

Barriers in immunization of children under two years of age in Mohmand Agency, Federally Administered Tribal Area, Pakistan

Muhammad Naeem¹, Aisha Imtiaz², Hamid Hussain², Naeemullah³, Shama Hidayat¹

ABSTRACT

Background: Immunization is vital in children health care, however, many studies have shown that child immunization is influenced by many factors.

Objective: To determine the barriers associated with immunization among children less than two years of age.

Material & Methods: A cross-sectional study was conducted in Tehsil Halimzai of Mohmand agency, Federally Administered Tribal Area, Khyber Pakhtunkhwa, from July to December 2014. Sample size was 421. Chi-square test was applied to determine association of socio-demographic factors to immunization.

Results: The socio-demographic data of participants showed that 197 (46.8%) participants were between 31 - 40 years of age. Mean age of the participants was 35.79 ± 8.03 . 245 (58%) were uneducated and 268 (89.8%) had monthly income between 5000 and 10,000 Pakistani Rupees (PKR). Among 421 children under two years of age, 287 (68.2%) were immunized and only 102 (35.5%) were fully immunized. Importance of child immunization was recognized by 286 (67.9%) parents, however, most of the parents 286 (67.9%) did not retain the immunization cards of their children. The socio-demographic factors found to be associated with immunization status of children included age ($P = 0.02$), income and education level of participants ($P < 0.01$). The other factors included psychological fear of being attacked ($P = 0.04$), awareness of the community about child immunization by the health care providers ($P < 0.001$). Lack of education of the community regarding immunization by health care providers was reported by 84.4% respondent. The opinion of Imam Masjid ($P = 0.011$) and community elders ($P = 0.019$) regarding immunization and its importance for child health were also identified as key factors for child immunization.

Conclusion: Parental age, education and income level, psychological fear of being attacked, awareness of the community about child immunization by the health care providers and opinion of Imam Masjid and community elders were identified as key factors for child immunization.

Keywords: Child Health, Immunization, Pakistan, Clergy, Fear, Parents

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INTRODUCTION

Almost six million children under the age of five years died in 2015. Ninety nine percent of all under-five deaths occur in developing countries¹. The child mortality in Pakistan is a major cause of concern, having infant and under-five mortality rates of 74 and 89 deaths per 1,000 live births, respectively². Around a third of these child deaths are due to vaccine preventable diseases. Pakistan is one of the three countries where polio transmission remains endemic³. Universal immunization of infants and young children under two years of age against major vaccine-preventable diseases is one of the most cost-effective means of reducing infant and child morbidity and mortality. Following the guidelines of the World Health Organization, the government of Pakistan initiated the Expanded Program on Immunization (EPI)², providing vaccination against nine infectious diseases⁴.

According to Pakistan Demographic & Health Survey (PDHS) 2012-13, there has been a slow improvement in the percentage of fully immunized children age 12-23 months, from 47 percent in 2006-07 to 54 percent in 2012-13. There are wide differences in coverage by region with highest coverage in Islamabad (74 %), and lowest in Balochistan (16 %), while immunization coverage in Khyber Pakhtunkhwa is 53 percent). Only one-third of children age 12-23 months have a vaccination card. This clearly indicates the need for revisiting the immunization strategies².

Immunization has significant health benefits, particularly for children; however studies showed that people, particularly in developing countries, do not vaccinate their children^{2,5}. The factors influencing the immunization status include gender and birth order of child, socio-economic status, maternal education level, area of residence. The misconceptions about vaccination and fear of the side effects of vaccines are identified as barriers to immunization⁶. Our study aimed to determine the rate of immunization and identify the barriers associated with non/incomplete immunization among children under two years of age (aged 12-23 months) in the Mohmand agency, Federally Administered Tribal Area (FATA) of Pakistan. The evidence generated by this cross-sectional study may be used by the

1. Benazir Butto Shaheed Teaching Hospital Abbottabad

2. Institute of Public Health & Social Sciences KMU Peshawar

3. Community Medicine Saidu Teaching Hospital, Swat.

Correspondence: Dr. Ayesha Imtiaz

Institute of Public Health & Social Sciences, Khyber Medical University, Phase V, Hayatabad, Peshawar

E.mail: drayesha.iph@kmu.edu.pk

Contact: 03339112885

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program managers and policy makers to devise measures to improve the immunization services and coverage especially in Mohmand Agency; FATA.

