all vaccinated. Since very few children are found not at all immunized we include them in the partially immunized category for convenience of analysis. Therefore now onward we have two groups of children; fully vaccinated (immunized children) and partially vaccinated (not immunized children) (Table 2).

So far it has been found that the performance of both the blocks regarding child immunization is below the state (75.7%) average. There are various schemes introduced by Central Government to reduce maternal mortality and morbidity by increasing institutional delivery covering the pregnant women not only from APL families but also from BPL and all SC/ST families. As a result the institutional delivery has increased from what it was before but at the same time non institutional deliveries also taken place side by side. Still in rural areas where the health facility is far away the poor class women give birth to their child at home depending on local daies and quack doctors. The children born at home are prone to be either not immunized or partially immunized. In the considered study area it was found that 38.75% children who were born at home are either not immunized or partially immunized whereas little more than 30% (33.33%) children who were born at some health centres or government hospitals are partially immunized (Table 3). Following is the detail discussion about various socio-economic determinants of child vaccination in the two blocks of Darjeeling.

Birth Order

Birth order seems to be an important determinant of vaccination status of children. Schaffer and Szilagyi (1995) in their paper showed that in some parts of the world there exist a strong association between immunization status and birth order; with children born into larger families having a low vaccination uptake and first born children being more likely to be immunized on time than second born children, so there may be an inverse relationship between immunization coverage and birth order of a child. At the same time majority of first-order births occur to younger women who are more likely than older women to utilize maternal and child health care services. Table 4 show that 69.29% of first child are vaccinated fully. The inverse relation is very prominent as the percentage immunized children has decreased consistently as the birth order increases. One can think of two countervailing effects of increasing birth order on likelihood of vaccination; learning effect and negligence effect. It may be expected that with the higher birth order the parents becomes older, their knowledge increases and they learn more about the vaccines and so the positive one could be some kind of learning effect about immunization.

Table 2. Sex of the Children and Immunization Status in Darjeeling

Sex (1)	No of Children (2)	Immunized Children (3)	% of (3) (4)	Not Immunized Children (5)	% of (5) (6)
Male	132	89	67.42	43	32.58
Female	113	70	61.95	43	38.05
Total	245	159	64.89	86	35.10

Source: field survey

Table 3. Birth Places of the Surveyed Children and Immunization Status in Darjeeling

Birth places (1)	No. of children (2)	% of (2) (3)	Immunized children (4)	% of (4) (5)	Not immunized children (6)	% of (6) (7)
Health Centres	165	67.35	110	66.67	55	33.33
Home	80	32.65	49	61.25	31	38.75
Total	245		159	64.9	86	

Source: field survey

Table 4. Birth Orders of the Children and Immunization Status in Darjeeling

Birth orders (1)	Immunized Children (2)	Not Immunized Children (3)	Total (4)	% of (2) (5)	% of (3) (6)
1st	88	39	127	69.29	30.71
2nd	53	29	82	64.63	35.37
3rd	15	12	27	55.56	44.44
4th	3	3	6	50	50
5th	0	3	3	0	100
Total	159	86	245		

Source: field survey

The negative one could be some kind of negligence effect to the higher order births and this effect perhaps increasingly increases with higher birth-order. For higher order births, it seems that the negligence effect becomes stronger so as to offset the learning effect.

Education of the Parents

Both father and mother from 200 families participated in the survey and questioned in order to elicit their education level. The percentage of illiterate fathers is 22% whereas it is 32.5% in case of mothers. 26.5% fathers and 17% mothers can write their name. The percentage of fathers and mothers who have studied up to primary is 13% and 25% respectively. 13.6% mothers' and18% fathers' have studied up to secondary level. Very few, only 5.6% mothers have studied up to 10^{th} level, whereas 13.5% fathers studied up to secondary level of education. 7% fathers and 6.2% mothers have claimed that they have 12 plus education in both the blocks.

