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Research Article

Factors affecting immunization among children of rural population of block Malpura, district Tonk, Rajasthan, India

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ABSTRACT

Background: Immunization is a highly cost effective way of improving child survival, however it is estimated that every year, at least 27 million children worldwide do not receive the basic package of immunizations. In India, immunization services are offered free in public health facilities, but the immunization rate remains low. The Routine Immunization schedule includes BCG, OPV, DPT, hepatitis B, and measles vaccines. Now heamophillus influenza B, DPT and hepatitis B are given combined as a pentavalent vaccine since September 2014 in Rajasthan. Objectives of the study are, to determine immunization coverage status of infants and to know about socio-demographic factors influencing infant immunization.

Methods: A cross-sectional study included 210 caretakers and infants of 12-23 months old selected by applying the 30 × 7 cluster sampling method in block Malpura during the period of March 2015 to April 2015. Only one infant was selected from each care taker.

Results: It was observed that 149 (70.96%) of the subjects had complete immunization while 50 (23.80%) had partial and 11 (5.24%) had no immunization coverage. Complete immunization was observed better in Hindu families of 121 (81.20%) subjects. Literacy status of parents is related to high immunization coverage as observed that 105 (70.47%) mothers and 111 (74.49%) fathers were literate out of 149 completely immunized subjects. Immunization coverage was observed better among children delivered at institutions as 132 (88.59%) out of 149 completely immunized subjects delivered at institutions whereas 23 (46%) from partially immunized and 06 (54.54%) from non-immunized were delivered at home. The commonest reason among partial and non-immunized infant was sickness 22 (36.06%) of elder sibling as a result of the previous vaccination followed by 20 (32.07%) of the sickness of beneficiary at the time of vaccination.

Conclusions: There is good immunization coverage observed in this rural block but to achieve the goal of vaccine preventable diseases and the millennium development goal of reducing child mortality, we have to strengthen routine immunization services and also to motivate the community as well as health care providers to follow the National Immunization Programme.

Keywords: Child mortality, Cluster sampling, Measles vaccine

INTRODUCTION

Immunization has one of the most significant, cost-effective and stimulatory public health interventions, through which a number of serious childhood diseases have been successfully prevented. About 25% of under 5 mortality is due to vaccine-preventable diseases. In view of routine immunization the provision of a primary series of vaccine in the first year of life is the milestone of other primary health care efforts.[1]

The World Health Organization (WHO) launched the Expanded Program of Immunization (EPI) in 1974 globally with focus on prevention of the six childhood

vaccine-preventable diseases.[2] The Universal Immunization Program (UIP) was introduced in India on November 19, 1985, with the objective to cover at least 85% of all infants by 1990.[3]

It is estimated that at least 27 million children and 40 million pregnant women worldwide do not receive the basic package of immunization (as defined by the WHO and UNICEF), and 2 to 3 million children die from vaccine preventable diseases every year.[4]

Immunization is also presented as the key strategy to achieve the Millennium Development Goals (MDGs) especially to reduce the under-5 mortality rate (U5MR), infant mortality rate (IMR) and proportion of child immunized against measles.[5]

India, along with the whole world, stands committed to the welfare of children, as reflected in the theme of 'World Health Day, 2005' viz., 'Make every mother and child count'.[6]

It was observed that only 60% of the children amongst aged 12-23 months in urban India are fully immunized.[7]

The NFHS have also reported that the proportion of fully vaccinated children between 12-23 months of age had increased from 36% in first survey (1992) to 42% in second survey (1998). Still only 44 % of the infants in India are fully immunized (NFHS-III-2005) which is much less than the desired goal of achieving 85% coverage.[8]

The current scenario depicts that immunization coverage has been steadily increasing but the present status remains still less than the desired. Immunization status varies widely across regions, states, strata's of the society depending upon socio-demographic factors and availability of health care.

Objectives of the survey

1. To determine immunization coverage status of infants.
2. To know about socio-demographic factors influencing infant immunization.

