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CAUSES OF IMMUNIZATION FAILURE IN DPT VACCINATION IN URBAN AND RURAL AREAS OF PESHAWAR

Mohammad Naeem, Syed Hussain Abbas, Seema Gul, Muhammad Adil, Muhammad Zia-Ul-Islam Khan, Muhammad Saleem Khan

Department of Community Medicine, Khyber Medical College, Peshawar - Pakistan

ABSTRACT

Objectives: To estimate coverage rate and factors associated with the failure of DPT vaccination in urban and rural areas of Peshawar.

Material and Methods: This cross-sectional study was conducted on 509 children in selected areas of Peshawar University, Peshawar Saddar, Naway Kalay and Pawaka Village. Parents were asked about demographics, the DPT (Diphtheria, Pertussis, Tetanus) vaccination status, reasons for not vaccination and their views on immunization. A separate questionnaire was made for 40 health personnel involved in immunization. The study was conducted from 9th to 20th of June 2010.

Results: DPT complete immunization coverage was found to be 69.4%. The reasons quoted for non-immunization by parents/guardians were no awareness (25.81%), centre too far (21.29%), busy/family problems (22.58%), wrong idea/sterility (10.32%) and fear of reactions (1.29%) and others (11.61%). The EPI staff quoted lack of awareness among people, load shedding, poor transport, facilities, lack of timely availability of vaccines and security as the main problem in immunization.

Conclusions: Our study revealed that low vaccination coverage was mainly due to low awareness among people and lack of knowledge regarding its importance. The main problems faced by the health personnel involved in immunization are lack of awareness among people, inadequate equipment and staff, security and lack of incentives.

Key Words: EPI Pakistan, Childhood immunization, DPT.

INTRODUCTION

Pakistan has an estimated infant mortality rate of 72 deaths/1,000 live births. Many of these infants still die of vaccine preventable diseases which have been eradicated in many countries. According to the World Health Organization (WHO), there were 4,190 reported cases of diphtheria worldwide in 2007. WHO estimated that 5,000 people died of the disease in 2002. Similarly, according to WHO, the worldwide deaths from Pertussis and Tetanus were 195,000 and 61,000 respectively. Pakistan has failed to eradicate diphtheria, Pertussis and Neonatal Tetanus. The reported cases for each were 37, 109 and 508 respectively. These diseases can be prevented by DPT vaccine. The Expanded programme on immunization (EPI) was started in 1978. The objective of DPT vaccination in EPI programme was to reduce morbidity and mortality resulting from three diseases i.e. Diphtheria, Whooping cough, Tetanus. Immunization against DPT is being provided through static and outreach centres as well as mobile teams throughout the country. In many parts of the country, especially in very poor and remote areas, the number of real and reported cases may vary substantially[1]. Furthermore the surveillance system in Pakistan and especially in Khyber Pakhtunkhwa is not efficient and fair enough to find out exact coverage of vaccine and the prevalent cases of the diseases. The coverage for DPT in 2008 was 68%. The DPT3 coverage for Khyber Pakhtunkhwa was 61.3% in survey 2006[2].

The aim of this study was to evaluate the current situation in Peshawar i-e to find the coverage of DPT and factors associated with non immunization of DPT with respect to the user as well as the provider. The results of this study would help us know as why the vaccine is failing and these diseases are still prevalent and what steps must necessarily be taken at this stage to achieve 100% eradication.

MATERIALS AND METHODS

A cross sectional study was conducted from 9th to 20th of June 2010 in urban and rural areas of Peshawar. Parents of 509 children were interviewed about their children, aged 4 years and below. Children less than 14 weeks old and those who had not spent the DPT immunization life time i.e. first 6 months of their life, in Peshawar, were excluded. Simple Random sampling was done. A confidence level of

Address for Correspondence:
Dr. Mohammad Naaeem
Assistant Professor,
Department of Community Medicine,
Khyber Medical College, Peshawar - Pakistan
Contact: 0300-5901841
E-mail: eaglebook86@gmail.com

95% and confidence interval of 5 was taken to derive the sample size and households were interviewed in selected areas of Peshawar university campus, Peshawar Saddar, Hashtnagri, Naway Kalay and Pawaka village. A researcher-administered standard questionnaire was used as a data collecting tool. Parents were given a choice to leave any question unanswered or to end the interview anytime they wished. All data was collected through informed consent.

