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Research Article

**ASSESSMENT OF EXPANDED PROGRAM ON IMMUNIZATION  
COVERAGE IN CHILDREN LESS THAN TWO YEARS  
COMING TO PAEDS OUTPATIENT DEPARTMENT SERVICES  
HOSPITAL LAHORE****Dr. Muhammad Bilal, Dr. Shakeel Mazhar, Dr. Muhammad Rashid Ali**  
Services Hospital Lahore**Abstract :**

**Background:** expanded program on immunization is carried out to protect all children against nine vaccine preventable diseases; still many children don't receive vaccination at proper age. The purpose of EPI is to initiate a collective effort to reduce the mortality results from EPI target disease by immunizing children of age less than two years. Hence, monitoring immunization coverage performance is essential for improving the quality of services and current immunization status.

**Study design:** cross-sectional study

**Study setting:** PAEDS Outpatient department of services Hospital Lahore.

**Study duration:** 1st May to 30th may 2015: 1 month

**Materials and methods:** Non probability convenient sampling technique was used. Every Mother of the child less than two years was personally interviewed and a preformed questionnaire was filled in. Data was analyzed using SPSS.

**Results:** 88.7% children received complete immunization till required for their age at proper time according to expanded program on immunization schedule while 7.2% children were partially immunized and 4.1 % children were non-immunized. Reasons behind incomplete immunization were 27.3% parents of children were not willing for immunization while reasons given by parents for child being not immunized were lack of information in 9.1% false beliefs in 18.2%, vaccination center not approachable in 45.5%, child sickness in 18.2% and unavailability of vaccinator in 9.1%.

**Conclusion:** The immunization coverage among children was found to be comparatively high and the major reasons for failure of immunization among children were inaccessibility of vaccination center, misconceptions among parents, child sickness and lack of information.

**Keywords:** Expanded program on immunization, Coverage, Failure reasons.

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**INTRODUCTION:**

Immunization has a long history of success. Studies have shown that it has an impact on the major causes of infant death and that it shapes trends of mortality and morbidity among communities [1,2]. Immunization remains one of most cost-effective health interventions 3 and prevents an estimated 2-3 million children deaths every year in all age groups, which makes it one of the most successful and cost-effective public health intervention. Nevertheless, vaccination has always faced multiple adversities, the most recent being the suspicion that it is an international conspiracy against selected communities, particularly those in developing countries [4-6]. The World Health Organization (WHO) initiated the Expanded Program of Immunization (EPI) in May 1974 with the objective to vaccinate children throughout the world. Ten years later, in 1984, the WHO established a standardized vaccination schedule for the original EPI vaccines: Bacillus Calmette-Guérin (BCG), diphtheria-tetanus-pertussis (DTP), oral polio, and measles. Increased knowledge of the immunologic factors of disease led to new vaccines being developed and added to the EPI's list of recommended vaccines: Hepatitis B (HepB), yellow fever in countries endemic for the disease, and Haemophilus influenzae meningitis (Hib) conjugate vaccine in countries with high burden of disease [7].

In 1999, the Global Alliance for Vaccines and Immunization (GAVI) was created with the sole purpose of improving child health in the poorest countries by extending the reach of the EPI. The GAVI brought together a grand coalition, including the UN agencies and institutions (WHO, UNICEF, the World Bank), public health institutes, donor and implementing countries, the Bill and Melinda Gates Foundation and The Rockefeller Foundation, the vaccine industry, non-governmental organizations (NGOs) and many more. The creation of the GAVI has helped to renew interest and maintain the importance of immunizations in battling the world's large burden of infectious diseases. In addition, the GAVI has set up specific milestones to achieve the EPI goals: that by 2010 all countries have routine immunization coverage of 90% of their child population, that HepB be introduced in 80% of all countries by 2007 and that 50% of the poorest countries have Hib vaccine by 2008. The Expanded Program on Immunization (EPI) was launched in Pakistan in 1978 by WHO and UNICEF to protect children

from tuberculosis, poliomyelitis, diphtheria, pertussis, tetanus and measles.

