

Assessment Level of Knowledge about Supplementary Polio Immunization in Mothers Presenting to Pediatric Population

WAHEED ULLAH¹, SARA JAMIL KHAN²

¹Community Medicine, MO DHQ Teaching Hospital Timergara

²Assistant Professor, Obstetrics and Gynaecology, Frontier Medical College Abbottabad

Correspondence to: Waheed Ullah, Email: dr.waheedullah713@gmail.com

ABSTRACT

Introduction: Humans are the only known reservoir of polio virus. Polio virus infection in humans can cause a crippling paralysis in a fraction of the infected patients. Due to permanent nature of the paralysis, low mutation rate of the virus, restriction of polio virus to human hosts and overall feasibility of polio eradication, the polio virus became the target of aggressive vaccination campaigns via supplemental polio immunization (SPI) across the world for more than two decades. To determine the level of knowledge about supplementary polio immunization in mothers presenting to pediatric Population.

Materials and Methods: This study was conducted in the Pediatric Department, OPD, District General hospital Timergara from 29-04-2021 to 29-7-2022. Through a descriptive, cross-sectional study design, 216 mothers of children aged 0-5 years, accompanying their children to the pediatric OPD, were included in the study through a consecutive manner and interviewed using a structured questionnaire.

Results: In this study 216 mothers were included. Mean age of the mothers was 30.97 years. Most mothers had average level of knowledge (48.6%) while 30.6% had poor level of knowledge regarding supplementary polio immunization. Most common religion was Islam (96.3%). Illiteracy was the most common educational status (32.9%) followed by secondary (22.7%) and primary (19.4%) education. Majority (58.8%) of mothers were housewives. Pearson Chi Square test for Level of Knowledge wise stratification of Educational Status of the mother gave a value of $\chi^2=45.793$ and was significant at $p<0.05$. Level of Knowledge wise stratification of Religion of the mother had 9 cells (75%) with expected count less than 5. Level of Knowledge wise stratification of Occupational status of the mother had $\chi^2=10.148$ with $p=0.11$ (i.e. >0.05). Finally, the Level of Knowledge wise stratification of Age groups of mothers had $\chi^2=2.87$ with $p=0.94$ (i.e. >0.05).

Conclusion: Level of Knowledge of mothers regarding supplementary polio immunization is significantly associated with maternal educational status

Keywords: Polio, supplementary polio immunization, polio drops

INTRODUCTION

Routine polio immunization, as part of Expanded Program of Immunization (EPI), is done via the oral polio vaccination (OPV) administered at birth and then at 6, 10 and 14 weeks of life.¹ This routine immunization program had remarkable uninterrupted success over the last 30-year period. But it could not eradicate the diseases targeted by it, including polio. So since 1998, in order to eradicate polio, persistent efforts led by the Global Polio Eradication Initiative (GPEI) to administer Supplementary polio immunization through mass campaigns, known as National Immunization Days (NIDs), have been highly successful eradicating the disease from most countries of the world. However, complete global eradication is yet to be achieved.² More worryingly for us in Pakistan, as per WHO/UNICEF data, polio has shown a recent resurgence of reported cases in Pakistan. Polio reported cases surged from 28 (2005) to 198 (2011).³ Furthermore, the immunization coverage rates for polio vaccination in Pakistan dropped from 83% (2006) to 75% (2012).⁴ Due in large part to the GPEI, polio no longer exists in most of the world today. Only three countries have endemic polio transmission – Nigeria, Pakistan and Afghanistan. India was removed from the W.H.O list of endemic countries in February 2012.² Pakistan's failure in polio control has alarmed the federal government and the civil society of Pakistan over the last few years, sparking feverish activity at multiple levels including personal involvement of the prime minister.^{5, 6, 7, 8} Recent reports suggests that within Pakistan the number of cases of polio has been rising disproportionately higher in the KPK and FATA regions.⁹ This is despite all the attention polio vaccination received in the last couple of years.¹⁰

What could possibly be causing this resurgence? In February 2010, WHO's Global Immunization Meeting held in Geneva identified parental knowledge and attitudes as the most prevalent cause for immunization failure across the world, responsible for about 28% of under-vaccinated and 55% of unvaccinated children.¹¹ Knowledge, attitude and practice (KAP) studies serve as an educational diagnosis of a target group and are an important way to measure changing beliefs and behaviors over the course of time. Combined with understandings from