Parents were asked about the DPT immunization status through a questionnaire containing information concerning demographics, highest education (None, Primary, Middle, Matric, Higher education, Traditional/Madrassa) occupation and monthly income of family earner, health education of parents (none, little, moderate, enough, everything) was assessed based upon their knowledge on immunization benefits, importance, DPT time schedule and side effects. Their accessibility to EPI centre in terms of distance in kilometers was approximated. Their view on immunization and reasons for non immunization were also noted. They were asked about the frequency of visits from health staff (often, sometimes, never). Parent's preference in place and time of immunization were also asked.

Forty health personnel involved in immunization administration were also interviewed. The centres visited for this purpose were EPI centre of Khyber Teaching Hospital, Lady Reading Hospital, Peshawar University Campus female dispensaries, different BHUs (Basic Health Units) of Hashtnagri, Pawaka and Naway Kalay.

A different questionnaire was made for immunization staffs containing demographic data that included name, sex, age, education and main hurdles in EPI.

They were asked about availability of transport, staff and whether they were satisfied with their salaries. They were also asked whether special incentives were given or not. They were also asked knowledge of parents, community leaders (Poor, Average, good, Vgood, excellent). They were inquired about the role of NGOs regarding immunization. They were asked to give one main suggestion to improve immunization programme.

Frequencies and cross tabulations were calculated by using SPSS version 16.0. Pearson's chi-square test was used for statistical testing. A P value of < 0.05 was considered significant.

RESULTS

Out of the total 509 children, 52.3% were females and males were 47.7%. Urban population was 54.6% while rural population was 45.4%. Most of the population was uneducated (41.1%).

The immunization coverage against DPT vaccination was 69.4%, 7.1% were incompletely vaccinated (missing one or two doses) and 23.6% were not vaccinated at all (figure 1). The vaccination coverage for DPT1, DPT2 and DPT3 were 76.4%, 71.3% and 61.4% respectively. The reasons for missed vaccination are given Figure 2. 53.2% parents had immunization card present.

Parents knowledge on vaccination was: little 32.8% (n=167), enough 31.0% (n=158), moderate 17.3% (n=88), none 12.2% (n=62) and everything 6.7% (n=6.7). When asked whether the immunization programme was beneficial most answered yes (90.8%). 9.2% did not consider it useful due to the causes given in figure 2.

When asked how often the health workers visited their place, 41.3% answered often however significant numbered answered never 13.9%. Most of the parents would like to immunize their children in the morning (72.7%) and at homes (57.2%).

Cross tabulation between education of parents and the immunization status showed a clear pattern of low immunization among uneducated and high immunization among educated families (Figure 3). High immunization rates were found for urban areas (82.4%) as compared to rural areas (53.7%) ($P<0.001$). However, a significant pattern was not observed with respect to sex of children. The females and males completely immunized against DPT were 52.3% and 47.7% respectively ($P=0.709$).

Immunization was high for household earners having government jobs (80.2%) and private jobs (82.2%) but coverage was low among children of labourers (47.2%) ($P<0.001$). Mothers having government jobs were much more likely to have their children immunized (86.2%) ($P<0.001$).

The income had a great effect on the immunization status of the child (Figure 4). The distance from the EPI centre had no significant effect on Immunization status of the children below 13 km but it had a clear effect on immunization of the children above 13 km (figure 5). Respondents who thought immunization wasn't of any benefit had a very low immunization status (17.0%) than the respondent's children who thought immunization was beneficial (74.7%) ($P<0.001$). Similarly in household where EPI workers visited often, coverage was high (84.3%) ($P<0.001$).

Most of the staff (70%) was not satisfied with the structure of salaries and government incentives. Sufficient transport was not available to EPI staff (75%) and EPI staff was insufficient for some areas (65%) Main hurdle faced by immunization staff was lack of awareness 32.5% (n=13), load shedding 20% (n=8), security problems 10% (n=4), lack of transport 10% (n=4), timely availability of vaccine 10% (n=4) and