**MATERIAL AND METHOD:**

Thousands of children die each year due to infectious diseases globally, which is a major health problem in Pakistan as well. Many more are blinded, and crippled for the rest of their lives. Fortunately, administering respective vaccine by expanded program on immunization can prevent these diseases. Since its inception in 1974, Pakistan's Expanded program on immunization (EPI) has contributed significantly towards child health and survival in Pakistan but still achievement and maintenance of high levels of immunization coverage has remained a challenge.

A research on availability of EPI services provided to children in rural Pakistani was conducted by M Naeem *et al*. It was a cross-sectional study. Systematic random sampling technique was used. The overall immunization rate in the children of Nurpur Shahan was 77.4%. This study found strong correlations to immunization rates in children. Increased educational status of the mother, greater maternal immunization during pregnancy, and home delivery of vaccines, was all directly linked to higher rates of immunization amongst children. Lack of awareness, followed by inadequate facilities were the most commonly cited reasons for discontinuing the program or abstaining from it altogether [21].

Household predictors of immunization coverage in Pakistan conducted a research. The data from PSLM 2010-11 survey was used in binary logistic regressions model to predict what factors contribute to either fully immunized children or completely not immunized children. The total sample of children under age 2 was 12506 children/households (PSLM 2010-11) out of those 80% were fully immunized, 17% partially immunized and 3% had not been immunized at all [22].

A study on assessment of EPI coverage in peri-urban area was conducted by Rima Ahmed *et al*. It was a cross-sectional study carried out by utilizing WHO thirty-cluster sampling technique. Forty five percent of the infants were age-appropriately vaccinated. In the multivariate model four factors i.e., type of house construction (proxy indicator of socio-economic status), mother's TT vaccination status, years

since marriage and parents' educational status were found to be significantly associated with children's immunization status[23].

A cross-sectional study with title of inequity in childhood immunization between urban and rural areas of Peshawar was held by Nazish Siddiqui. The immunization coverage in urban areas was 76.5% while in rural areas it was 48.8%. Causes for non-immunization were different in urban and rural areas. In urban areas, lack of awareness and care takers/parents being busy were the main reason for non-immunization. In rural areas, in addition to formers, lack of accessibility to health centers and misconceptions about vaccination were major reasons for non-immunization[24].

A study on EPI coverage and associated factors among children aged 12-23 months was conducted by Worku Animaw *et al* in Arba Minch town and Zuria District, Southern Ethiopia 2013. It was Cross-sectional community based study. Nearly three fourth (73.2%) of children in Arba Minch Town and Arba Minch Zuria district were fully immunized. The rest 20.3% were partially immunized and 6.5% received no vaccine. Mother education, mothers' perception to accessibility of vaccines, mothers' knowledge to vaccine schedule of their site, place of delivery and living altitude were independent predictors of children immunization status[25].

Another research was conducted on coverage of Vaccination and the Factors Influencing Its coverage among Children by Tsuda Y *et al* in Takatsuki, Japan showing that voluntary vaccination coverage rates were low when compared with routine vaccination rates. The children who were not the first born of the family and who had young and poorly educated parents were less likely to receive voluntary vaccination. Japanese government-supported vaccines had a higher coverage. Mass communication media and family pediatricians were effective means to disseminate voluntary vaccination-related information[26].

Evaluation of immunization coverage in rural area of Pune. Maharashtra conducted by Pankaj Kumar *et al* . It was cross-sectional study conducted in the field practice area of the Rural Health Training Center (RHTC) using the WHO's 30 cluster sampling method for evaluation of immunization coverage. A total of 210 children aged 12-23 months were included in the study. It was found that 86.67% of the children were

fully immunized against all the six vaccine-preventable diseases. The proportion of fully immunized children was marginally higher in males (87.61%) than in females (85.57%), and the immunization card was available with 60.95% of the subjects. The most common cause for partial immunization was that the time of immunization was inconvenient (36%)27.

A study on Childhood vaccination in informal urban settlements in Nairobi, Kenya was conducted by Matua MK *et al* . The study was carried out as part of a longitudinal Maternal and Child Health study undertaken in Korogochi and Viwandani slums of Nairobi. Measles coverage was substantially lower than that for the other vaccines. Up-to-date (UTD) coverage with all vaccinations at 12 months was 41.3% and 51.8% with and without the birth dose of OPV, respectively. Full vaccination coverage (57.5%) was higher than up-to-date coverage (51.8%) at 12 months overall. Multivariate analysis showed that household assets and expenditure, ethnicity, place of delivery, mother's level of education, age and parity were all predictors of full vaccination among children living in the slums28.