health communication theory, KAP can be a critical source of transformative insights and valuable baseline data.^{12, 13} An Indian study from Lucknow showed that knowledge about routine polio immunization was prevalent in 0% -20% of the studied mothers depending upon whether the question was about ages or dosages of polio immunization and whether their children were completely/partially immunized.¹⁴ In another massive Indian study specifically designed to measure knowledge regarding supplementary polio immunization via eradication campaign showed that results for knowledge were extremely positive; 72% (benefits of OPV) and 80% (awareness of the campaign).¹⁵ A Pakistani KAP study showed the correct knowledge regarding polio transmission to be 44.5% and vaccination as the method for prevention to be 82.1%.¹⁶ Lastly a third Indian KAP study done in 2011 found the most common reason for positive attitude regarding polio vaccine to be that it "Eradicates poliomyelitis" (82.8%), the most common reason for negative attitude towards polio vaccination to be "Causes harm to children" (57.8%).¹⁷ As mentioned previously, WHO found that problems in parental knowledge regarding childhood vaccination is a critical factor for the resurgence of vaccine preventable diseases. Peshawar has recently been identified by WHO as the world's largest reservoir of polio.¹⁸ So this study is designed to determine the knowledge of local mothers presenting to our pediatric outpatient with their children. The results of this study will help us identify gaps in maternal knowledge regarding supplementary polio immunization. These gaps in knowledge can then be targeted in outpatient encounters between mothers and health care providers (doctors, nurses) via counseling. Since most mothers, sooner or later, during care of their children, come in contact with health care providers on outpatient basis and are receptive to counseling during those encounters, this counseling will help reduce gaps in knowledge, which according to WHO, are a critical factor in resurgence of vaccine preventable diseases.

MATERIALS AND METHODS

This study was conducted in the Pediatric Department, OPD, District General hospital Timergara from 29-04-2021 to 29-07-

2022. Through a descriptive, cross-sectional study design, 216 mothers of children aged 0-5 years, accompanying their children to the pediatric OPD, were included in the study through a consecutive manner and interviewed using a structured questionnaire. Sample size is **216** keeping 72% good knowledge regarding polio vaccination among Indian mothers, 95% confidence interval and 6% margin of error under WHO sample size calculations. All mothers of children aged 0-5 years accompanying their children to pediatric OPD were included. Mothers who refuse to give interview. Mothers who only partially answer the questionnaire. Mothers who are unable to communicate properly due to any reason (e.g. psychiatric illness, deafness)

The study was conducted at the OPD of Pediatric department in Khyber Teaching Hospital. The inclusion and exclusion criteria were strictly followed to control bias and confounding factors. Mothers were briefed about the purpose of the study, the confidentiality issues, and the fact that it will not affect the future medical care if they agree to participate. A written informed consent obtained.

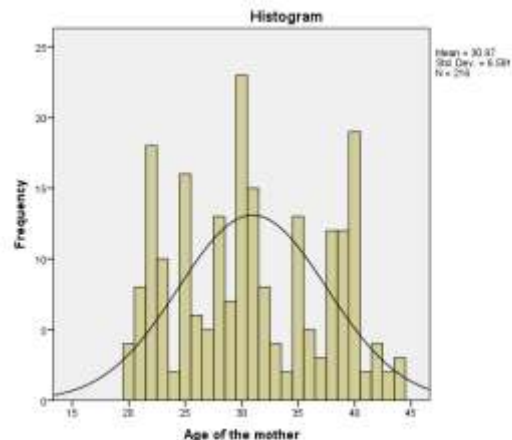
All mothers were interviewed using structured questionnaire (proforma given at the end). The respondents were evaluated for knowledge regarding supplementary polio immunization graded as per operational definition. Permission to use the questionnaire from previous research has already been granted. Data analysis was done using SPSS version 20. Frequencies and percentages were calculated for categorical variables like educational status, occupational status, religion, and knowledge regarding supplemental polio immunization (i.e. good, average, poor). Mean + standard deviation of numerical variables like age of the mother were calculated. Results are given in the form of graphs and tables. Knowledge is stratified among age of the mother, education, occupation, and religion to see the effect modifiers.

RESULTS

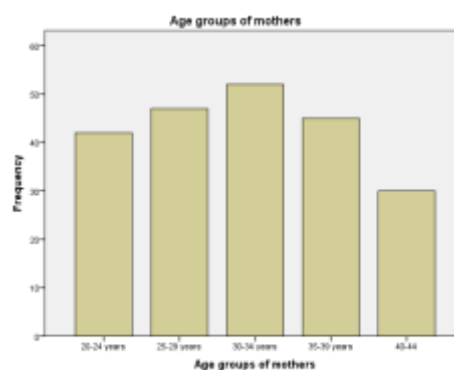
A total of 216 mothers were interviewed in this study. Minimum age of the mother was 20 years and maximum age was 44. The mean age was 30.97 years with a standard deviation of 6.58 years. (Table 1). Most of the mothers 52 (24.1%) were in the age group 30-34 years, followed by 47 (21.8%) mothers in the age group 25-29 years and 45 (20.8%) mothers in the age group 35-39 (Table 2). Although the objective was to determine the level of knowledge of each mother measured as aggregate score of correct answers to the questionnaire, we also calculated frequencies for answers to individual questions (Tables 8-25). One mother out of the 216 interviewed had never heard of polio before (Table 8). Children were identified as the most susceptible group by 188(87%) mothers, adults by 9(4.2%) mothers, while 19(8.8%) mothers didn't know about the age group most susceptible to polio (Table 9). One mother out of 216 mothers had never heard of supplementary polio immunization(SPI). The purpose of SPI was correctly identified as polio eradication by 193(89%) mothers while 23(10.6%) mothers didn't know the purpose of SPI (Table 16). Frequencies and percentages for level of knowledge of mothers regarding supplementary polio immunization is given in Table 7. Knowledge was poor for 66(30.6%) mothers, average for 105(48.6%) mothers, and good for 45(20.8%) mothers. Since every correct answer was marked as 1 and other answers marked as 0, and since we had a total of 18 questions, we also calculated a knowledge score distribution with a mean of 9.36 (out of 18) and standard deviation of 4.045 (Table 3 and Histogram 02).

