

## Original Article

# IMMUNIZATION STATUS AMONG CHILDREN UNDER 23 MONTHS OF AGE

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**Objective:** To find out the immunization status against vaccine preventable diseases, timeliness of vaccination according to EPI schedule and availability of EPI card among children aged 0-23 months residing in Jallo village district Lahore.

**Material & Methods:** This descriptive cross-sectional study was conducted in village Jallo, District Lahore, having a population of 8061. 331 children aged 0-23 months of the area were included in the study. Data was collected by interviewing the mothers of selected children. Data was entered and analyzed using Epi Info. Frequency distribution with percentages were calculated.

**Results:** Out of total 331 children, 63.4% were fully immunized, 30.5% were partially immunized while 6.1% were not immunized. A child was considered as fully immunized if he/she was vaccinated as per EPI schedule according to his/her age. Only 6.2% were vaccinated according to the EPI schedule and vaccination card was available with 89%.

**Conclusion:** Findings of this small scale study revealed that only 63.4% children were fully immunized which was much less than target of 80%. (EPI objective was to achieve 90% immunization coverage with at least 80% in every district by 2010). Parents must be motivated to get their children completely vaccinated in a timely manner according to the recommended schedule.

**Keywords:** Immunization, EPI Schedule, timeliness.

## Introduction

Immunization is the process whereby a person is made immune or resistant to an infectious disease, typically by the administration of a vaccine.<sup>1</sup>

Immunizations today save more than three million lives a year. However, millions of children still do not have access to basic immunization and die from diseases that can be prevented by available vaccines. Mother's knowledge, attitude and practices play a major role in achieving complete immunization before first birthday of the child.<sup>2</sup> An estimated 2.1 million people around the world died in 2002 of diseases preventable by widely used vaccines. This toll included 1.4 million children under the age of five<sup>3</sup> and more than 90,000 children suffered from paralytic polio that could have been prevented by administration of two drops of oral polio vaccine.<sup>4</sup>

Pakistan is the 7<sup>th</sup> most populous country in the world with more than 180 million population. About 5 million children are born every year. More than 0.4 million of them die due to one or other cause. An estimated 60,000 Pakistani children die each year from vaccine preventable diseases. The Expanded Programme on Immunization was started by the World Health Organization (WHO) in 1974.<sup>5</sup> In Pakistan, Expanded Programme of Immunization was started in the year 1978 with the ultimate objective of reduction in morbidity and mortality

caused by six vaccine preventable diseases. In addition, vaccination against Hepatitis B was included in EPI in July 2001.<sup>5</sup>

The Government of Pakistan is committed to improve the immunization status and contributes about US\$24 million each year on the routine immunization activities. External grant assistance provides a further US\$ 2.5 million each year for routine EPI. Currently EPI focuses on the standard eight antigens. GAVI support has been provided for the introduction of Hepatitis B vaccine in 2001. Vaccine Haemophilus Influenza Type b was included in 2008. BCG and OPV0 are given at birth; Pentavalent /OPV 1, 2 and 3 are given at 6, 10 & 14 weeks i.e. each dose with an interval of 4 weeks. Measles vaccination is given at 9 months of age to complete the schedule of immunization.<sup>6</sup> The objective of expanded program of immunization is to achieve 90% routine immunization coverage of all EPI antigens with at least 80% coverage in every district by 2010.<sup>7</sup>

Prior to initiation of the EPI, the coverage for TB, Diphtheria, Pertussis, Tetanus and Measles was less than 5%. But now the coverage is increased to 79%, thus decreasing incidence of many diseases. Measles death decreased by 60% worldwide between 1999 and 2005 and polio cases were less than 2000 cases in 2006.<sup>8</sup>

This study was designed to find out EPI coverage and timely immunization of children aged 0 to 23 months residing in Jallo village of District Lahore.

### Objective

To find out the immunization status against vaccine preventable diseases, timeliness of vaccination according to EPI schedule and availability of EPI card among children aged 0-23 months residing in Jallo village District Lahore.

### Material & Methods

This was a descriptive cross sectional study conducted in the village Jallo union council 52, which is a rural area of District Lahore from 1st July 2010 to 31st July 2010. Eight Lady Health Workers (LHWs) are working in this village, covering population of 8061 and 1291 registered houses. BHU is located in Jallo village where immunization services are provided by lady health visitor and vaccinator; an outreach team is also working in the area.