A study on Vaccination Coverage Survey in Dhaka District was held by MNA Khan *et al*. In this survey 30 Clusters were randomly selected from a list of villages in 63 Unions of Dhaka Following probability proportion to size (PPS) Sampling procedure. The Study showed that the routine 'immunization coverage in Dhaka Among children by 12 Months of age by card + History was 97 % For BCG, 97% For Diphtheria, Pertussis Tetanus (DPT 1) And Oral Polio Vaccine (OPV 1), 75% For DPT3 And OPV3 And 67% For measles29.

Health-care provision factors associated with child immunization coverage in a city center and a rural area in Kabul, Afghanistan was conducted by Hemat S *et al*. A total of 1327 households were surveyed in Kabul province, the proportion of fully immunized children, those who had received at least 1 dose of BCG, 3 doses of DPT, and 1 dose of measles vaccine, was 84.5% in the city center and 60.7% in the rural area. Fully immunized status was positively associated with close proximity to a health facility and attendance at antenatal care[30].

An EPI-survey on Infant vaccination coverage in 2005 and predictive factors for complete or valid

vaccination in Flanders, Belgium by Theeten H et al showed that the coverage rate reached 92.2%. The vaccinating physician, the employment situation of the mother and the family income were significant predictive factors for having received all recommended vaccine doses (complete schedule)[31].

A study focusing on Childhood vaccination in rural southwestern Ethiopia by YM et al showed that 78% had received at least one vaccination. Only 37% were fully vaccinated. Women's decision making autonomy, number of under-five children in the household, mother's education, use of antenatal care services and proximity to health facility were the main factors associated with full vaccination status[32].

Assessment of Routine Immunization Coverage in Nyala Locality and reasons behind Incomplete Immunization in South Darfur State, Sudan conducted by Ismail ITA et al showed that vaccination coverage as revealed by showed vaccination card alone was 63.4% while it was increased to 82.2% when both history and cards were used. The factors contributing to the low vaccination coverage were found to be knowledge problems of mothers (51%), access problems (15%) and attitude problems (34%). Children whose mother attended antenatal care and those from urban areas were more likely to complete their immunization schedule[33].

A study focusing on Factors affecting routine immunization coverage among children aged 12-59 months in Lao PDR after regional polio eradication in western Pacific region by Maekawa M et al showed that DPT3 coverage was 72%. Influential factors on fully immunized child was distance, literacy, possession of livestock; mothers knowledge of immunization target diseases, measles immunization schedule; and mother's willingness to pay for immunization[34].

A study finding the association between travel time to health facilities and childhood vaccine coverage in rural Ethiopia by Okwaraji YK et al showed that Missing vaccination data ranged from 4.6% for BCG to 16.4% for Penta3 vaccine. In children with complete vaccination records, BCG vaccine had the highest coverage 97.3%, Penta3 coverage was 92.9% and Measles vaccine had the lowest coverage 81.7%. Children living  $\geq 60$ mins from a health post were significantly less likely to receive Penta3 vaccine compared to children living  $< 30$ mins from a

health post. This effect was not modified by household wealth[35].

A study on immunization Coverage and Its Determinants Among Children Born in 2008-2009 by Questionnaire Survey in Zhejiang, China conducted by Watanabe M et al showed that Immunization coverage of 5 vaccines were all greater than 90%, but the age-appropriate immunization coverage rates for 3 months and for first dose of measles-containing vaccine was 41.3% and 64.5%, respectively. Siblings in household, mother's education level, household registration, socioeconomic level of resident areas, satisfaction with clinical immunization service, and convenient access to local immunization clinic were associated with age-appropriate coverage rates[36].

## OBJECTIVES

The objectives of this study are to:

1. Assess immunization coverage and dropout rate.
2. Elicit reasons for immunization failure in children less than two year coming to Paeds outpatient department Services Hospital Lahore.