MATERIAL AND METHODS

Population based cross-sectional study, conducted in Mohmand agency, Federally Administered Tribal Area and the study duration was six months (July to December 2013). The sample size was 421; calculated by using the WHO software for sample size calculation in Health studies. Anticipated proportion of non-immunized children under 2 years of age (22%)⁷. Margin of error (d) 0.04 at 95% confidence interval and non-respondent rate (10%).

Multi-stage random sampling Technique was used for the study. Tehsil Halimzai was selected out of seven Tehsils in Mohmand Agency (Halimzai, Safi, Baizai, Ekka Ghund, Ambar, Pindialy and Prang Ghur), through simple random sampling using a 'lottery' method. Cluster of thirty villages was selected by simple random sampling from fifty six villages Tehsil Halimzai. From each village fifteen households were selected, using the bottle neck method. Households with children between eighteen to twenty four months of age were included in the study. Individuals not willing to participate were excluded from the study.

Data collection Procedure

Approval was obtained from the AS&RB and Ethical Review board of Khyber Medical University. Permission was sought from the political agent and the tribal elders of the area before conducting my study. The participants were briefed on the purpose of the study and an informed consent was taken from them before starting the data collection. The data was collected through pretested structured questionnaire. Information was obtained from the parents of children under two years of age as well as the community elders and imam Masjid in that area. Data was collected by the researcher, two Lady Health visitors and one male EPI technician trained for the purpose. The information was obtained about demographics of participants including age, gender, educational level and monthly income of the respondent as well as the age, gender of child participating in the study. Education level of parents was categorized into illiterate (No school education), Primary education, Middle education, secondary

education and above and religious/madrassa education). Socio-economic status was defined as participants self reported monthly income in Pakistani rupees.

Information was also obtained about the immunization status of child, immunization card availability, awareness of community about immunization, immunization related health services, and about the threats given the society and the psychological fear of the society. Fully immunized child was defined as a child under two years of age who received at least 1 dose of Bacille Calmette-Guérin (BCG) vaccine, 3 doses of oral polio vaccine (OPV), DPT3 and measles 1 vaccine, Hepatitis-B and Meningitis vaccination and the parents giving the history of immunization and/or having the immunization card with them. Partially immunized child was a child who received at least 1 dose of BCG vaccine, 3 doses of oral polio vaccine (OPV), and the parents have no immunization card with them or a child who had missed any of the vaccines given under National Immunization Days (NID's) under 2 year of age. A child who has not received any vaccination under NIDs against nine EPI targeted diseases was called Non-immunized child³.

Data Analysis Procedure

The data was analyzed using SPSS 22 (Statistical Package for Social Sciences). Descriptive analysis include Mean \pm SD for continuous variables (Age) and frequencies, percentages/proportions for the categorical data (gender, socioeconomic status, education level, immunization status of child, awareness of community about immunization). Chi-square Test was used to determine the association of immunization status of child with independent variables. At 95% confidence interval, P-value \leq 0.05 was taken significant.

RESULTS

There were 421 children under the age of two years in our study, 239 (56.8%) were female. Demographic characteristics of participants showed. Mean age of the participants was 35.79 ± 8.03 ; 197 (46.8%) participants were between 31 - 40 years of age and 95 (22.5%) were \leq 30 years of age. Majority of the participants 268 (89.8%) had monthly income between 5000 and 10,000 PKR,

while 110 (26%) had monthly income of Rs 5000 or less. Similarly, 245 (58%) were uneducated, while 107 (25.4%) had secondary school or higher education. Only 10 (2.4%) participants had received religious education (Dinee Uloom). Majority of participants had either three 128 (30%) or four 141(33.5%) children, while 85 (20%) had either two or one child. Data related to immunization status of children under two years of age showed that 287 (68.2%) children were immunized. Among immunized children, only 102(35.5%) were fully immunized, while 185 (64.5%) were partially immunized. Importance of child immunization was recognized by 286 (67.9%) parents, however, most of the parents 286 (67.9%) did not retain the immunization cards of their children.