METHODS

The present cross-sectional household based descriptive study was conducted at rural area of block Malpura District Tonk, Rajasthan from March 2015 to April 2015. Necessary approvals were taken from HREC of Geetanjali University, Udaipur, Rajasthan. The study area comes under jurisdiction of Panchayat Samiti Malpura, District Tonk, Rajasthan.

The study population comprised of children aged 12-23 months and their caretaker. Age was confirmed by birth certificate or immunization card or, when it was not available, by asking the mothers (using a standardized Indian calendar and major holidays as reference points). House-to-house visits and face-to face interviews were conducted on a pre-tested proforma.

Sample size and data collection

The study sample included 30 clusters from the entire population of Block Malpura, District Tonk (Rajasthan) selected as per the 30×7 cluster sampling method (desired precision of ± 10% with expected coverage of 70%) as proposed by WHO.[9]

Thirty clusters in the community were demarcated based on its population. In Malpura block, there were a total of 169 revenue villages with total population of 2,00,775. In order to decide clusters, sampling interval was 6692.5 rounded up to 6693 as per formula.

Seven subjects between age group of 12-23 months were selected from each of the 30 clusters to attain the required sample size of 210 children.

The first household was selected randomly in each cluster and every next household was studied in a sequence, until a total of seven eligible children in the age group of 12-23 months were covered. On reaching the selected household, the mother of the eligible child (12-23 months) was interviewed.

If no child belonging to the target population was found, next households were checked till an eligible child was found.

The preformed, pretested, semi structured questionnaire was designed in English and translated into local language by investigators used to collect information from mothers regarding demographic and socio-economic status, status of immunization of their child, reasons for noncompliance (if applicable), questions on contraindications of immunizations questions testing knowledge of childhood immunizations (possibility of side effects, age at start program, which diseases prevented). To maintain privacy, information was collected maintaining utmost privacy as per the convenience of respondents. Time required to complete one interview was 10-15 minutes. The collected data was numerically coded and entered in Microsoft Excel 2007, and then transferred to the SPSS (ver.19). Data was analyzed using appropriate statistical tests.

Complete immunization

Child who has received three doses of DPT, Hepatitis B and OPV each and one dose of BCG and Measles each.

Partial immunization

A child who had missed any one or more of the above doses.

No immunization

A child who had not received even a single dose of any vaccine.

Dropout rate

DPT 1 coverage-DPT 3 coverage/DPT 1 coverage ×100

RESULTS

It was observed that 149 (70.96%) infants were completely immunized and 50 (23.80%) had partial immunization while 11 (5.24%) were not immunized with any of the vaccine. The proportion of fully immunized children was comparatively higher in males than in females (Table 1).

Out of 149 completely immunized subjects 90 (60.40%) belonged to nuclear family, whereas 121 (81.20%) were from Hindu religion whereas 105 (70.46%) mothers and 111 (74.49%) fathers were literate.

Out of 50 partially immunized subjects, there were 30 (60.00%) subjects belonged to nuclear and 29 (58.00%) were Hindu while mothers 32 (64.00%) and fathers 19 (38.00%) of partially immunized subjects were illiterate.

Table 1: Distribution of study subjects with their Gender and Immunization status (n = 210).

Variable	Male (n = 111)	Female (n = 99)	Total (n = 210)
Complete immunization	81 (72.97)	68 (68.68)	149 (70.96)
Partial immunization	26 (23.42)	24 (24.24)	50 (23.80)
No immunization	04 (3.60)	07 (7.07)	11 (5.24)
Total	111 (52.85)	99 (47.14)	210 (100)

Of the 11 non-immunized subjects, 06 (54.54%) from nuclear family and 05 (45.46%) were Hindu whereas 08 (72.73%) mothers and 05 (45.46%) fathers were illiterate.