Mothers' Education

Table 5 consider mothers' education and the immunization percentage of boys and girls separately. From the data it is very clear that non educated mothers have less inclination toward child immunization than educated mothers. The percentages of fully immunized boys and girls have increased consistently with the educational level of the mothers. Therefore, mothers' education is another important determinant of the immunization status of children. Vaccination coverage is higher for those children whose mothers are more educated. This is possibly because educated mothers are in a better position to realize the importance of vaccination. Since mothers with primary school education and above are the ones more likely to have their children vaccinated, it is important that government should make sure that more girls get at least school education.

There is a vast amount of demographic literature indicating that female literacy exerts greater influence on fertility and child mortality than male literacy' (Bhat *et al*., 1992). Role of education/ literacy/ female literacy is also agreed by many other researchers (George *et al.*,, 1993; Desai *et al.*, 1998; Gauri *et al.*, 2002) in making people more health conscious. The same story can be found in this study where percentage of fully immunized children has increased with the increase in the fathers' education level but not consistently.

Income of the Father

As expected children from the higher income strata are fully immunized, the percentage is pretty higher for middle income group also. But the lower income group children are really susceptible to all those diseases as only 53% in income group 2000-4000 and 46% in income group 0-2000 are immunized. People from these categories are mostly tea garden labour, daily wage earner or those who does not have any regular and organized work or even small farmers who cultivate vegetables in very small lands.

Mothers' age

Chance of immunization of children increases with their mother's age only up to the age group of 25-29 and then decreases. A positive relationship is also noted by Steele *et al.* (1996). In our case we have found that after the age 30 the percentage of immunized children decreases consistently (Table 6). Most immunized children belong to the mother age category 26-30. Very young mothers i.e., 18, 19 years old are also not very inclined to immunize their children as they themselves are not so experienced about the life support services and their children's health. Mothers aged more than 35 years mostly have higher birth ordered child who is less than 2 years old. So these mothers are also not very regular in immunizing their child.

Table 5. Education Levels of Mothers and immunization status in Darjeeling

Education Level of Mothers (1)	No. of Mothers (2)	% of (2) (3)	No. of Children (4)	Immunized Children (5)	% of (5) (6)	Not Immunized Children (7)	% of (7) (8)
No Education	65	32.5	92	47	51.087	45	48.91
Can Write Name	34	17	39	21	53.85	18	46.15
Primary	50	25	55	38	69.09	17	30.91
Secondary	27	13.6	31	25	80.65	6	19.35
10^{th} Level	11	5.6	13	13	100	0	0
12 Plus	13	6.2	15	15	100	0	0
Total	200	100	245	159		86	

Source: field survey

Table 6. Mother's Age as Determinant of Immunization

Mothers' age group (1)	No of mothers in the group (2)	No of children (3)	Immunized children (4)	% of (4) (5)	Non immunized children (6)	% of (6) (7)
18-22	40	43	24	55.81	19	44.19
22-26	49	59	37	62.71	22	37.29
26-30	68	73	53	72.6	20	27.4
30-34	26	40	27	67.5	13	32.5
34-38	15	27	17	62.96	10	37.04
>38	2	3	1	33.33	2	66.67
Total	200	245	159		86	

Source: field survey

Table 7. Religion Statuses

Religion (1)	No. of Children In The Category (2)	Immunized Children (3)	% of (3) (4)	Non Immunized Children (5)	% of (5) (6)
Hindu	155	105	67.74	50	32.26
Islam	35	21	60	14	40
Christian	40	25	62.5	15	37.5
Others	15	8	53.33	7	46.67
Total	245	159	64.9	86	35.10

Source: field survey

One of the very important socio-economic variables is religion which is not quantifiable but is an important determinant of child immunization. The following table (Table 7) is constructed to show the religion wise vaccination in the surveyed area. 67.74% Hindu children got full vaccinations and this is the dominant religion in the surveyed area. The percentage of Christian children fully vaccinated is 62.5%. In other categories 53.33% of children are fully vaccinated. In case of Muslim children the immunization percentage is 60%. So in the above section all the possible determinants of child immunizations have been discussed. Now it seems important to analyze how and to what extent these determinants explain the outcome factor 'immunization'.