Analysis of the socio-demographic factors affecting immunization of children under two years of age indicated that age, socio-economic status and education level of the parents were associated with the immunization status of children (Table 1). Age of the parents was found to have significant effect on immunization status of children (P = 0.02). Immunization rate of children was highest among participants between 20 to 30 years of age (22% vs 12.7%) as compare to

participants below 20 years of age (2.4% vs 6%). The participants above 40 years of age have high rate of non-immunization (27.8% vs 36.6%).

Parental education emerged as a key factor influencing child immunization (P < 0.01). The immunization rate was highest among children of parents having secondary school or higher education (89.7% vs 10.3%), followed by those with less than secondary school education: (78%) vs 22%). Immunization rate was also higher among children of parents and with deeni uloom. Monthly income of participants was another factor having significant effect on child immunization (P < 0.01). The immunization rate in children increases with increasing monthly income of participants, being highest among those with monthly income above Rs 10,000 (93% vs 7%).

Gender of the child had no association with their immunization status (P = 0.298). Similarly total number of children also had effect on the immunization status of children in the study (P= 0.05). The immunization rate of children was highest for participants having either one or two children (23.3% vs 13.4%). Participants having four or more children have low immunization rate.

Table 1: Socio-demographic characteristics associated with Immunization Status of Children under two years.

| Variables/Factors | Immunized N = 287 | | Non-Immunized N = 134 | | Total | P - value |
|---|----------------------|--------|--------------------------|--------|-------|-----------|
| | n | % | n | % | | |
| Age of Respondent (Years) | | | | | | |
| < 20 | 7 | (2.4) | 8 | (6.0) | 15 | 0.021 |
| 20 - 30 | 63 | (22.0) | 17 | (12.7) | 80 | |
| 30 - 40 | 137 | (47.7) | 60 | (44.8) | 197 | |
| > 40 | 80 | (27.8) | 49 | (36.6) | 129 | |
| Participant Education Level | | | | | | |
| No school education | 139 | (48.4) | 106 | (79.1) | 245 | < 0.001* |
| < 10 yrs. | 46 | (16.0) | 13 | (9.7) | 59 | |
| ≥ 10 yrs. | 96 | (33.4) | 11 | (8.2) | 107 | |
| Deeni Uloom | 6 | (2.1) | 4 | (3.0) | 10 | |
| Participant Monthly Income (PKR) | | | | | | |
| ≤ 5000 | 65 | (22.6) | 45 | (33.6) | 110 | < 0.001* |
| 5000 - 10,000 | 182 | (63.4) | 86 | (64.2) | 268 | |
| > 10,000 | 40 | (13.9) | 3 | (2.2) | 43 | |
| Total Number of children | | | | | | |
| ≤ 2 | 67 | (23.3) | 18 | (13.4) | 85 | 0.05 |
| 3 | 90 | (31.4) | 38 | (28.4) | 128 | |
| 4 | 89 | (31.0) | 52 | (38.8) | 141 | |
| > 4 | 41 | (14.3) | 26 | (19.4) | 67 | |

*Fisher exact test was used for statistical analysis

Information was also collected about the other factors which can be the possible barriers to child immunization, especially in prevailing context of tribal areas (Table 2). Participants were asked about the direct threat given to people about not immunizing their children by different fraction of society and the psychological effect of fear of being attacked while immunizing children. Majority of the participants 414 (98.3%) did not report of any direct threat, however, the psychological fear of being attacked was reported by 410 (97.4%) respondent and was found to have significant association with immunization status of children ($P = 0.04$). Despite of the fear, participants immunized their children [98.9% vs 95.5%]. The opinion of Imam Masjid and community elders regarding immunization had significant effect on child immunization. 252 (59.8%) Imam Masjid and 194 (46%) community elders were against immunization. The immunization rate was low where imam masjid (55% vs 70%, $P = 0.011$) and community elders (42.9 vs 53.0, $P = 0.019$) were against immunization. The other reasons given by

the parents, for not immunizing the children are given in Figure 1.

