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Research Article

Immunization status of children less than 5 years attending to tertiary care hospital out-patient department in an urban area, prospective-descriptive study

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ABSTRACT

Background: The Indian population has swollen to 1.21 billion.1 Children below 5 years constitute 12-15% of this population. To determine the immunization status of children <5 years of age attending Tertiary care hospital Outpatient department and the various factors influencing immunization status.
Methods: Design of the study was Prospective-descriptive hospital based study. Patients/subjects were one thousand children <5 years of age. Subjects were selected by random sampling method, Immunization status of these children was analyzed and the cause for partial and non-immunization were studied. Information on socio demographic factors and immunization status was analyzed.
Results: One thousand children under 5 years were studied for distribution of gender, age, residence, socio-economic status, religion, literacy, type of family, order of birth, type of delivery, number of children, age and occupation of mother. Of all parameters studied there were significant correlation between low maternal education, paternal education , low maternal age (15-20years), agriculture, higher birth order , joint family, low socio-economic, Muslim followed by Hindu, Christian, rural population, age group of 1-5 years, total number of children >2 with partial immunization.
Conclusions: We observed that only 32.6% children were fully immunized. Financial problem, Lack of knowledge, immunisation at government hospital, ignorance seems to be a major contributing factors for under immunization. Female gender, rural back ground, belonging to Muslim community, low socioeconomic status, low maternal age, uneducated parents and being from joint family are the other contributing factors for the poor immunization coverage and were found to be statistically significant. Our study shows children had 100% immunised for BCG, OPV-0, OPV-1 and DPT-1.

Keywords: Association, Social factors, Vaccine coverage

INTRODUCTION

The Indian population has swollen to 1.21 billion.[1] Children below 5 years constitute 12-15% of this population. In the 1980's the percentage of immunization was less than 5% according to government figures. The campaign picked up in the early 1990's.[2]

The scenario changed rapidly in the 90's, as the government took up the issue of national immunization. In 1995-96 the immunization was almost 97.1% for BCG, 91.6% for polio, 82.6% for measles. Karnataka too saw such a growth in immunization status.

An evaluation by UNICEF (2001) showed that in India, 49% of children are fully immunized which is significantly low.

All these statements, the disparity between government figures and UNICEF figures for immunization shows the need for the study. Thus, it is necessary to not only assess the coverage but also to study the social factors influencing immunization and to know the reasons for non-immunization, partial immunisation and delayed immunisation if any.

METHODS

Prospective-Descriptive Hospital based study. Socio economic status was calculated using modified B. G. Prasad classification. Data was collected from parents of 1000 children less than 5 year attending OPD. An oral questionnaire method and written proforma of IAP Immunization Schedule 2011 was adopted to assess their immunization status and social factors influencing immunization coverage. Children who have not taken immunisation 2 weeks from the date of immunization were considered to have missed immunization. Missing any of the doses of schedule is considered to be partially immunized.

Descriptive statistics reported using numbers and Percentage for the categorical variable and chi-square test or fisher's exact test was done to test the association between the Partial immunized and fully immunized with demographical, clinical variables. STATA-IC 12 is used for statistical calculation and P<0.05 is considered as significant.

RESULTS

Our study group comprised 610 males (61%) and 390 females (39%). Males dominated in all the age groups. Residence distribution showed that 200 children were from rural areas (20%) and 800 were from urban area (80%) giving a ratio of 1:4.

Table 1: Age and immunization.

Age in years	Fully immunized		Partially immunized		Total	
	No	%	No	%	No	%
<1	186	57.06	256	37.98	442	44.20
1-2	92	28.22	172	25.52	264	26.40
2-5	48	14.72	246	36.50	294	29.40

P value is <0.001 is significant.

This table shows children <1 year were better immunized, followed by 1-2 and 2-5years age group.

This shows children from urban are better immunized and is statistically significant (Table 2).

Table 2: Place and immunization.

Place	Fully immunized		Partially immunized		Total	
	No	%	No	%	No	%
Rural	8	2.45	192	28.49	200	20
Urban	318	97.55	482	71.51	800	80

P value is <0.001 is significant.

Table 3: Religion and immunization.

Religion	Fully immunized		Partially immunized		Total	
	No	%	No	%	No	%
Christian	70	21.74	86	12.76	156	15.6
Hindu	224	68.71	452	67.06	676	67.6
Muslim	32	9.82	136	20.18	168	16.8

P value is <0.001 is significant

There is statistically significant difference between immunization statuses among religions. Christians are better immunized followed by Hindus and least among Muslims.