Immunization was observed better in institutional deliveries as the findings of our study also take this concept to one step further. 132 (88.59%) out of 149 completely immunized children were delivered at institutions while 23 (46%) from partially immunized and 06 (54.54%) from non-immunized were delivered at home. The immunization card was found with 91 (61.07%) of completely immunized while 18 (36%) form partially immunized and 07 (63.63%) non-immunized had no immunization card (Table 2).

Table 2: Distribution of study subjects with demographic variables and immunization status.

Variables	Complete Immunization (n = 149)	Partial Immunization (n = 50)	No Immunization (n = 11)	Total (n = 210)
Type of family				
Nuclear	90 (60.40)	30 (60.00)	06 (54.54)	126 (60.00)
Joint	59 (39.60)	20 (40.00)	05 (45.46)	84 (40.00)
Religion				
Hindu	121 (81.20)	29 (58.00)	05 (45.46)	155 (73.80)
Muslim	28 (18.79)	21 (42.00)	06 (54.54)	55 (26.20)
Mother's educational status				
Illiterate	44 (29.53)	32 (64.00)	08 (72.73)	84 (40.00)
Literate	105 (70.47)	18 (36.00)	03 (27.27)	126 (60.00)
Father's educational status				
Illiterate	38 (25.51)	19 (38.00)	05 (45.46)	62 (29.53)
Literate	111 (74.49)	31 (62.00)	06 (54.54)	148 (70.47)
Mother's occupational status				
House Wife	98 (65.77)	35 (70.00)	07 (63.64)	140 (66.67)
Working	51 (34.22)	15 (30.00)	04 (36.36)	70 (33.33)
Place of Delivery				
Home	17 (11.40)	23 (46.00)	06 (54.54)	46 (21.90)
Institutional	132 (88.60)	27 (54.00)	05 (45.46)	164 (78.10)
Immunization Card				
Present	91 (61.07)	32 (64.00)	04 (36.36)	127 (60.47)
Absent	58 (38.92)	18 (36.00)	07 (63.64)	83 (39.53)

The commonest reason among partial and non-immunized infants according to the respondents was sickness 22 (36.06%) of elder sibling as a result of previous vaccination followed by the sickness 20 (32.78%) of the beneficiary at the time of vaccination. Other responsible reasons were migration, lack of knowledge regarding the immunization schedule as well as subsequent vaccination of the child, unavailability of both the parents at the time of vaccination, lack of time and hard to reach vaccination site (Table 3).

BCG was administered to 191 (90.95%) subjects while DPT 3 was administered to 153 (73.85%) with the dropout rate of 15.47% (Table 4).

Table 3: Distribution of study subjects with the possible causes of Partial and Non-immunization.

Variable	Partially Immunized (n = 50)	Non – Immunized (n = 11)	Total (n = 61)
Unavailability of both the parents	05 (10.00)	05 (45.46)	10 (16.39)
Parents / child had gone outside on the scheduled date of vaccine	10 (20.00)	05 (45.46)	15 (24.59)
Had no information regarding vaccine	01 (02.00)	05 (45.46)	06 (09.83)
Had no information regarding Immunization schedule	08 (16.00)	06 (54.54)	14 (22.95)
Unavailability of health staff	01 (02.00)	03 (27.27)	04 (65.57)
Sickness of elder sibling as a result of the vaccination	14 (28.00)	08 (72.73)	22 (36.06)
Lack of knowledge/forgot regarding the subsequent vaccination of the child	04 (08.00)	04 (36.36)	08 (13.11)
Lack of time	04 (08.00)	03 (27.27)	07 (11.47)
Child unwell	15 (30.00)	05 (45.46)	20 (32.78)
Hard to reach vaccination site	03 (06.00)	02 (18.18)	05 (08.19)

*Multiple responses, total not additive

Table 4: Comparison of immunization coverage for various vaccines amongst children in the age group 12-23 months (%) of present study with NFHS-3, DLHS-3 (State & Rajasthan) and Block CMHO Malpura, Tonk.