The role of health care staff in child immunization was also analyzed. Fifty one percent participants reported that immunization staff make regular visits for routine immunization, while 62 (14.7%) participants were not aware of the such visits. It was also reported that 213 (89%) female participants were not provided with immunization related information by the health care staff. It was also informed by 416 (98.8%) participants that the health care providers did not arrange any meeting with the village elders or with Imam Masjid regarding the awareness and importance of immunization. Awareness of the community about child immunization had significant influence as child immunization rate was higher among those who received information from the health care providers in the local health care facility (17% vs 5.2%; $P < 0.001$) (Table 2). Sources of information about mass polio vaccination campaign are given in Figure 2.

Table 2: Other factors characteristics associated with Immunization of Children under two years.

| Variables/Factors | Immunized N = 287 n % | Non-Immunized N = 134 n % | Total | P - value |
|---|-----------------------------|---------------------------------|-------|-----------|
| Direct Threats to People to Not Immunize Their Children | | | | |
| Yes | 5 (1.7) | 2 (2.0) | 7 | 0.852* |
| No | 282 (98.3) | 132 (98.5) | 414 | |
| Psychological Fear of being Attacked | | | | |
| Yes | 284 (98.9) | 128 (95.5) | 412 | 0.004* |
| No | 3 (1.10) | 6 (4.47) | 9 | |
| Opinion of Imam Masjid | | | | |
| In favour of immunization | 6 (2.1) | 1 (0.7) | 7 | 0.011* |
| Against immunization | 158 (55.1) | 94 (70.1) | 252 | |
| Indifferent/neutral | 123 (42.9) | 39 (29.1) | 162 | |
| Opinion of Community Elders | | | | |
| In favour of immunization | 51 (17.8) | 29 (21.6) | 80 | 0.019 |
| Against immunization | 123 (42.9) | 71 (53.0) | 194 | |
| Indifferent/neutral | 113 (39.4) | 34 (25.4) | 147 | |
| Regular visits by Health Care Staff for Routine Immunization | | | | |
| Yes | 144 (50.2) | 73 (54.5) | 217 | 0.636 |
| No | 101 (35.2) | 41 (30.6) | 142 | |
| Don't Know | 42 (14.6) | 20 (14.9) | 62 | |
| Awareness about immunization by Health Care Staff | | | | |
| Yes | 49 (17.1) | 7 (5.2) | 56 | < 0.001 |
| No | 238 (82.9) | 27 (94.8) | 365 | |