Study of Likelihood of Full Immunization of Children- YULES' Coefficient of Association and the Logit Model analysis

This section explains how well some of the very important determinants of child immunization are associated with immunization itself. For the very purpose the Yules' coefficient of association have been calculated to show the association or dissociation between child immunization and mothers' education, fathers' education and fathers' occupation. The Yule's coefficient of association is calculated using the following formula:

As a measure of the intensity of association between two attributes A and B, G. Udny Yule gave the coefficient of association Q, defined as follows:

$$Q = \frac{(AB)(\alpha\beta) - (A\beta)(\alpha B)}{(AB)(\alpha\beta) + (A\beta)(\alpha B)} = \frac{N\delta}{(\alpha B)(\alpha\beta) + (A\beta)(\alpha B)} \quad (1)$$

If A and B are independent, δ= 0 and Q= 0.
If A and B are completely associated, then
either (AB) = (A) à (Aβ) = 0, or (AB) = (B) à (αB) = 0
And in each case Q = +1.
If A and B are in complete dissociation then either (AB) = 0 or (αβ) = 0 and we get Q = -1.
Hence, $-1 \leq Q \leq 1$.

In our case of child immunization and various immunization determining factors we have calculated Yules' coefficients to find out the association between the two. The Yule's value corresponding to mothers' education is 0.5713. This is reflective of a moderately good degree of association. The Yule's value for father's education is 0.3861. Although this is positive, mothers' educational status seems to have a better degree of association with child immunization scenario compared to that of fathers. This result goes at par with the other studies which reveal that education of mothers is more intensely associated with child's vaccination coverage. For this reason, the father's education level was not considered as one of the determinants. The Yule's value for occupation of father is 0.0245 which shows very low association. So occupation may not be a good determinant for vaccination. In the following section the Logit regression analysis have been done where some other determinants like birth order, fathers' income, mothers' age, distance from the nearest health facility and religion of the parent/children along with mothers' education have been considered.

Analysis of child immunization by Logit model

In our case the binary Logit model can be specified in the following way:

$P_i = 1/1+e^{-Y}$

Where $Y = \alpha + \beta_1$birth order $+\beta_2$ mothers' age$+\beta_3$fathers' income $+ \beta_4$distance $+ \beta_5$ gender of child $+\beta_6$ religion $+ \beta_7$ mothers' education + error (2)

Here, Y is not the response variable but a linear function of a set of predictor or explanatory variables. Adjusted values are calculated from Logit regressions incorporating all predictor variables simultaneously. When calculating the adjusted values for a particular predictor variable, all other predictor variables are controlled by setting them to their mean values in the underlying regression.

Characteristics of the Predictor/Explanatory Variables

Hypothesis: 1 There exist a strong association between immunization status and birth order; with children born into larger families having a low vaccination uptake and the first child being more likely to be immunized on time than the second child, so there may be an inverse relationship between immunization coverage and birth order of a child.
Hypothesis: 2 Majority of first-order births occur to relatively younger women who are more likely than older women to utilize maternal and child health care services. With the higher aged mother the probability of fully immunized child increases up to a level but with the gradual increase in age the probability decreases when a particular threshold level of age is crossed.
Hypothesis: 3 Children of high income group are more likely to be fully vaccinated than a poor household.
Hypothesis: 4 Children from urban area is more likely to be vaccinated than their rural counterpart as the distance from a health facility is less in urban area than that in the rural area. So the distance from a health centre and the incident of a child to be fully vaccinated are inversely related.
Hypothesis: 5 It has been found from many studies that there are, though not very severe, gender discrimination in child vaccination in mainly extreme rural areas of India. So we can hypothesize that a boy is more likely to be fully vaccinated than a girl. We assign the value '1' if the child is boy and '0' if girl. Hence,
Gender = {1, boy}, {0, girl}
Hypothesis: 6 Hindu children are more likely to be fully immunized than those in other religion. We put the value '1' if child is Hindu and '0' otherwise.
Hypothesis: 7 Non-educated mothers have less inclination toward child immunization than educated mothers. Literate mothers' are assigned the value '1' and illiterate mothers' are '0'. In the following section we have done the hypothesis testing for equation (2). All the calculations were done using SPSS 11 and Eviews 3.1 Statistical Packages. The following results were found from the analyses.

