RESEARCH PAPER | Statistics | Volume : 5 | Issue : 12 | December 2015 | ISSN - 2249-555X

Immunization Coverage in India: A Study by using NFHS-III Data

KEYWORDS: Vaccination, Chi-square Test , Immunization, India.

M.Mamatha	V.Nageswara Rao
Research Scholar in Statistics, Kakatiya University, WARANGAL.	Professor, Department of Mathematics, K L University, GUNTUR

ABSTRACT Present study attempts to explore the coverage of vaccination status among children aged 0 to 9 months using the National Family and Health Survey (NFHS-III) data. Vaccines stimulate the body's own immune system to protect the person against subsequent infection or disease. Immunization plays an important role in reducing child mortality and morbidity of any country. In India the maternal and child health is not promoted aggressively except in few cases which are either at high risk or only in reach of a certain set of people. Relatively more number of the urban than the rural is utilizing the immunization program. Coverage of all vaccines is better among the urban than rural and coverage of all vaccines is seen to be slightly higher among the male than to female. Coverage pattern of the Measles vaccine and Vitamin-A supplement is not up to the level of satisfaction among the child population.

1. Introduction:

Immunization is the process whereby a person is made immune or resistant to an infectious disease. Vaccination for children in India is carried out under the Universal immunization Program. The Indian Academy of Pediatrics has also recommended its own schedule with newer vaccines.

The National Immunization schedule is as follows:

- At Birth:
- BCG and Oral Polio vaccine
- 6,10 and 14 weeks
- DPT and Oral Polio vaccine
- 6 to 9 months
- Oral Polio vaccine
- 9 Months
- Measles vaccine

Immunization forms the major focus of child survival programmes by protecting the children from life threatening diseases, which are avertable throughout the world. Roughly three million children die each year of vaccine-preventable diseases with a disproportionate number of these children residing in developing countries. Immunization is one of the most cost effective public health interventions and largely responsible for reduction of under-5 mortality rate. The immunisation programme in India was flagged off in 1978 as Expanded Programme on Immunisation (EPI). It gained impetus in 1985 as the Universal Immunisation Programme (UIP) and was carried out in phased manner to cover all districts in the country by 1989-90 (MoHFW 2006-07: 58). 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.

2. Data source and Methods:

Data was analyzed using SPSS software .The database for the present article is from the NFHS-III (2005-2006). The NFHS surveys were conducted by the Ministry of health And Family Welfare and International Institute for Population Sciences (IIPS), Mumbai as the nodal agency. We make use of Chi-square test to find out the results from the data.

2.1. Chi-square test:

One of the most useful non-parametric statistics is chi-square test. The formula for chi-square for testing the association between the categorical variables is

$$\chi^2 = \sum_{i=1}^{r} \sum_{j=1}^{c} \frac{(O_{ij} - E_{ij})^2}{E_{ij}}$$

Where

r = number of rows
c = number of columns
O_{ij} = Observed frequency or Actual number in cell (i , j)
E_{ij}= Expected frequency in cell (i , j)
(r-1)*(c-1) = degrees of freedom

We use the P-value for making a decision. It is defined as "the probability that the null hypothesis is true". For a fixed level of significance 'α' (usually 0.05 or 0.01, more rarely 0.10), we reject null hypothesis if the P-value is smaller than α, otherwise we fail to reject null hypothesis at level α.

We can compute P-value by using the following

formula

$$\text{P- value} = [\ 0.5^{df/2} / \Gamma(df/2)\ ] \times (\chi^2)^{(df/2)\ -1} \times e^{-\chi^2/2}$$

Where

Γ-Gamma value
d.f- degrees of freedom
χ^2- **Chi-square** value

3. Principal findings:

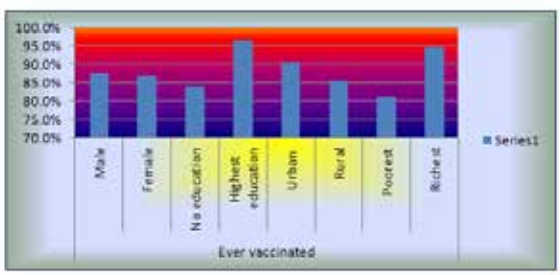
In a community with higher immunisation coverage, chances of unvaccinated children getting exposed to disease germs passed around by other unvaccinated children are less. Since vaccination of one child confers health benefits for others it has to reach all the corners of the country.

This paper tries to find out the determinants of immunisation coverage rate among children aged 0 to 9 months,

Volume : 5 | Issue : 12 | December 2015 | ISSN - 2249-555X

spread in urban & rural along with male & female population.

The vaccination pattern is observed to be almost similar in male and female population and the level of education of the parent is seen to be a significant factor for protecting their children by giving vaccines. The proportion of vaccinated is comparatively high among the urban than to the rural population. Though the government of India is carrying the immunization programme by providing the vaccines for free of cost still it is observed that the vaccination is greatly influenced by the poor and rich disparity.



The coverage of vaccination is seen to be least among the Tripura (54.6%) and Arunachal Pradesh (61.6%) and observed to be highest in Tamil Nadu (98.7%) and Goa (97.6%) states. The coverage of vaccines is seen to be roomy in most of the states, with the Indian capital Delhi having 83.4% of vaccination. The coverage is seen to be far reaching all the south Indian states of India. Statistically significant association is observed between the ever-vaccinated with Type of place of residence, sex, level of education and wealth index.

Out of the total population 12.4% are still not been vaccinated. Non-utilization of vaccines is found to be 9.1% among the total urban and 14.2% among the total rural population. The non-coverage rate of vaccines is observed to be slightly high in female (12.9%) than the male (12%) child.