*Fisher exact test was used for statistical analysis

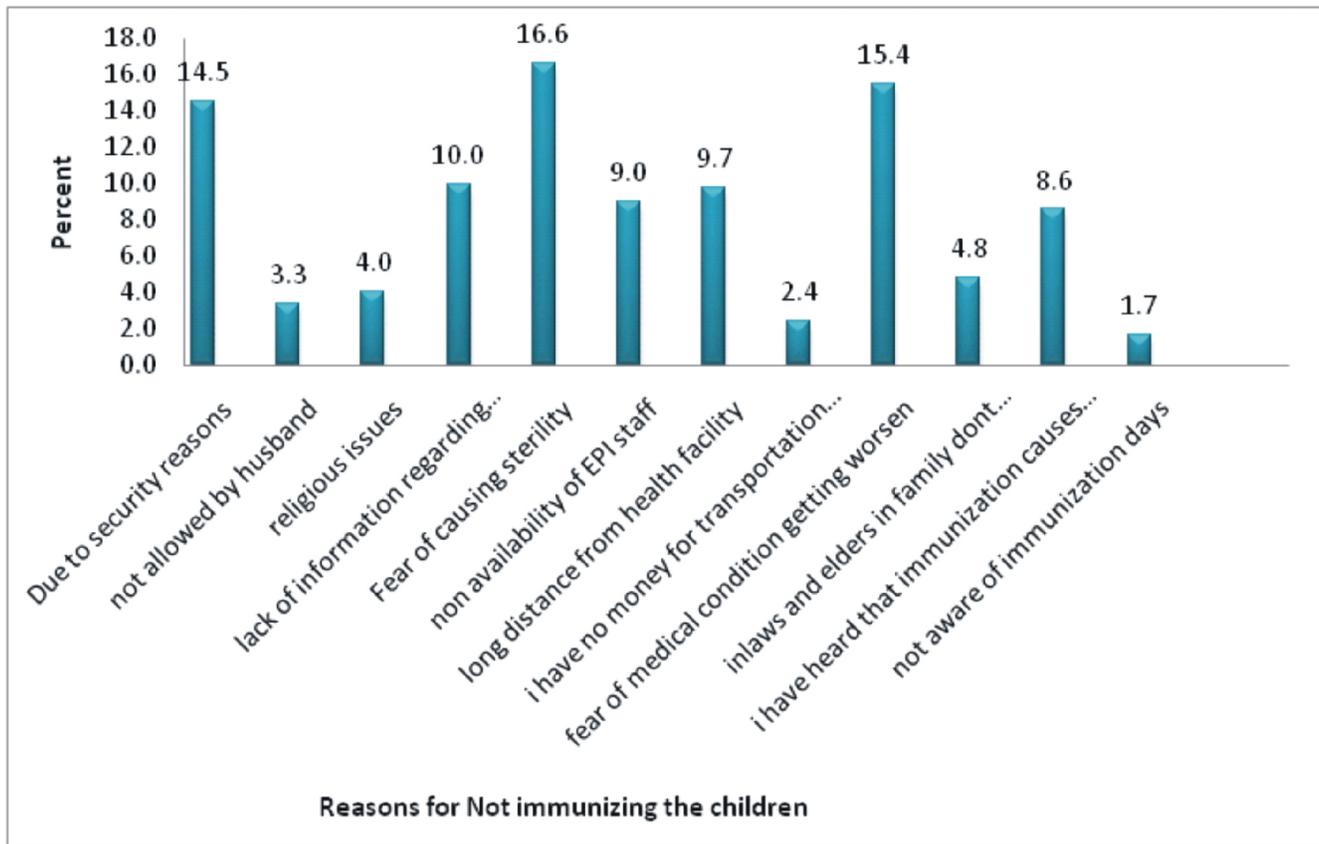


Figure 1: Reasons for not immunizing the children under two years in Mohmand Agency as reported by the participants