Applying convenient sampling technique, 331 children aged 0-23 months were selected for the study from list available with the LHWs. Questionnaire was designed covering all the variables for collecting data through interview about socio-demographic characteristic of parents, age of child / date of birth, vaccination status, timeliness according to EPI schedule, age of child in days at the time of vaccination, place of immunization, vaccination card availability. After taking permission from concerned authority (EDO Health Lahore) households with children aged 0-23 months were visited according to list collected from Lady Health Workers and mothers were interviewed with their consent. LHWs/lady health supervisor assisted the researcher during the process of household interview. The questionnaire was translated into Urdu language during the process to minimize error. Data were based on self-report of child's mother; date of birth was confirmed from LHWs record, date of administration of vaccines from vaccination card and permanent register of vaccinator. The data was entered, cleaned and analyzed using Epi Info. Frequency distribution with percentages was calculated for variables regarding socio-demographic characteristics of parents and immunization status of children. Frequency and percentages were calculated for all the variables and presented in the form of tables.

### Results

63.4% children aged 0-23 months were fully immunized according to their age. 30.5% children were partially immunized while 6.1% had not received any vaccine. Regarding socio-demographic characteristics of children's parents 72% fathers were between 18-35 years of age while 91% mothers were in this age range. Regarding the education status 75% fathers and 65% mothers were literate. Majority of the fathers were laborers (62.5%). Most of the mothers were housewives (98.5%). Only 1.5% (7) women were working. As far as the economic status is concerned 68.88% fathers had monthly income between Rs. 5000-10000. 13% had an income less than Rs 5000 and 18% above Rs 10,000. (Table 1)

The coverage of each antigen among vaccinated children aged 0-23 months was also estimated. It was 94% for BCG, 93% for Pentavalent I/OPV I, 87% for Pentavalent II/OPV II, 78% for Pentavalent III / OPV III and 75% for Measles. Regarding timeliness of vaccination, out of 311(94%) fully vaccinated children only 196 (63.4%) were given BCG within 40 days of their birth. 37 children (12.54%) out of 295 received pentavalent I/OPVI at the age of 68 weeks. Similarly 14 children (6.2 %) out of 226 received pentavalent 3/OPV3 at the age of 14-16 weeks. Measles I was received by 43 children (27.74 %) out of 155 at the age 9-10 months. Thus only 6.2% children received vaccination according to EPI schedule. 89% of the children had vaccination card. Mostly children were brought for vaccination (183 i.e. 55.3%) to the health facility (BHU Jallo) whereas 148 children (44.7%) received vaccination through outreach teams.(Table 2)

### Discussion

Global vaccination goal is "Fully immunize 90 percent of children under one year in every country, with at least 80 percent coverage in every district by 2015." (United Nations General Assembly and MDG 2002). Our study at Jallo was an attempt to assess the status of vaccine coverage in children (331) aged 0-23 months. This study was based on information from mothers of children, from vaccination record, LHWs registers, vaccination cards and permanent EPI register; the "preferred" source of information in the study was the mother of the child. Eight vaccines were studied. A child was considered as "fully-immunized" if she/he was vaccinated according to her/ his age i.e. if all vaccines recommended in schedule were given in time according to child's age. The acceptable levels of vaccination coverage level

identified as "low" coverage. Fully immunized children were 63.4 % which is below the national average and global level; it is below 80% with "unacceptably low" coverage.

A cross sectional study was conducted in peri-urban area (Gadap town) Karachi in 2006 by WHO to assess immunization coverage. The reported coverage was very low i.e 45% . The coverage of individual vaccines was 76% for BCG, 61% for DPT III, 45% and 27% for measles<sup>9</sup> A third party coverage evaluation survey was conducted in 2006 by UNICEF where the BCG coverage was 98%, DPT III coverage 82% and measles I 80.2%. Fully immunized children were 76.2% in Punjab.<sup>10</sup> A quantitative survey by WHO in year 2009 showed that overall coverage in Punjab was 70% & 68% children were fully vaccinated while 26.8% children were partially vaccinated and only 5.4% of the children remained unvaccinated on the whole.<sup>11</sup> Only 47% of Pakistani children age 12-23 months had received all recommended vaccines. More than 80% of children received BCG and the three polio vaccines. Reported routine vaccination coverage in 2008 for BCG was 92%, Polio 75%, combination of DPT & Hep B 68% , TT 50% whereas the coverage in 2009 for BCG was 93%, Polio 86%, Pentavalent 86%, Measles 85% and TT 55%.<sup>12</sup> These findings are consistent with the findings of our study where the coverage of BCG is maximum. Timeliness of vaccination is one of the quality measures. Most of the children were not timely immunized which

reflected the poor quality of services on the part of health personnel. BCG (63 %), Pentavalent I (12.54 %) Pentavalent III (6.19 %) and Measles I (27.4 %) were given according to EPI schedule. A study was conducted in Sierra Leone, in which 286 children participated, out of which 85% (95% CI: 80-89%) of children had complete immunization according to the WHO definition. This proportion was composed of 56% (95% CI: 50-62%) of children with age-appropriate immunization, and 29% (95% CI: 24-34%) with age-inappropriate immunization that is if all recommended vaccinations were given, but one or more were given later than the scheduled date. Timeliness of vaccinations is most important in children who are at increased risk of vaccine-preventable diseases.<sup>13</sup>

