

Immunization Coverage in a Rural Area

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Abstract

Background: To assess the immunization status of children less than 2 years of age. The impact of mother's education, presence of health workers in the area and gender on immunization status was studied.

Methods: In this descriptive cross-sectional study, carried out in slums, nomads and other areas of a union council in Islamabad, a total of 768 children were recruited for study less than 2 years of age. Data collection was carried out by using a structured performa, interviewing parents of children for dates on vaccination cards looking at the BCG scar mark. Cluster sampling technique was adopted and a total of 96 clusters were taken in whole of the area.

Results: Out of total 786 study participants 98% received some form of immunization and 2% received no immunization at all. 52% were males whereas 48% were females. Among the males the immunization status distribution was 80% fully immunized, 17% partially immunized and 3% not immunized against any antigen. In the females 80% were fully immunized, 19% partially immunized and 1% not immunized against any antigen. In the children age group 15 months and above who completed their age for EPI schedule, 81% were fully immunized, 17% partially immunized and 2% were not immunized against any EPI antigen. The valid coverage (vaccination card only) of these vaccines by antigen was highest in pentavalent/pneumococcal/OPV1 of 86% and lowest in measles2 which was 75%. The coverage of antigens by card plus history was highest of 97% in BCG and pentavalent/pneumococcal/OPV1 and lowest of 88% in measles2. Lady health workers covered areas had a better coverage rate (99%).

Conclusion: EPI coverage in union council Islamabad is quite well established. The immunization coverage status for male and female children is equal. The surveillance and monitoring system is well designed both by district health authorities and WHO as well. Factors which encourage higher immunization rates were better maternal education, presence of lady health workers

in the area and nearby availability of immunization service.

Key Words: Immunization, EPI, WHO

Introduction

Childhood diseases have been a major concern throughout the world. Immunization of children is an indispensable element of Primary Health Care and is set up as a horizontal program, incorporated into existing health services.¹ World Health Organization (WHO) identified the need for public health intervention and started the Expanded Program on Immunization (EPI) in May 1974 with the objective to vaccinate the mothers against tetanus and their children against six deadly diseases (Childhood Tuberculosis, Poliomyelitis, Diphtheria, Tetanus and Measles) throughout the world, hoping to decrease the incidence of these diseases.² In 1984, WHO established a standardized vaccination schedule for the EPI vaccines: Bacillus Calmette Guerin (BCG), diphtheria-pertussis-tetanus (DPT), oral polio and measles. With the passage of time Hepatitis B (HepB), yellow fever and Haemophilus influenzae meningitis (Hib) conjugate vaccine were added in EPI list in countries with high burden of disease.³ In 1999, the Global Alliance for Vaccines and Immunization (GAVI) was created to achieve specific milestones and attain the EPI targets: that by 2010 all countries had routine immunization coverage of 90% of their child population. Hepatitis B vaccination was introduced in 80% of all countries by 2007 and 50% of the poorest countries had Hib vaccine by 2005.⁴

Monitoring and evaluation of immunization program in countries without a proper health infrastructure through a modified cluster survey sampling method was developed by WHO. Vaccination dates can be determined if vaccinations were given at an ideal age and in appropriate interval and missed immunizations can be identified through this home based surveys.⁵⁻⁷ The present health sector in Pakistan still needs a lot of attention and causes great concern to all the involved health authorities. The children under 5 years of age which constitute 15% of Pakistan's population contribute 50% of the total mortality as compared with 8-10% in the developed world.⁸ The current infant

mortality rate of 40/1000 and under five mortality rate of 54/1000 is still the highest in the South East Asian region.⁹ EPI program was further strengthened by the Accelerated Health Program (AHP) in 1983 which improved the coverage from 5% in 1982 to 70% in 1984.¹⁰ Hepatitis B vaccine (Hep B) was added in 2002 with support of GAVI.¹¹ In 2006, a tetravalent combination vaccine was introduced replacing separate diphtheria, tetanus and pertussis (DTP3) and hepatitis B vaccines. This was later switched in 2008 to the pentavalent (DTP-Hep B-Hemophilis Influenza Type B) vaccine with the addition of the new Hib vaccine. There is also introduction of pneumococcal vaccine since mid-2012. The estimated total coverage for a fully immunized child in Pakistan varies from 56% to 88% with considerable variations among provinces and also variation in the coverage with respect to antigen is seen being highest for BCG, DPT1 and HBV and lowest for polio.¹²⁻¹⁴