## Method

**Study design :** cross-sectional study

**Study setting :** Paeds Outpatient department of services Hospital Lahore.

**Study duration:** 1st May to 30th may 2015: 1 month

**Sample size:** The sample was estimated using WHO S-size software by using formula of estimated population proportion with specified relative precision at confidence interval of 95 % with anticipated population proportion of 80% and relative precision (relative error) of 10% the minimum sample size was 97.

**Sampling technique:** Non probability convenient sampling technique .

## Inclusion criteria:

Children less than two years of age.

## Exclusion criteria:

- a. Parents of children who were not willing to participate in study.
- b. Children suffering from any acute illness.

**Operational definition:**

The following operational definitions are used:

**Fully immunized :** It is defined as both male and female children who took all the recommended nine vaccines included in expanded program on immunization verified by immunization card or verbal information by mothers or caretaker at the time of survey.

**Partially immunized :** It is defined as both male and female children who missed at least one of the nine vaccines included in expanded program on immunization verified by immunization card or by verbal information from mothers or caretaker at the time of survey.

**Not immunized :** It is defined as both male and female children who didn't receive any of the nine vaccines included in expanded program on

immunization verified by immunization card or by verbal information from mothers or caretaker at the time of survey.

**Data collection procedure:** Parents of the children were approached and the researcher himself interviewed parents of children using semi structured questionnaire. These children were under two years of age. All data was conducted through informed consent.

**Data analysis plan:** Data was analyzed or descriptive variable was analyzed in terms of tables, frequency and percentage.

**Data collection tool:** With the use of researcher administered standard Questionnaire. The questionnaire was semi-structured (pre-designed closed ended with open ended questions). The questionnaire collected information regarding immunization status of the child and reasons for failure of immunization.

**RESULTS:****Table 1: Age Distribution of children in study (n=97)**

Age	Frequency	Percent
0-6	29	29.9 %
7-12	29	29.9 %
13-18	20	20.6 %
19-24	19	19.6 %
Total	97	100 %

Among the 97 children under study 29 (29.9%) were between the age of 0 to 6 months, and 29 (29.9%) were also between the age of 7 to 12 months; while 20 (20.6%) were between the age of 13 to 18 months and 19 (19.6%) were between the age of 19 to 24 months.

**Table 2: Gender distribution of immunized children (n=86)**

Gender	Frequency	Percent
Male	40	46.5%
Female	46	53.4%
Total	86	100%

In a total of 86 children who were found to be fully immunized 40 (46.5%) of them were male while 46 (53.4%) were females.

**Table 3: Gender distribution of partially and non-immunized children (n=11)**

Gender	Frequency	Percent
Male	4	36.4%
Female	7	63.6 %
Total	11	100%

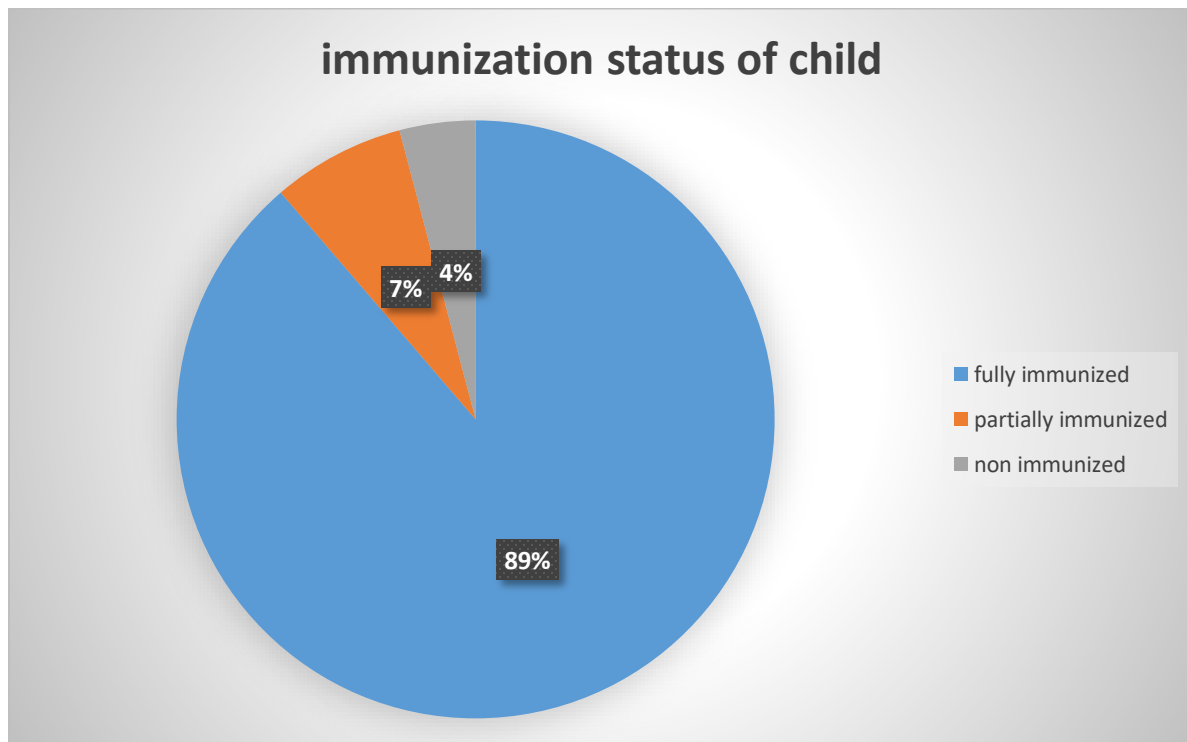
During study there were 11 children who were not immunized and partially immunized among them 4 (36.6%) were males and 7 (63.6%) were females.