Although coverage with recommended vaccines for each new birth cohort remains high, vigilance is needed to maintain these levels. Difficulty in accessing the immunization services in terms of distance, costs, and time can still be the main barrier in some parts of the rural. Statistically significant differences in vaccination coverage levels between the rural population and their urban counterparts were determined for individual vaccines. On the whole the oral polio vaccine given at birth is seen to be very low and is quiet miserable in the rural along with very meager coverage in male and female population. The coverage of the vaccines DPT-3(49%), Measles (48%) and vitamin-A (39%) supplement is significantly low among the rural population. On the whole the vaccination coverage of Measles and Vitamin-A supplement is observed to be very poor among the urban as well as rural. Though the primary response of the coverage for the vaccines DPT as well as Polio was exceptionally admirable, but decreased radically for the subsequent doses. The dropout rate of DPT vaccine in urban shows that, the dropout from the first dose to second dose of DPT is 7.5% and second dose to third dose is still more with 12% and the dropout rate from the first dose to second dose of Polio is 5.5% and second dose to third dose is still more with 10.46%.An additional amount of 0.3% of dropout rate of the Polio vaccine is seen compared to the DPT vaccine. An immunization session is effective only if each child and woman attending it receives all vaccines s/he is eligible for, following necessary safety and efficacy procedures and returns timely for the next vaccine, hence an attractive strategy for the rural population is to be implemented whereby immunization is always available to the children by strengthening the vaccination at various sources for the population and awareness among the population is to be strictly monitored by educating them regarding effectiveness of immunization. The communication through media and publicity by the health workers at the pre-informed place and time could increase the awareness among the low coverage areas of rural India.

When we considered the coverage of individual vaccines among male and female,it is seen to be slightly high among the male children than to the female children of India. Statistically significant differences in vaccination coverage levels between the male and female child population was determined for individual vaccines. The coverage of the Measles and vitamin-A suppliment is significantly low among the male and female children. Though the primary response of coverage for the vaccines of DPT as well as Polio was exceptionally admirable among the male and female children, but decreased radically for the subsequent doses. The dropout rate of DPT vaccine in male shows that, the dropout from the first dose to second dose of DPT is 9.5% and second dose to third dose is still more with 16% and the dropout rate from the first dose to second dose of Polio is 6.7% and second dose to third dose is still more with 12%. The dropout rate of DPT vaccine in female shows that, the dropout from the first dose to second dose of DPT is 11% and second dose to third dose is still more with 15% and the dropout rate from the first dose to second dose of Polio is 5.7% and second dose to third dose is still more with 12%. Hence the dropout rate of DPT vaccines is more in female than to male. The coverage of the series of Polio vaccines is better compared to the series of DPT vaccines among the urban, rural and also in male, female child population.

4. Conclusion:

Evaluation of efforts to increase the coverage should be enhanced in the rural population. For the health benefits to continue, high levels of vaccination coverage must be attained for each new birth cohort irrespective of male and female child and must be monitored to ensure protection from disease. Monitoring of vaccination should be encouraged at all levels to achieve the control over the diseases through the vaccination.

	Urban	Total	%	Rural	Total	%	Pearson Chi-Square value	Male	Total	%	Female	Total	%	Pearson Chi-Square value
Vaccinated	10225	11286	91	18139	21234	85		14725	16790	88	13639	15730	87	
Received DPT 1	14932	18618	80	20629	30047	69	946.452	18807	25297	74	16754	23368	72	43.346
Received DPT 2	13731	18600	74	18025	30005	60	1098.552	16858	25264	67	14898	23341	64	45.163
Received DPT 3	11999	18600	65	14758	30005	49	1165.549	14214	25264	56	12543	23341	54	31.270

Volume : 5 | Issue : 12 | December 2015 | ISSN - 2249-555X

Received POLIO 0	11510	18619	62	11451	30051	38	2712.903	12182	25297	48	10779	23373	46	28.710
Received POLIO 1	16926	18607	91	25887	30026	86	630.252	22386	25278	89	20427	23355	87	24.371
Received POLIO 2	16018	18583	86	24109	29987	80	690.360	21036	25243	83	19091	23327	82	25.127
Received POLIO 3	14261	18583	77	20905	29987	70	689.778	18481	25243	73	16685	23327	72	23.629
Received MEASLES	11532	18582	62	14435	29952	48	974.866	13857	25224	55	12110	23310	52	45.190
Received BCG	15634	18618	84	21665	30053	72	1187.354	19687	25298	78	17612	23373	75	42.139
Received Vitamin A	9213	18613	49	11810	30033	39	635.747	11126	25285	44	9897	23361	42	15.641

df-4 & *Asymp. Sig. (2-sided)= 0.00*

REFERENCE

1. Bonu Ranu, S., & Baker M.T.D. (2003). The impact of the national polio immunization campaign on levels and equity in immunization coverage: Evidence from rural north India. Social Science Medicine, 57, 1807-19. | 2. A.M. Kadri*, Anjali Singh**, Shikha Jain**, R.G. Mahajan* and Atul Trivedi**(2010), study on immunization coverage in urban slums of Ahmedabad city, Health and Population: Perspectives and Issues Vol. 33 (1), 50-54. | | 3. Nilanjan patra(2009), thesis 'when will they ever learn?': the great Indian experience of universal immunisation programme. | 4. Sharma, Suresh (2005) "Child Health and Nutritional Status of Children: The Role of Sex Differentials", working paper series no.e/262/2005. Institute of Economic Growth, Delhi, India. | |