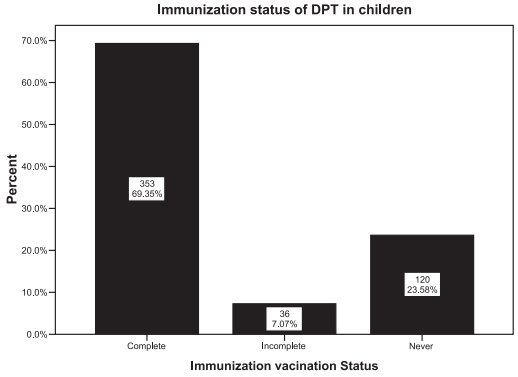


Fig. 1

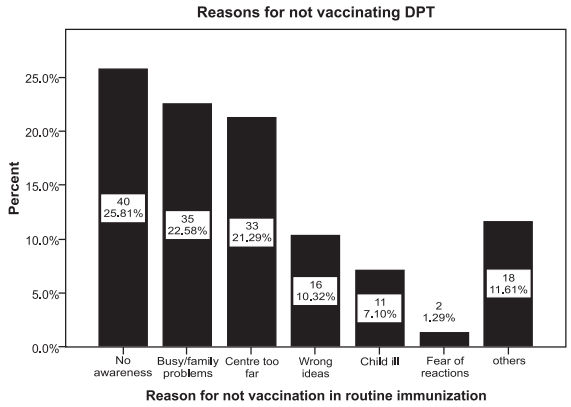
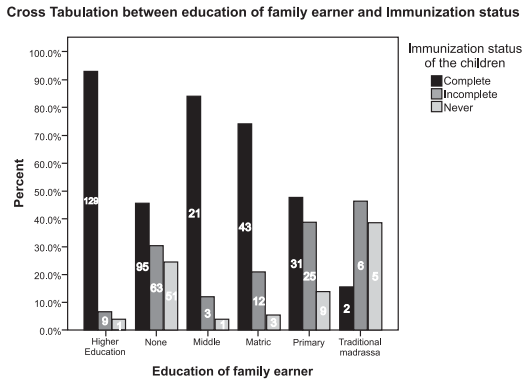


Fig. 2



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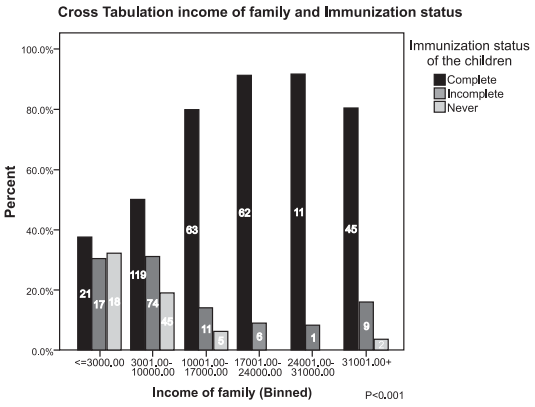

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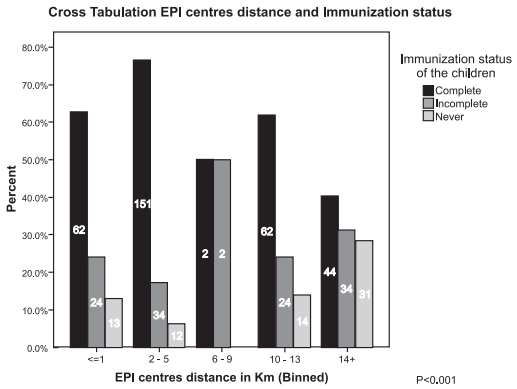

Fig. 5

negative or negligible role of media 7.5% (n=3). Suggestions for improvements by immunization staff were increase in awareness among people 45% (n=18), more transport 20.0% (n=8), better security 12.5% (n=5) and more staff 7.5% (n=3).

Most of the immunization staff rated the community leaders' cooperation as good (50%) however significant number answered poor (30%). 67.5% stated poor cooperation of NGOs with the EPI. Similarly they put parent's knowledge about immunization at average 52.5% and poor 37.5%.

DISCUSSION

Our study found the DPT child immunization rate at 69.4% (Figure 1). This is consistent with national figures[2] but higher than studies conducted in Khyber Pakhtunkhwa[3,4]. Causes of low vaccination in children against DPT (Figure 2) were similar to many other studies[3,4,5]. Interestingly, misconception had a minor role in poor immunization in children. Most of the parents wanted to immunize their children in the morning and at homes showing that if immunization is done at homes a much higher rate can be achieved.