**Table – 4: Immunization status of children (n=97)**

immunization status	Frequency	Percent
Fully immunized	86	88.7%
Partially immunized	7	7.2%
Not immunized	4	4.1%
Total	97	100%

Out of a total of 97 children under study, 86 children (88.7%) were fully immunized, 7 (7.2%) were partially immunized; while 4 (4.1%) were non immunized. This has been shown in Table 1.

Figure – 1





**Table – 5: Confirmation of BCG vaccination by scar mark (n=93)**

Scar mark in children	Frequency	Percent
Absent	4	4.3%
Present	89	95.7%
Total	93	100%

In 93 children who were fully or partially immunized, 4 (4.3%) of them didn't have BCG scar mark while 89 (95.7%) of them had scar mark.

**Table – 6: Reasons for immunization failure of children (n=11)**

Reasons	Frequency	Percent
Parents were not willing for vaccination	3	27.3%
Parents were willing but due to some obstacles could not immunize their child	8	72.7%
Total	11	100%

3 children out of a total of 11 who were not immunized or partially immunized didn't get vaccine because their parents were not willing to have it however parents of 8 children were willing to have their child get vaccine but child remained non-immunized or partially immunized due to some obstacles.

**Table – 7: Reasons given by parents for their child being non-immunized or partially immunized (n=11)**

Obstacles	Frequency	Percent
Lack of information	1	9.1%
False beliefs	2	18.2%
Vaccination center is not approachable	5	45.5%
Child sickness	2	18.2%
Unavailability of vaccinator	1	9.1%
Total	11	100%

Lack of information for child being non-immunized or partially immunized was the reason given by 1 (9.1%) parent out of 11 parents whose child were non-immunized or partially immunized. On the other hand 2 (18.2%) parents gave the reason of false beliefs, for 5 (45.5%) parents vaccination center was not approachable; while 2 (18.2%) gave the reason of child sickness besides this for 1 (9.1%) there was unavailability of vaccinator.