Table 8. Multivariate Logit Regression Result

	Coefficient (β)	Level of Significance	Exp(β)
X_1= birth order	-0.590	0.0204	0.554
X_2= mothers age	0.0308	0.4225	1.031
X_3= fathers income	0.0129	0.0016	1.000
X_4= distance	-0.219	0.0000	0.803
X_5= gender of child	0.425	0.2515	1.529
X_6= religion	0.721	0.0513	2.056
X_7=mothers education	1.923	0.000	6.840
A	-0.371		0.690

Log Likelihood: -93.55942. Mc Fadden R square: 0.410756, count R^2 =0.80

DISCUSSION

Before going to the regression results, let us have a look at the possible collinearities among the predictor variables to avoid the problems of multicollinearity. In most observational research (as opposed to experimental research, where treatments can be randomized), a certain amount of multicollinearity is inevitable, because most of the predictor variables (such as in our case mother's age and birth order of children, mothers' and fathers' education) are correlated to some extent. As a rule of thumb, when two predictor variables are imperfectly correlated but both are relevant to explain from a theoretical point of view, one should not eliminate one of the variables to reduce multicollinearity, unless the correlations are higher in absolute magnitude (more than about 0.825). But the Pearson Correlation Matrix (not shown) shows the maximum correlation coefficient is 0.6 which is much less than the threshold magnitude.

Table: 8 shows the results of the logistic regression analysis of the likelihood of full immunization as explained by the socioeconomic characteristics of children aged 1to 2 years old. Children with full immunization coverage (FIC) were assigned the value 1 and children who were not fully immunized were assigned the value 0; i.e. not fully immunized children were treated as the reference category. Birth order has a significant inverse effect on child vaccination. Child from higher birth order is significantly less likely to be fully vaccinated than its lower birth order counterpart. Hence, our hypothesis 1 is true and $\beta_1<0$. The correlation analysis showed that there was a high correlation between the mothers' and father's education level (0.516, significant at 1% level). For this reason, the father's education level was not considered as one of the determinants. Regression analysis led to the conclusion that the mother's education level and the fathers' income or living standards were significantly positively associated with FIC. Therefore hypothesis 3 and 7 are true and $\beta_3>0$ and $\beta_7>0$. The results did not show any significant gender bias in immunization coverage, although evidence of a little preference for sons has been found in our survey. The population of Darjeeling is exceedingly heterogeneous. The majority of the people in the hills are of Mongoloid origin, belonging chiefly to various Nepalese castes, but also including a large number of Lepchas, Bhotias and Tibetans. The survey area we have considered in Darjeeling district mostly consists of Nepali people. In Nepalese gender biases is not as strong as in the other Bengalese and Bihari people. So it is not very surprising that we did not get significant gender biases in case of child vaccination in these two blocks of Darjeeling district. So our hypothesis 5 is untrue. We did not get any significant positive relation between mothers age and child vaccination. Result shows with the increase in mothers' age the chance of full vaccination increase but not significantly. So hypothesis 2 is also not true. Chance of immunization varies with religion also. The Logistic Regression result shows that our hypothesis 6 is true i.e., $\beta_6>0$, Hindu children are significantly more likely to be fully immunized than other religion. The coefficient also has a positive sign indicating the same. Distance from the health facility also bears a significant effect on full vaccination of a child. Long distance walking from the health facility creates a negative effect on child's immunization especially for the poor household. Hence the hypothesis 4 is also true and the coefficient $\beta_4<0$ significantly explain the result.