Table 4: Type of family and immunization.

Type of family	Fully immunized		Partially immunized		Total	
	No	%	No	%	No	%
Joint	72	22.09	346	51.34	418	41.8
Nuclear	254	77.91	328	48.66	582	58.2

P value is <0.001 is significant

This table shows significant children from nuclear family are better immunized.

Among fully immunized, male constitute 64.42% and female 35.58%, among partially immunized 59.35% males and 40.65% females. There was no significant statistical difference among male and female immunization status.

Association between socioeconomic status (ses) and immunization was studied. Statistical comparison cannot be made out as the values are very low

Data shows children from SES 1 are fully immunized and are partially immunized. Among SES 2 and 3 34.32% and 5.34% are partially immunized.

Association between number of children and immunization status was studied. Statistical comparison cannot be made out as the values are very low. Data shows among fully immunized single child constitutes 63.1%, two children constitutes 30.67%, three children 6.13%. Among Partially immunized one child constitutes 40.36%, two children 37.69%, three children 21.36%, four children 0.59%.

Association between birth order and immunization was studied. Statistical comparison cannot be made out as the values are very low.

This shows most of parents have single child which constitutes 2/3rd of study population. Among the first born, 71.78% are fully immunized, 58.46% are partially immunized. The bulk of the study population was formed by the 1st born 628 children. 2nd born child, 25.77% are fully immunized and 29.67 are partially immunized, 3rd born child, 2.45 are fully immunized and 11.2% are partially immunized, 4th born child, 0.59% are partially immunized.

Association between birth weight and immunization status was studied. Data showed children with birth weight >2.5kg 96.32% and <2.5kg 3.68% are fully immunized and >2.5kg 91.69%, <2.5kg 8.31% are partially immunized.

Association between father education and immunization was studied. And Statistical comparison could not be made out as the values were very low. Among the fully immunized children postgraduates constitute 17.18%, graduates constitute 79.14%, PUC 3.68%. Among Partially immunized illiterate constitutes 0.59%, primary 0.59%, middle 7.12%, high-school 28.49%, PUC 27.30%, graduates 32.3%, postgraduates 3.56%. This shows children with graduates and postgraduates parents are better immunized. Data suggested among fully immunized 64.42% parents are professionals, 29.45% are businessman, 4.91% are skilled, 1.23 % is unskilled workers. Among partially immunized professionals constitutes 8.31%, business 45.40 %, skilled 14.84%, agriculture 18.40%, unskilled 13.06%. Immunisation is highest among children of professional parents.

Association between mother age and immunization was studied. And Statistical comparison could not be made out as the values were very low.

Data shows among the fully immunized mothers of age 21-25years constitutes 56.44%, 26-30 years 37.42% and 31-35 years 6.13%.

Among partially immunized 21-25 years constitutes 45.4%, 26-30 years 43.32%, 31-35years 5.93% 36-40 years 4.75% and 15-20 years 0.59%.

Association between mother education and immunization was studied. And statistical comparison could not be made out as the values are very low.

Data shows among the mothers of fully immunized 63.80% are graduates, 28.83 are PUC, 4.91% postgraduates and 2.45% are high school. Among the partially immunized children 29 % are graduates and postgraduates each, high school 25.6%, middle school 11.2%, postgraduates 2.8%, primary and illiterate 0.8% each.

Association between mother occupation and immunization was studied. And Statistical comparison could not be made out as the values are very low. Data shows mother occupation among fully immunized children 61.96% are house wife, 29.45% are professional, skilled are 7.36% and unskilled are 1.23%. Among the partially immunized 83.98% are house wife, 9.5% are unskilled, 2.97% are skilled, 2.37% are professionals and 1.19% are in business. This shows professional mothers children are better immunized followed by skilled worker and house wives.

Table 5: Individual vaccine coverage.

Vaccine	% Coverage
BCG	100
OPV-0	100
DPT-1	100
Hepatitis-B-1	99.20
HIB-1	68.40
Pneumococcal-1	32.7
IPV -1	33
Rotavirus-1	34.2
OPV-2	99.56
DPT-2	99.56
Hepatitis-B2	99.56
HIB-2	65.12
Pneumococcal-2	27.37
IPV-2	27.81
Rotavirus-2	29.14
OPV-3	98.95
DPT-3	98.95
Hepatitis-B3	98.95
HIB-3	64.83
Pneumococcal-3	24.67
IPV-3	24.67
Measles	98.79
Hepatitis-A1	63.77
MMR-1	61.70
Varicella-1	61.70
PneumococcaL-B	20.96
DPT-B	95.59
HIB-B	63.00
OPV-B	95.59
IPV-B	20.26
Hepatitis-A2	55.95
Typhoid	71.63
MMR-2	7.14
Varicella-2	7.14
DPT 2B	100
OPV-2B	100
Typhoid-B	7.14