Figure – 2

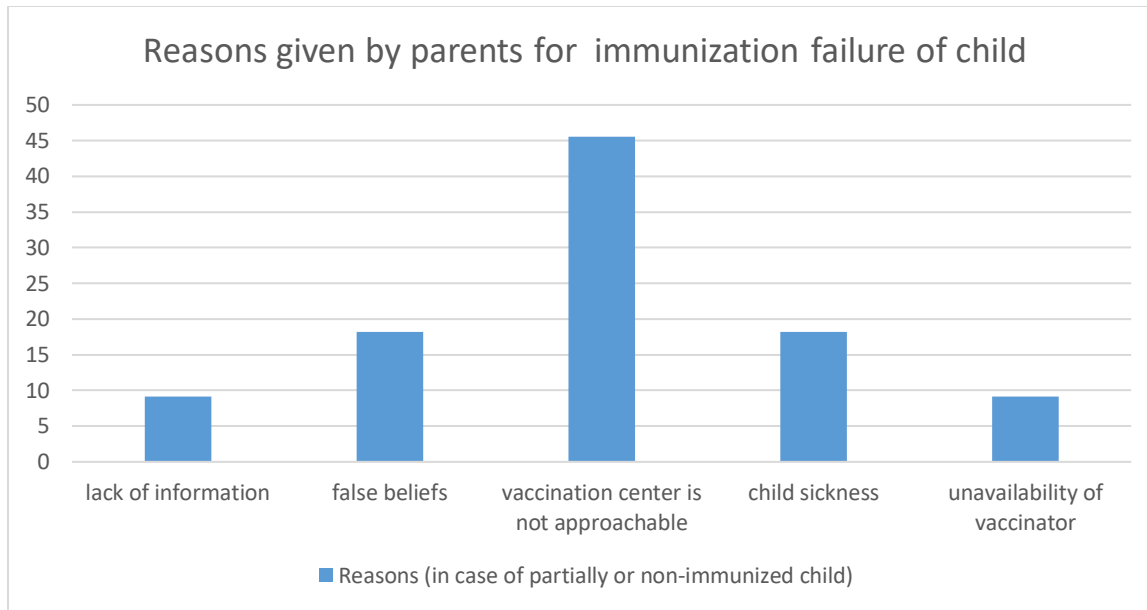


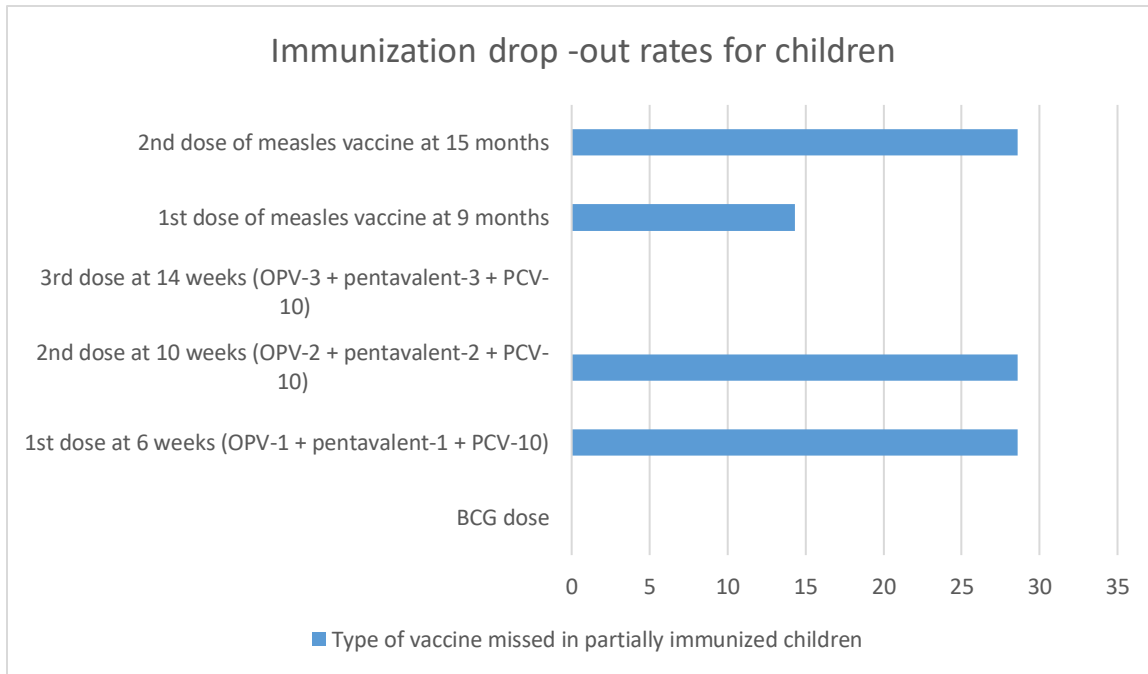
Table – 8: Immunization drop-out rates for children (n=7)