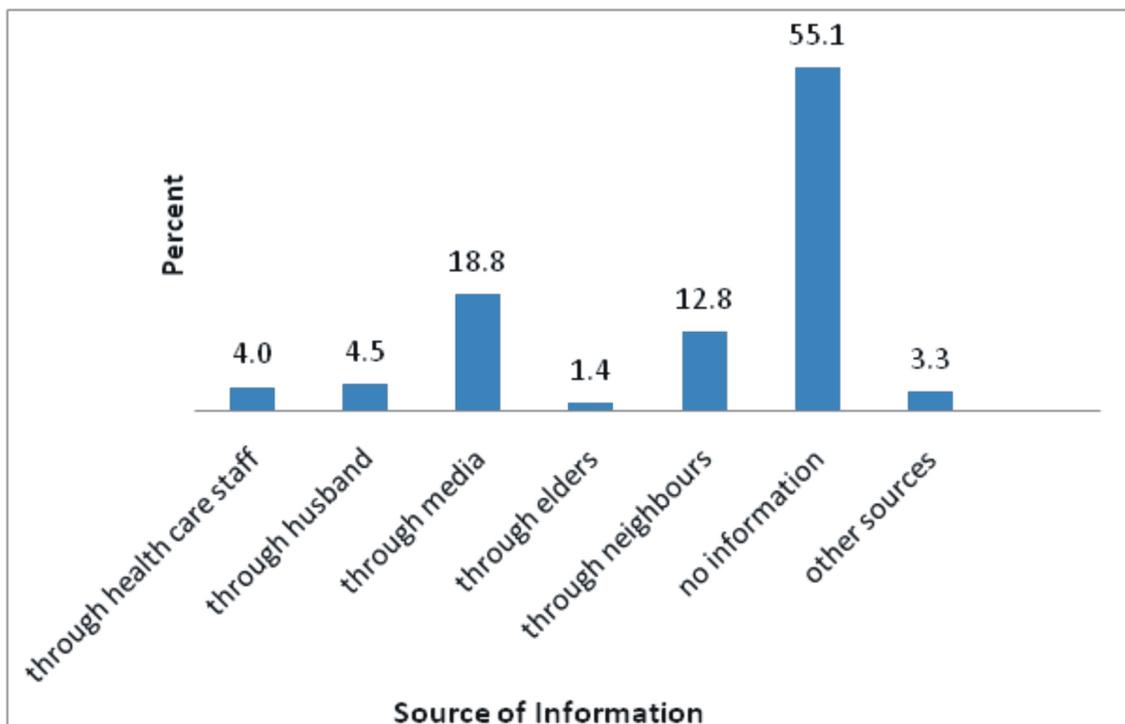


Figure 2: Sources of information about Polio vaccination campaign

DISCUSSION

This community based study was designed to determine the barriers associated with immunization of children under two years of age in Mohmand Agency, FATA. Sixty eight percent children were immunized. Among immunized children, only one third were fully immunized. Importance of child immunization was recognized by majority of parents, however, most of the parents did not retain the immunization cards of their children. The percentage of fully immunized children was lower than the national figure (54%) and that in Khyber Pakhtunkhwa (53 percent) as reported in PDHS 2012-13. Only one-third of children age 12-23 months have a vaccination card². FATA being the backward area of Pakistan, having the low literacy rate, especially among female, gender inequality, conservative nature of the society, economic instability, poverty and insecurity are suggested to be related to low immunization rate in tribal areas⁸.

The high rate of partial immunization in our study may be attributed to the to the incidence of side-effects from previous doses and/or ignorance on the part of mothers who may believe that one dose of a particular vaccine type is enough⁹. Similar findings were given by the United States Agency for International Development (USAID) in their report. With the exception of Punjab, all other provinces had higher percentage of partially immunized children. Partial immunization was also more common among children from low socio-economic status and uneducated or less educated families. High rate of illiteracy particularly among females, economic instability, insecurity, gender inequality, are suggested to be responsible for partial immunization³.

The socio-demographic factors found to be associated with immunization of under two years of age in our study, were age, socio-economic status and education level of the parents. Parental age is one of the important factors influencing child health. In our study, the immunization was found to be low in children of parents below twenty years of age. Younger parental age reducing the probability of vaccination of a child has been documented in another study in Nigeria. This may be related to the experience of childcare and knowledge of the importance of vaccination that comes with increasing age¹⁰. Similarly a study by Soma et al. reported that women above 30s were more willing to have children fully immunized as

compared to teenage mothers¹¹. However, it was observed in our study that immunization rate decreases with increasing parental age.

Some studies suggested that parents and caregiver' gender may have a crucial role for accessing vaccination of children. In Pakistan where gender norms restrict female mobility in public, women refrain from leaving their homes in order to maintain their reputation and status, or in some cases, out of fear^{12,13}.

Evidence suggests that parental education, employment status and income level can determine the immunization status of children^{14,15,16}. Some studies emphasized the role of maternal education in child immunization¹⁷, while other study identified²⁴ father's education as an influencing factor, whereas mother education influence the long-term health outcomes¹⁸. Higher socioeconomic status and education level positively influence immunization rate, as confirmed in other studies^{19,20,21}. These two inter-related and mutually complementing variables, bridge the gap of other factors influencing the immunization, such as lack access to information, distance of vaccination centres, poor access to media and lack of institutional deliveries and antenatal care. These two factors are also integrally associated with urban residence, which also favours greater uptake. Moreover, educated and wealthier women are more likely to have decision autonomy and understand the need for childhood vaccination⁹.