Reasons for partial-immunization

- Number (%)

- Lack of knowledge of immunization schedule: 462 - 46.20%
- Unwell child, immunization postponed: 36 (3.60%)
- Lack of health facility in nearby locality
- Ignorance: 8 (0.80%)
- Busy parents: 4 (0.40%)
- Because of the belief that immunization may be harmful
- Non availability of Local Health Worker/Anganwadi Worker
- Adverse reaction in previous vaccination
- Fear of injection
- Medical reasons
- Immunisation in government hospital: 312 (31.20%)
- Influence of other family members not to take
- Vaccines not available earlier
- Lack of motivation: 76 (7.60%)
- Financial reasons: 602 (60.20%)

Table 6: Comparison of individual vaccine coverage.

Type of Vaccine	Present study	Chhabra et al[14]	Singh et al[10]	Bhatia et al[16]
BCG	100	87.2%	68.6%	93.99%
OPV-1/DPT-1	100	81.5%	75.7%	93%
OPV-2/DPT-2	99.56	76.8%	73.2%	90.5%
0PV-3/0PV-3	98.95	70.7%	66.7%	85.9%
MEASLES	98.79	65.3%	60.1%	76%

Reasons for partial immunization

Most common reason Financial reasons: 602 (60.20%) followed by,

Lack of knowledge of immunization schedule: 462 - 46.20%, Immunisation in government hospital: 312 (31.20%), Lack of motivation: 76 (7.60%), Unwell child, immunization postponed: 36 (3.60%), Ignorance: 8 (0.80%), Busy parents: 4 (0.40%).

In the Study by Nirupam, et al, common reasons for unimmunization were obstacles, lack of information and lack of motivation.[3]

Study conducted by Malini Kar et al, where the common reasons were unwell child, lack of knowledge of immunization schedule and migration to native village.[5]

These variation in reasons for unimmunization in different areas and different.

studies might probably due to variations in the literacy, availability of health facility, greater man power involvement in pulse polio programme, under supervision and health monitoring system across the country.

DISCUSSION

Accurate measurement of vaccination coverage is an essential step in determining expected reduction in morbidity and mortality from vaccine preventable diseases. It is one of the ways to evaluate effective operation of programme.

In our study it was seen that 60% constituted by male of which 34% are fully immunized 40 % constituted by female of which 29% of them are fully immunized.

Study by Nirupam S et al, revealed males (39%) had better immunization than females (30%).[3] Which is comparable to study conducted by Yadav J et al, stated coverage levels of males (63.7%) were better than in females (57.1%), and also study conducted by Malini Kar et al, revealed 70.7% of males are fully immunized compared to females where 29.3% are immunized.[4,5]

Our studies show children from rural area 4% and from urban 39.75% are fully immunized. This is statistically significant. study conducted by Dhadwal D et al, in Shimla showed 84.3% of urban and 57.5% of rural children were fully immunize.[6] Another study conducted by Gaash B in Kargil also showed better immunization among children of urban (72%) than rural (62%).[7] Study by Singh et al revealed Urban children out numbered rural children in attaining the higher immunization level.[8]

So immunization is better in urban areas than rural probably due to easy accessibility and better health care, better health awareness and higher standard of living.

Our study shows Christians are 44.8% are fully immunized followed by Hindus 33.1% and Muslims 19% which is comparable to study by Yadav et al, during 1999 showed 100% Christians 61.5% Hindus and 50.5% Muslims are fully immunized, study conducted study by Malini Kar et al, showed Hindus (69.9%) are better immunized than non-Hindus, other study conducted by same authors in BIMARU states in 2000 showed 48.8% Hindus, 38.7% Muslims and 73.7% of Christians are fully immunized.[6,9,10] This was due to better literacy and socioeconomic condition of Christians. Intervention programs need to be tailored specifically for Muslim community through an in-depth analysis of psycho-social needs and subsequent corrective actions.

Determined by "per capita income"- an index of standard of living of the people. Depends on the literacy, occupation, number of dependents in family or family size.

Our study shows from SES 1 44.5% are fully immunized and 55.4% are partially immunized, SES 2 and 3 all are partially Immunized.