Vaccines	Frequency	Percent
BCG dose	0	—
1st dose at 6 weeks (OPV-1+ Pentavalent-1 + PCV-10)	2	28.6%
2nd dose at 10 weeks OPV-2+ Pentavalent-2 + PCV-10)	2	28.6%
3rd dose at 14 weeks (OPV-3+ Pentavalent-3 + PCV-10)	0	0%
1st dose of measles at 9 months	1	14.3%
2nd dose of measles at 15 months	2	28.6%
Total	7	100%

Regarding a total of 7 partially immunized children 2 (28.6%) of them had 1st dose at 6 weeks (OPV-1 + pentavalent- 1+ PCV-10) missed, 2nd dose at 10 weeks (OPV-2 + pentavalent- 2+ PCV-10) was also missed by 2 (28.6%) children; further more 1 (14.3%) child missed 1st dose of measles vaccine at 9 months while 2 (28.6%) children missed 2nd dose of measles vaccine at 15 months.



Figure - 3



### DISCUSSION:

This study was conducted to find out the EPI coverage rate among children of less than 2 years of age and to probe the causes for non-immunization in children i.e. either negligence on part of parents or other reasons. A sample of 97 parents was selected for topic under study and study was conducted in Paeds OPD of SHL. The results are quite satisfactory i.e. coverage rate is approximately 89% in spite of the study being conducted in people mostly belonging to low socioeconomic status and people from rural background .

The higher coverage rate achieved show a gradual improvement in awareness and participation of community towards acceptance of immunization as a compulsory practice. According to PDHS (Pakistan demographic and health survey) in 1990 vaccination coverage for neonates was only 35%, it gradually rose up to 2002 to be 53% in PIHS (Pakistan Integrated Household survey), but this improvement was not significant. During 2007-2008, vaccination coverage has raised significantly to 78% shown in PSLM (Pakistan Social and Living Standards Measurement survey).<sup>22</sup> But we are still lagging behind regional countries like Bangladesh and Sri Lanka in achieving the desired rated of 90% fully immunized children.

The coverage rate is quite high as compared to the coverage rate of EPI assessed overall in Pakistan 56% to 88%, Punjab 65.5% and Lahore 82.0%<sup>10</sup>, the reasons for this are the facts that this study was not conducted on a representative sample of population rather it included only parents coming to Paeds OPD for medical checkup or for follow up. So coverage rate is expected to be high. Secondly study was conducted in a well-developed Urban Area in a tertiary care hospital and most of the people presenting in this scenario are assumed to be well aware of the benefits of vaccination. A cross sectional study conducted in Peshawar showed significant differences in immunization rates between rural and urban areas i.e. 76% and 48% respectively.

As far as gender distribution of immunized children is concerned, it involves 86 children out of which 40 are males and 46 are females. It does not reflect any gender disparity among people although it prevails in many rural areas of developing countries like Pakistan.

Gender distribution among non-immunized children throws a light on high percentage of girls being non immunized i.e. 7 out of 11. It might have been putting forward the backward thinking of a male dominated society where people think that women need not much

protection and cure against diseases or disabilities. Similar results were reported in India in rural area of Pune, Maharashtra where status of complete immunized children was marginally higher in males (87.61%) than in females (85.57%) [27].

As far as parents' willingness regarding immunization follow up is concerned, 3 out of 11 (27%) showed non cooperative attitude toward vaccination program. They couldn't give any sound or acceptable reason. This reflects a high degree of lack of interest in promoting health of their children in addition to lack of knowledge or awareness.

The other few reasons given by the parents who were aware fully of the importance of immunization, gave nominal reasons for non-immunization of their children; which cannot be embraced at all, as it is a major issue concerning health and better survival of children. The most presented reason seems to be non-availability of approachable vaccination center, argued by 5 parents out of 11 (45%). A cross sectional study conducted in Peshawar showed that the low immunization rates among children of rural areas was lack of accessibility to health centers. [24] Another research in 2011 on availability of EPI services provided to children in rural Pakistani village showed that and home delivery of vaccines was directly linked to higher rates of immunization amongst children [21].

The other highlighted reason is false beliefs about vaccination i.e. 2 out of 11 parents (18%) figured out this reason. False beliefs only prevail in a low educated society where people are reluctant to accept new advancements in science and stick to their old theories and life experience. Misconceptions about vaccination seem to be a prevailing reason in non-immunized children in rural areas of Peshawar in a research published in Journal of Ayub medical college [24].