Vaccine	Present study (n = 210)	NFHS- 3 Rural India (2005–06)	DLHS-3 Rajasthan (2007-08)	DLHS-3 Tonk (2007 - 08)	Block CMO Malpura (2013 - 14)
BCG/OPV/ Hep –B	191 (90.95)	78.0%	81.5%	93.2%	100%
DPT 1/OPV 1/ Hep – B 1	181 (86.19)	-	74.4%	-	92%
DPT 2/OPV 2/ Hep – B 2	165 (78.57)	-	66.6%	-	91%
DPT 3/OPV 3/ Hep – B 3	153 (72.85)	55.0%	53.4%	52.0%	92%
Measles	149 (70.96)	59.0%	65.5%	63.6%	84%

DISCUSSION

The WHO 30-cluster sample survey for estimating immunization coverage among children has been found to be very useful by public health administrators in developing countries, because it is rapid, operationally convenient, and cost effective.

In the present study, out of 210 infants 70.96% of the children were fully immunized while 23.80% were partially and only 5.24% were non - immunized. Similar results of 72.23% completely immunized and 4.64% non-immunized, were observed in a study by Kalaivani et al[1] and in another study, 73.3% fully immunized and 2.8% non-immunized infants by Yadav S et al[10] (Table 1).

In our study it was observed that mothers of 70.47% completely immunized children were literate while mothers of 64.00% partially and 72.73% of non-immunized subjects were illiterate. The results are comparable to the study by Ray SS et al[11] where mothers of 71.00% completely immunized subjects were literate whereas 63.00% of partially/non-immunized child were illiterate. This shows the association of higher literacy level with better immunization status of child.

Place of delivery was also associated with the immunization status as good immunization coverage was observed in 88.59% out of 149 completely immunized children born at institution in comparison to 54.00% out of 50 partially immunized and 45.46% out of 11 non-immunized institutionally delivered infants. This shows that the child born at home was less likely to have immunization services and health services are not accessible/ reached to them. The studies by Bhuwan Sharma et al[12] was also observed 82.3% institutional deliveries among completely immunized and only 17.7% among partially / non-immunized child.

There are multiple reasons behind partial and non-immunization of the child where the main reason in this study was sickness 36.06% of elder sibling after vaccination and the beneficiary 32.08% himself at the time of vaccination and lack of time for vaccination was 11.47%. A study conducted by Malini Kar et al[13] showed that the major causes for incomplete immunization were illness of child 30.8% and by Bhuwan Sharma et al[12] 29.2% was illness of child and lack of time for vaccination was 10.0% which is comparable to our study.

We have observed 90.95% had immunized with the BCG which are comparable to DLHS-3 Tonk 93.2%, Yadav S et al[10] 94.75% and by Bhuwan Sharma et al[12] 97.14% as well as Block Chief Medical Officer, Malpura 100% which may be due to high percentage of institutional deliveries while Measles vaccine was administered in 149 (70.96%) which are also comparable to (63.2%) by DLHS-3. The dropout rate for DPT 1 to DPT 3 was 16.02% which is quite comparable to a study 18% by Pragati chabra et al[14] and 18% by Suresh K et al[15] and 15% by Yadav S et al.[10]

This increased coverage against vaccine preventable Diseases may be due to incentives given to social mobilizers (ASHA's) on complete immunization for every child as well as Shubhlaxmi Yojna dealing with girl child and other IEC activity implementation. A number of previous studies have shown that uptake of preventive behaviours is very sensitive to small incentives that can play a role in promoting preventive health services.[16-18]

CONCLUSION

Overall immunization coverage is satisfactory but not up to the national guidelines. The major reason for partial or non-immunization was fear of sickness due to immunization. Strengthening of routine immunization programme as well as surveillance and monitoring of routine immunization services is needful. The emphasis is to identify small areas or pockets where the immunization coverage is deficient and every opportunity should be used to vaccinate eligible children if we want to achieve the goal of 100% immunization coverage. Immunization practices should be encouraged by IEC and social mobilization.

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