Similar observations made by Dalal et al, which also reveals better immunization among higher socio

economic strata as follows, 100% of class I, 95.8% of class II 92.1% of class III, 81.7% of class IV and 48.6% of class V are fully immunized. Per capita income in India is among the lowest in the world. Children in medium and high socioeconomic status areas tend to have 10% to15%higher levels of immunization coverage compared to children of low socioeconomic status.[11]

Our study shows 43% with single child, 39% with 2 children, 12% with 3 children are fully immunized. More the number of children less likely to receive full immunization.

Caring for multiple children can create a unique barrier to vaccination. This shows most of parents have single child which constitutes 2/3rd of study population. The bulk of the study population was formed by the 1st born i e 628 children. Among the fully immunized 1st born constitutes 71.78%, 2nd born child constitutes 25.77%, 3rd born child constitutes 2.45%, 4th born child constitutes 0%.

As the birth order of the child increases immunization declines. There is a strong association between use of family planning and use of immunization services or it may indicate that mothers at home are unable to bring their infant for the practical difficulties and expense of having other children at home.[9] It was found that mothers with 2-3 children are 20% less likely and those with >4 children are 40% less likely to have vaccinated children than those with 1 child.[12] Study conducted in Malawi, where 72% of 1st born, 64% of 2nd/3rd born, 63% 4th/5th born and 58% of 6+ order were fully immunized.[13]

Children with normal birth weight 33.6% and low birth weight 17.6% are fully immunized respectively.

Our study shows children with father illiterate, primary, middle and high-school no children are fully immunized, father with PUC 6.1%, graduates 54.2%, postgraduates 70% are fully immunized.

Significantly higher level of knowledge is found amongst mother with higher level of education and will understand the scientific information more easily than those with lower of education. This high level of knowledge may be attributable to quality of information provided to mothers at health facilities. Literate mothers will know the schedule of vaccines and there benefits better than illiterate. Literate mothers are 1.4 times more likely to get their children fully immunized.[14]

Freeman reported that provision of information to mothers regarding when to start the immunization and how often the child should be immunized were key factors determining the immunization status, so mother will understand above facts better when she is literate.[15]

Children with mother illiterate, primary, middle school no children are fully immunized, mother completed high school 3.1%, PUC 31.7%, Graduation 71.2 and Post-graduation 57.1% are fully immunized.

Our study shows children of professional father are 78.9%, businessman 23.8%, skilled worker 13.7%, farmer 0%, unskilled worker 4.3% are fully immunized. This shows education of father play significant role in immunization of children.

children of professional mother are 85.7%, business 0 %, skilled worker 54.5%, unskilled 5.8%, house wife 26.3% are fully immunized. This shows education of mother has impact on immunization of children.

Comparable to study conducted by Elizebath, et al showed 70.3% of children of mother <19yrs, 71.9% of children of mother 19-29 yrs and 76.5% of children of mother 30+yrs are fully immunized.[12]

So younger mothers are less likely get their children fully immunized compared to older ones probably because they may be unaware of immunization schedule. This is another reason why child marriages have to be discouraged, as the young mother is not in a position to assume responsibility of a child.

CONCLUSION

From this hospital based observational study on Immunization status of children less than 5 years attending to a tertiary care hospital outpatient department.

We have derived the following conclusions:

1. Of the total 1000 cases 32.6% were fully immunized, 67.4%% were partially immunized.
2. Males were better immunized than females (p=0.123).
3. Immunization coverage was better in Urban children than Rural once (p<0.001).
4. Christians had best immunization coverage followed by Hindus and least in Muslims (p<0.001).
5. Children with higher socioeconomic status are immunized better.
6. Single child better immunized than multiple children.
7. Children from nuclear family are better immunized than joint family.
8. Children with birth order 1 better immunized.
9. Children with normal birth weight are better immunized than low birth weight.
10. Children of literate parents had better immunization coverage than those illiterate parents.
11. Children of younger mother are at risk of being getting under immunized than of older mother.
12. Children had 100% immunized for BCG, OPV-0, OPV-1, DPT-1. Dropout rate for hepatitis B-1 0.8%.OPV-2, DPT-2 and Hepatitis B-2 is 0.44%. OPV-3, DPT-3 and HepatitisB-3 1.05%. MEASLES dropout rate is 1.21%.

13. Most common reasons for failure immunize identified in our study were financial reason followed by lack of knowledge about immunization schedule, immunisation at government hospital, lack of motivation and ignorance.

Limitations of the study was to as this is a hospital based study, it does not represent the component of the society and since study group was between less than 5 years there might be chances for recall bias.

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