2 parents argued about their child being sick and not contraindication of vaccination. Child sickness seems to be a logical point but the parents could not give any sound reason neither presented any authentic medical certificate confirming contraindication of vaccine in their child by any registered medical practitioner or health care unit. Lack of information about vaccination schedule and its benefits is another reason quoted amplifying the need to expand the awareness and education about vaccination benefits. Similar results were reported by a research published in Journal of Ayub medical college Abbottabad where major cause of non-immunization in Urban

Areas was lack of awareness and parents being busy [24]

Unavailability of vaccinator at vaccination center is complained by 1 participant which is an alarming message for the health authorities and managers in a country like Pakistan where vaccination preventable diseases are already on a rise like polio. 17.18.

Finally if we focus a light on dropout rates in partially immunized children, it shows a high drop out at 6 weeks and 10 weeks of schedule as compared to vaccines given at birth. It reflects lack of interest of parents besides availability of vaccination services in their range and laziness and questioning attitude of parents for not completing the immunization schedule.

Lower dropout rate for measles at 9 months shows that, people who follow the immunization course up to 6 months tend to be regular and show serious concern towards getting their children completely vaccinated. It will also help in achieving WHO goal toward eliminating measles in EMRO region up to 2015. It is in contrast to the statistics obtained in a research in Dhaka where immunization coverage rate for DPT1 and OPV1 is 97%, 75% For DPT3 and OPV3 and 67% for measles [27]

Dropout rate for 2nd dose of measles at 12 months is again significant. It may be due to wrong perception of people that vaccination is only needed during 1st year of life and children are protected against diseases after this time period. Or they may be unaware of the complete schedule or are lazy to follow up routine immunization.

### CONCLUSION:

- In our research on expanded program of immunization coverage in children less than 2 years of age coming to Paeds OPD SHL 88.7% children were fully immunized, 7.2% children were partially immunized and 4.1% were completely non-immunized.
- This study revealed that major reasons for non-immunization of most children were inaccessibility of vaccination centers false beliefs and misconceptions among parents about immunization, child sickness that if sick child got vaccinated it would be dangerous for him or her and bad consequences would come and lack of information among parents about EPI and its schedule
- The other minor reasons that accounted for non-immunization of children were unavailability of vaccinator and busy life of parents.

- We found that some gender discrimination was also present our result showed that among non-immunized children 63.6% were females while 36.6% were males
- Our result showed that the dropout rate of BCG vaccine was 0% the reason behind it was that most of the children were in hospital or clinic and they were given BCG vaccine by hospital or clinic vaccination team
- The dropout rate of vaccine dosage (OPV-1, Pentavalent-1, PCV-10) at 6 weeks, 10 weeks (OPV-2, Pentavalent-2, PCV-10) and the 2nd dose of measles at 15 months was found to be high 28.6% while that of the first dose of measles vaccine at 9 months was found to low 14.3%
- We concluded that immunization status of children can be improved by making more immunization centers, spreading awareness among people about immunization importance and benefits and counseling them about their misconceptions and beliefs.

#### RECOMMENDATIONS

- A comprehensive program should be launched for information, education and communication (IEC) to improve awareness about vaccination and broad acceptance of expanded program on immunization.
- Awareness should be given through effective media like TV, radio print media, posters, national level awareness campaign, folk media interpersonal communication and involvement of local community activist.
- Parents should be given full information regarding EPI schedule, vaccination benefits and its contraindications via social health motivational schemes and by using mass media for interest of general public.
- In case of contra indication of vaccine in severely ill children, there should be some nationally accepted policy of issuing certificates to those children by registered medical practitioners.
- All general misconception and false beliefs about childhood vaccination should be removed through promotional awareness programs and counseling especially in low coverage areas.
- Vaccination center's setup needs to be improved. Vaccination centers should be made approachable to the native community in the most convenient manner. It should be within the residential area of the local community and a proper approachable metallic road should be present. In addition to it facility of appropriate

transport to vaccination center, if provided, can give fruitful results.

- The situation can also be ameliorated by arrangement of door to door vaccinators with provision of necessary facilities but it will require allocation of more funds and demands higher authorities interest in making situation better.

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