Subjects and Methods

This descriptive Cross-sectional study design was taken to assess the immunization status of children less than two years of age at union council Sohan, Islamabad for a period of 06 months from June to December 2013. According to District Health Office, Islamabad total population of Union council Sohan in 2012(mid-year) was 40580. Informed consent was taken prior to data collection. Cluster sampling technique was applied and a sample size of 768 was attained through 96 clusters, each comprising of 08 children. Data collection was done by a structured Performa recording age, sex, mother’s education, BCG scar and immunization status according to vaccination card. Collected data was entered and analyzed in the data file using SPSS version 10. Fully immunized were those who were vaccinated against all listed diseases in EPI Program . Partially immunized means vaccinated against fewer than 8 immunizations, but at least one immunization.

Results

Of the total 768 people surveyed 52% were male and 48% female. 86% came up with immunization card and 14% showed non-availability. 44% of mothers were illiterate, 25% educated up to primary level and 31% completed their secondary education or more. Out of total 786 study participants 98% were totally or partially immunized (Table 1). BCG scar was found in 97% of surveyed population with 3% missing . In the children age group 15 months and above who completed their age for EPI schedule, 81% were fully

immunized, 17% partially immunized and 2% were not immunized against any EPI antigen.

Table 1: Immunization status of children (n=786)

Immunization status	No(%)
Fully immunized	629 (80)
Partially immunized	141(18)
Not immunized	16(02)

Table2. Immunization coverage vaccine wise

Type of Vaccine	Percentage of Children			
	On Card	History	No Immunization	Not Applicable
BCG	85%	12%	3%	Nil
OPV 0	87%	11%	2%	Nil
Pentavalent/Pneumococcal/OPV1	81%	11%	2%	7%
Pentavalent/Pneumococcal/OPV2	76%	11%	3%	10%
Pentavalent/Pneumococcal/OPV3	70%	10%	7%	13%
Measles1	51%	8%	5%	36%
Measles2	28%	5%	4%	63%

Table 3 . Source of vaccination

Type of Vaccine	Percentage of Children				
	Outreach	Hospital	Health Center	Private	Not Applicable
BCG/ OPV 0	8%	29%	60%	Nil	3%
Pentavalent/Pneumococcal/OPV1	67%	23%	2%	Nil	8%
Pentavalent/Pneumococcal/OPV2	65%	19%	3%	Nil	13%
Pentavalent/Pneumococcal/OPV3	63%	16%	2%	Nil	19%
Measles1	16%	9%	33%	Nil	42%
Measles2	7%	6%	20%	Nil	67%

Table 4 : Immunization status of children versus gender of children

Gender of children	Immunization Status			Total
	Fully Immunized	Partially Immunized	Not Immunized	
Male	318(80%)	67(17%)	11 (3%)	396 (52%)
Female	298 (80%)	69 (19%)	5 (1%)	372 (48%)
Total	616 (80%)	136 (18%)	16 (2%)	768

The valid coverage (vaccination card only) of these vaccines by antigen was highest in penta1/pneumococcal1/opv1 of 86% and lowest in measles2 which was 75% (Table 2). The coverage of antigens by card plus history was highest of 97% in BCG and penta1/pneumococcal1/opv1 and lowest of

88% in measles. BCG/ OPV 0 was maximum achieved by health center, while Pentavalent/Pneumococcal/OPV1 from out reach (Table 3). Among the males the immunization status distribution was 80% fully immunized, 17% partially immunized and 3% not immunized against any antigen. In the females 80% were fully immunized, 19% partially immunized and 1% not immunized against any antigen (Table 4).

Majority of mothers were illiterate (Table 5) . Lady health workers covered areas had a better coverage rate of 99% for children who received some form of immunization as compared with the figures of 96% in the non-health worker areas. People have trust in public sector immunization services (Table 6).

Table 5 : Immunization status of children versus mother’s education

Mothers Education	Immunization Status			Total
	Fully Immunized	Partially Immunized	Not Immunized	
Illiterate	270(81%)	55(16%)	10 (3%)	335
Primary	141 (74%)	47 (25%)	2 (1%)	190
Secondary	205 (84%)	34 (14%)	4 (2%)	243
Total	616	136	16	768

Table 6: Immunization status of children versus lady health workers field area

Lady Health Workers Field Area	Immunization Status			Total
	Fully Immunized	Partially Immunized	Not Immunized	
Yes	442(84%)	80(15%)	6 (1%)	528
No	174 (73%)	56 (23%)	10 (4%)	240
Total	616 (80%)	136 (18%)	16 (2%)	768