Aside from estimation of coverage, our study also examined various characteristics of children and their families, in an attempt to investigate how these factors might affect children's vaccination status. The educational status and occupational status, may act as a "secondary factor" in leading to higher vaccination coverage, via its association with the parents' cultural status, social and mental health, inter-personal relationships, and their level of care and attention towards their children, etc. In our study group, the vaccination site was mainly the health centers (55.3%), although outreach team was also providing immunization services in the area .This finding could "truly" reflect that the health center was the most preferred site for vaccination, or the parents were

**Table-4:** Socio-demographic characteristics of parents of under 23 months old children in Jallo village, District Lahore.

Characteristics		Father		Mother	
		Frequency	Percentage	Frequency	Percentage
Age in years	18 to 35 years	240	72	300	91
	36 and above	91	28	31	9
Education	Literate	249	76	216	65.3
	Illiterate	82	24	115	34.7
Occupation	Labour	208	62.8	-	-
	Agriculture	48	14.5	7	1.5
	Business	75	22.7	-	-
	House wife	-	-	324	98.5
Monthly income in Rs	Below 5000	43	13	4	1.2
	5000 - 10,000	228	69	3	0.9
	Above 10,000	60	18	-	-

**Table-2:** Immunization status of children under 23 months of age in Jallo village, District Lahore.

Characteristics		Frequency	Percentage
Status of Immunization	Fully immunized	210	63.4
	Partially immunized	101	30.5
	Not immunized	20	6.1
Immunization coverage	BCG	311	94
	Zero-OPV	193	58.3
	Penta1/OPV1	295	92.7
	Penta2/OPV2	266	87
	Penta3/OPV3	226	78
	Measles 1	155	75
	Measles 2	155	75
Availability of EPI card	Yes	277	89
	No	34	11
Vaccination according to EPI schedule	BCG	196	63
	Penta1/OPV1	37	12.54
	Penta3/OPV3	14	6.19
	Measles 1	43	27.74
	Measles 2	43	27.74
Place of Vaccination	Health facility	183	55.3
	Out reach team	148	44.7

health center and outreach services. Either situation is a positive finding from a public health point of view, and indicates that vaccination services are mainly received from a primary health care center.

One of the criteria for assessing the "quality" of vaccination services is the possession of a vaccination card. Vaccination cards inform the parents and health personnel about the vaccination status of the child and timeliness and periodicity of vaccinations, alerts to any interruption in services, and reminds the parents about date of the "next" vaccination. In the study group, only 12 % of the children reportedly did not have vaccination cards. A cross sectional study was conducted in Mawatch Goth of Kemari town Karachi in 2007. It was observed that 70% children were immunized. About 55.5% mothers had vaccination cards with them, 21.5% had lost their cards while 23% did not know about the card.<sup>14</sup> Health personnel working in the field should emphasize the importance of owning and retaining a vaccination card during their training and consultation services in the field and should motivate parents in this respect.

A source of error in this study could be a "social desirability bias" i.e., parents who only have to give

their word, instead of providing a proof, could be more likely to claim that their children were immunized and misled the interviewer, even when the child had missing doses/vaccines.

To avoid social desirability bias in this study, efforts were made to obtain all available written information from vaccination cards, child follow-up cards, LHWs diaries and EPI permanent /daily register, etc., to increase validity of self-reports. In summary, it is important to evaluate immunization coverage periodically at a larger scale and to determine reasons for non-vaccination (if any) to plan interventional activities in regards to the associated status and needs, with an ultimate goal of maximizing childhood vaccine coverage nationwide.

## Conclusion

EPI coverage rate is 64% which is lower than the district and the national figures. Further individual vaccine coverage in children had high deviations from the recommended schedule. Only a very small proportion of children (6.2%) had been vaccinated according to EPI schedule. Major source of immunization service delivery remained BHU Jallo in comparison to the outreach services by vaccinator.

It was concluded that EPI is to trying reach the targeted population at Jallo. Still there is a felt need to improve the services to fully achieve the program objectives.

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