Hence, in the surveyed villages in Darjeeling district it is found that the immunized children are quite less in number than the state average (75.7, DLHS III). Most of the predictor variables are working in the same line what was hypothesized. Only not a very significant (significant at 20% level) gender bias have been found among the people regarding child vaccination, although the estimated odds ratio (OR) is 1.529, indicates that the probability of complete immunization coverage is higher in this category (boy) compared to that in the reference category (girl). Fathers' income is also significant and OR>1 and if fathers' income increased by 1 unit, 1% more child would get vaccinated. Mothers' education is very prominent (OR=6.8) and if one more mother got education then 1.9 unit children get the chance to be immunized. In case of religion odds ratio is 2.056 and the probability of complete immunization coverage is higher in this category (Hindu) compared to that in the reference category (others).

Conclusion

The importance of full immunization coverage for children should be emphasized, not only to ensure the improvement and prevention of child mortality and morbidity, but also to secure the overall development of the country.

Various reasons were uttered by the mothers for incomplete vaccination of their children. The attitudinal reluctance toward immunization at an early age is a combination of unawareness of places where the program is conducted, poor knowledge of the proper age for immunization and a lack of faith in immunization. The costs associated with immunization may also prevent participation in an immunization program. There may be travel costs to the immunization site, waiting costs or lost wages involved that may be substantial for a poor daily wage earner. Other reasons include long distance from the health facility, long waiting time at the health facility, lack of vaccine on the appointment day, absence of personnel at the health facility, child ill-health at the time of immunization, lack of information about the days for vaccination, forgetting the days of immunization, mother's illness on the day of vaccination, social engagements, lack of money, parents objection, disagreement or concern about immunization safety and other miscellaneous reasons. Understanding of the importance of vaccination, education and occupational status showed significant differences with respect to children with complete and incomplete vaccination status. Reasons from suppliers' side for poor immunization coverage in such areas may be system failure in reaching under-privileged population or inadequate immunization supplies, including services.

REFERENCES

1. Banerjee, Debabar (1990): 'Politics of Immunization Programme', Economic and Political Weekly, Apr 7, pp-715-8.
2. Bhat, P.N. Mari and Rajan, S. Irudaya (1992): 'Demographic Transition in Kerala: A Reply', Economic and Political Weekly, June 6, pp-1213-5.
3. Desai, S. and Alva, S. (1998): 'Maternal Education and Child Health: Is There a Strong Causal Relationship?' Demography, Vol-35, No.-1, pp-71-81.
4. District level household and facility survey III, 2007-08. Ministry of health and family welfare. Government of India.
5. Gauri, V. and Khaleghian, P. (2002): 'Immunization in Developing Countries: Its Political and Organizational Determinants', Policy Research Working Paper No.-2769, The World Bank.
6. George, A. and Nandraj, S. (1993): 'State of Health Care in Maharashtra: A Comparative Analysis', Economic and Political Weekly, Aug 7, pp-1671-83.
7. Lodha, *et al* (2000). Diphtheria in urban slums in north India. Lancet. 2000;355(9199): 204.
8. Nath B, Singh JV, Awasthi S, *et al* (2007). 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.
9. Pande RP (2003). "Selective gender differences in childhood nutrition and immunization in rural India: the role of siblings." Demography 2003; 40:395-418.
10. Schaffer, S.J. and. Szilagyi P.G (1995) Immunization status and birth order. Arch Pediatr Adolescent Med. 149(7): 792-7.
11. Steele, F., Diamod, I. and Amin, S. (1996): 'Immunization Uptake in Rural Bangladesh: A Multilevel Analysis', Journal of Royal Statistical Society, Vol-159, Part-2, pp-289-99.

****