Discussion

Among the category of illiterate mothers 3% of children were not immunized against any EPI targeted diseases. Whereas in the mothers who received primary and secondary education not immunized were 1% and 2% respectively. The same observations were made in a study carried out by Jani JV et al in rural Mozambique that 28.2% of the children were not fully immunized by 2 years of age mainly due to inaccessibility to vaccination sites and illiterate mothers where as in another study by Javaid BK low immunization coverage was attributed to poor

maternal education.^{15,16} About 44% of respondent mothers of the children in the study population were illiterate. Also the proportion of partially immunized children was relatively higher in illiterate mothers (16%) and mothers educated up to primary level (25%) as compared with the mothers having education of secondary level or more (14%). Schools in the public sector are inadequate particularly the schools for girls and their availability was not also close by. Majority of the population living in union council Sohan is of lower or poor socioeconomic class, living in hard conditions, in congested costly rental accommodations, is unable to afford the costly private education. A large number of people living over here are internally displaced peoples from Khyber Pakhtoonkhwa’s war affected areas. Knowledge about EPI schedule and awareness of benefits of vaccines is indeed only possible with a good formal education of the recipient families particularly the mothers of the children. Various studies done at Karachi revealed that mothers with higher levels of education had higher percentage of immunization among their children.^{17,18} An Ethiopian study also ends up with the finding that mother's education has a positive effect on children's immunization furthermore the mothers who had received better antenatal care were more likely to have their children immunized¹⁹. Though the number of children’s mother with uneducated or minimal formal education was about 68% (including illiterate and primary level education) is quite high in the present study but still the children receiving complete and partial immunization for their age make up 98% (513/525).Whereas the coverage figure for completely immunized children, in this study was 78% (411/525). This indicates hardworking health staff of the BHU Sohan and more readily available vaccination facilities as it is close to the capital city, Islamabad. There is also vigilant surveillance of the WHO and as they have now posted staff to monitor polio campaigns and EPI program for improving coverage. A study conducted in Uganda found the major reasons for children not being immunized were lack of awareness about EPI schedule as well as not considering it important enough coming to the same conclusion as of the present study.²⁰

The present survey depicts that 98% of children received some form of vaccination (who were either completely or partially immunized) with 80% up to date with EPI course and 27% had amicably completed it. Only 2% had received no immunization at all. Out of 25.8% of children found to be fully immunized only 6.8% were confirmed by card.²¹ The results of a

national immunization survey in Angola in 2010 showed BCG coverage 95%, polio 3 and penta3 80%.²² In an Indian study 86% were fully immunized against all six vaccine preventable diseases.²³ The results of the present study are better as compared with the results of all above cited studies. In a study conducted at village Noor Pur Shahan, Islamabad in 2011 showed that 96.6% of children have received some form of vaccination, with 58.3% up to date with EPI course and 19.1% completed it. Just 3.4% of children received no immunization at all.²⁴ The figures closely tally and of course Noor Pur Shahan is also under same administrative control as is Sohan where present study was conducted. Ministry of Health's survey reported a 76.2% immunization rate for Punjab in 2006, the results which match to the findings of the present study.²⁵ In a study conducted in selected villages across Pakistan showed marked improvement in immunization coverage rates from 48% to 90% at the end of 5 years of continuous monitoring and education.²⁶

There are about 19 lady health workers (LHW) in the union council Sohan, covering more than 50% of the population are directly involved in EPI program and their role is considerable. In comparison, in non-LHW areas 73% children fully immunized, 23% partially immunized and 4% were not immunized. Results clearly show a better immunization coverage in LHW areas of the Sohan, the same findings reflected in a survey conducted in Iran that between 1984 to 2000 the immunization rates raised from 20% to 95% reducing the infant mortality to half²⁷. National program guidelines explicitly articulate that 'Health Houses' of LHWs may act as vaccination sites where LHWs will assist the vaccinators in provision of immunization services through arranging the immunization sessions and necessary social mobilization.²⁸ Involvement of LHWs can make a difference in terms of vaccine coverage.²⁹

Conclusion

1. The overall immunization coverage rate was satisfactory.
2. People showed confidence in the public sector vaccination services.
3. Higher immunization coverage was seen in children of mothers who were educated up to secondary level or more. LHW covered areas had better coverage. There was no difference in the immunization status of both the sexes.
4. In the children age group 15 months and above who completed their age for EPI schedule, 81%

were fully immunized, 17% partially immunized and 2% were not immunized against any EPI antigen.

5. In view of population expansion more vaccinators need to be employed

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