Cross tabulation between education of parents and the immunization showed high immunization among educated families. Mothers having knowledge about immunization and its importance had much greater vaccination rate than mothers who did not (Figure 3). This was found consistent with other studies[6,7,8] and therefore, by increasing education in the population and filling in the lacunae regarding health education can help curb the lower vaccination rate against DPT[4,5].

No significant pattern was observed with respect to sex of children for DPT vaccination. The females and males completely immunized were 52.3% and 47.7% respectively. This was in contrast to studies conducted elsewhere[9] and is possibly due to the fact that gender bias is not present at younger age especially when availing free services like immunization[3].

Immunization was high for government and private jobs rather than for labourers, this relationship could have been due to income disparities between these jobs. Similarly, mothers having government jobs were much more likely to have their children immunized because they were mostly educated and had a better economic status[5].

A high coverage rate was found in urban areas of Peshawar (82.4%) than rural areas (53.7%). The reason behind this can be understood by viewing the causes of non vaccination where the 'centre being far' is found to be one reason. Similarly, poverty and low literacy in rural areas play its part. This finding was similar to other studies in Peshawar and elsewhere[3,4,5,10].

The monthly income of family and the immunization status had a very clear relationship. With income below Rs. 3,000, nearly half of the children were not immunized however with income above Rs. 10,000, most of the children were immunized (Figure 4). This shows that better economic conditions improve immunization rate. This was similar to studies in Khyber Pakhtunkhwa and elsewhere[3,6,10].

One of the main causes of low vaccination was distance of health centre which was insignificant below 13 km but above 13 km, there was a sharp decrease in immunizations (Figure 5) indicating the need of more functional health centres in distant areas, to attain better immunization. This correlation was not uncommon; it has been indicated in many studies[3,11,12].

When asked about the frequency of visits of health personnel including the Lady Health Workers, most answered often (once in 2 months) (41.3%). However, a significant number answered never (13.9%). This rate was a little higher than other areas in Pakistan and Khyber Pakhtunkhwa[3]. The reason behind better performance of health workers is Peshawar being the capital of the province with easier access and more facilities. This can also be the reason of relatively higher immunization rate in Peshawar than other parts of the province[3,10,11,13].

Mothers were specifically asked about access to information, most of the women had access to electronic media like TV and radio (82.9%), only some had access to print material and few had no access at all. Mothers having access to electronic or print material had a high immunization rates than mothers having no access at all. This shows that if the message conveyed through electronic media is further improved and more frequently aired, it can help improving the awareness and also removing the misconceptions related to immunization as indicated by a study in Karachi[14,15].

A significant number of health personnel (42.7%) didn't get vaccines on timely bases. Many vaccines expired due to many reasons, most important of all being load shedding. This was also seen in other studies and if controlled, can be a major factor in improving immunization on the part of the provider[11,16].

When asked whether they had authority to ask for more vaccines, most of them answered "yes". All the health workers quoted to have had training and knew how to handle cold chain; all the EPI staff had adequate equipment for cold chain. This was similar to studies in Lahore and Khyber Pakhtunkhwa[3,11,17] and in contrast to studies elsewhere, showing that international organizations' performance in providing equipment regarding immunization is good in Urban and main cities[6].

Most of the staff (70%) was not satisfied with the structure of salaries and government incentives and all replied that there were no special performance based incentives given to them. This was found in other studies[3,11,18,19] and can be the reason of low performance of EPI staff. This issue must be addressed because as long as the people remain uneducated, the better performance of the staff could bring a significant change. Similarly insufficient staff was a problem faced by some EPI centres. Lack of awareness by the parents and security were other issues faced by immunization staff. Therefore, it is important that security of the staff should be ensured. This was also found in studies conducted in Sindh and Khyber Pakhtunkhwa Pakistan[3,11,19,20].

Several methodological issues are to be considered in cross sectional studies. Such a study does not allow an interpretation of a clear causal relation between the associated factors found in this study and lack of immunization, also many of the associated factors in a same population are interdependent or have synergistic effect (e.g. low income, low literacy, lack of information) making it difficult to build a clear relationship between individual variables. This also indicates that improving one factor can show improvement in the other. Therefore future approaches to such studies should give importance to the complex interdependent nature of these variables because strict controls of variable can't be achieved in a cross sectional study of such nature.

CONCLUSION

The difficulties faced by immunization staff were lack of awareness in parents, load shedding, transport and security issues. Lack of incentives was the reason of lack of interest and low performance of the EPI staff.

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