The other possible barriers to child immunization, as identified in the study included the insecurity, psychological fear of being attacked for the reason of immunizing their children, opinions of community elders, imam masjid, religion, influence of husband and family members, afraid of side effects, negative propaganda about immunization, long distance to travel to health facility, non-availability of EPI staff, lack of awareness and information.

The present security situation in Pakistan, especially in KP and FATA, furthermore the attacks on and killings of EPI personnel had negative impact on the immunization campaign. The parents of the children feel threatened while immunizing their children in immunization campaigns, because of the attacks on immunization teams. Opinion of the village elders

and Masjid Imam, regarding immunization also has its impact. The religious people and especially the imam masjids (Molvis) have deep roots in the community and they are considered as guides for the religious matters. They consider vaccination as an anti-muslim international agenda. They forbade and discourage their followers not to immunize their children. Certain events in the past raised question on the role of on EPI staff and jeopardize the confidence of community on them. These are considered strong reasons for the refusals²². Religion was reported as an important factor affecting immunization, in other studies as well^{23,24}.

Lack of information/awareness emerged as an important barrier to child immunization in our study, leading to misconception about immunization, fear of side effects, non-awareness about immunization days/campaigns. Fear of side effects from the vaccination was identified as a key factor for low vaccination rate in rural areas of Pakistan in other studies^{25,26}.

FATA being the war affected area, still there is a sense of insecurity and uncertainty in spite of multiple military operations. People of FATA have limited access to print and electronic media. Majority of tribesmen have conservative thinking, not allowing electronic media (TV, radio, computers) in their homes which are the major source of information these days. Apart from this PTV transmission is not accessible in Mohmand agency (FATA) on normal TV or outdoor antenna. Due to the recent attacks on EPI staff, the immunization campaign days are kept in secret. People get informed only when door to door immunization is started²². That's why during the vaccination campaigns most of parents and elders in community and home oppose vaccination²⁷.

Health staff of the local health facilities and health care workers have an important role in improving immunization coverage. However, in our study the local community was not satisfied with the role of health staff in terms of making regular visits, holding meetings with community, providing information about importance of immunization and immunization days/campaigns. It was also revealed in our study that the health staff was untrained, and unable to provide adequate information to the respondent about immunization. There is a dire need of trained staff for vaccination especially in FATA. Also during the

immunization campaigns volunteers are difficult to hire mainly due to low incentives, complicated way of payment, delay in payment.

Role of LHV's and LHW's is also questionable. They do not visit the houses in Mohmand agency (FATA) in order to take awareness sessions with community females and elders regarding the health issues and importance of immunization. Most of the LHV's remain absent from duties. The communities do not report them as they are females and they consider it difficult for them to come daily for duties. Most of the LHV's come from settled areas for duties and because of poor monitoring they take the job very easy²⁸.

Strength and Weaknesses:

It was a community based study conducted in tribal area of Pakistan providing the information required for improving the child immunization. Probability sampling techniques (Multi stage random) was used to select the participants increasing the external validity of study. The evidence provided may not be strong enough for identifying risk factors as it was a cross-section study design. Only one tehsil was selected for data collection due to security reasons.

CONCLUSION

The immunization status of child was related to education level and income status of the participants. Lower rate of school education and poor socio-economic status of the participants are areas of concern. Similarly the high rate of partial immunization in children was related to poverty, illiteracy and lack of health education. Attacks on EPI staff were considered as an important barrier to immunization as there is psychological fear of being attacked for immunizing their children. Awareness of community, particularly female has to be improved. Imam Masjid and community elders, having influence on the community, need to be engaged in immunization activities. Role of health staff in immunization must be reviewed.

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