Table 1: Age Distribution of the Mothers (n=216)

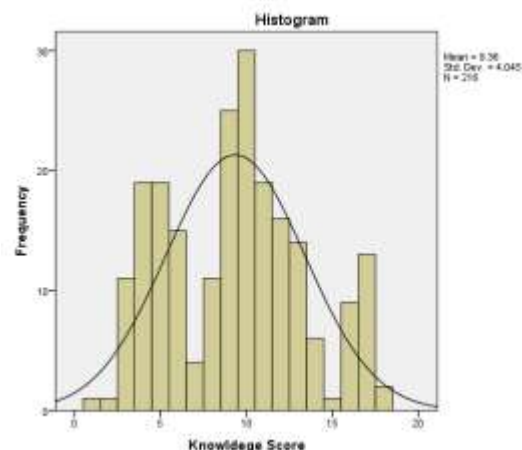
N	216
Mean	30.97
Median	30.00
Mode	30
Std. Deviation	6.581
Minimum	20
Maximum	44



Histogram 1: Age Distribution of the Mothers (n=216)



Bar Chart 1: Age Groups of the Mothers (n=216)



Histogram 2: Knowledge Scores Distribution Among The Mothers (n=216)

Out of the total of 216 mothers, the majority, 127(58.8%) mothers, had the occupational status of a housewife (Table 4). An overwhelming majority of mothers, i.e. 208(96.3%) were Muslims (Table 5). About one third of the mothers, 71(32.9%) were illiterate, 49(22.7%) were secondary school education while 42(19.4%) had primary school education (Table 6). Maternal age groups, occupational status, educational status, and religion were all stratified against level of knowledge regarding supplementary polio immunization. Pearson Chi square test performed for each stratification, to look for significance at p<0.05 (Tables 26-29). Level of knowledge wise stratification of Educational status of the

mothers yielded a Pearson Chi-square value of 45.793 and was significant with p value of 0.00. No cells had expected count less than 5 (Table 26). On the other hand, level of knowledge wise stratification of age group had p value of 0.942 (Table 27), while knowledge wise stratification against occupational status had p value of 0.119 (Table 29). Because of the overwhelming majority of mothers being Muslims and very few of other religions, cross tabulation of level of knowledge against religion gave 9(75%) cells with expected counts less than 5 (Table 28).

Table 2: Occupational Status of the Mother (n=216)

Occupational status of the mother	Frequency	Percent
House Wife	127	58.8
Unskilled	33	15.3
Skilled	28	13.0
Not working	28	13.0
Total	216	100.0

Table 3: Religion of the Mothers (n=216)

Religion of the mother	Frequency	Percent
Muslim	208	96.3
Christian	5	2.3
Hindu	2	.9
Sikh	1	.5
Total	216	100.0

Table 4: Educational Status of the Mothers (n=216)

Educational status of the mother	Frequency	Percent
Illiterate	71	32.9
Primary School (1-5 std)	42	19.4
Secondary School (6-10)	49	22.7
Pre University (11-12)	27	12.5
Graduation & above	27	12.5
Total	216	100.0

Table 5: Level of Knowledge of the Mothers (n=216)

Level of Knowledge of mothers	Frequency	Percent
Poor (score<7)	66	30.6
Average (score 7-12)	105	48.6
Good (score 13 or more)	45	20.8
Total	216	100.0

Table 6: Mothers Heard of Polio (n=216)

Have you heard of the disease poliomyelitis?	Frequency	Percent
Yes	215	99.5
No	1	.5
Total	216	100.0

Table 7: Most Susceptible (n=216)

Who are people most susceptible to it?	Frequency	Percent
Children	188	87.0
Adults	9	4.2
Don't know	19	8.8
Total	216	100.0

DISCUSSION

Expanded program of immunization (EPI) started 30 years ago had huge impact globally on a number of vaccine preventable diseases. Since the polio virus, because of its specific biology and habitat is especially suitable for eradication, it was started being targeted since 1988 for eradication. Efforts accelerated in 1998 under the name of the Global Polio Eradication Initiative (GPEI) to administer Supplementary polio immunization through mass campaigns, known as National Immunization Days (NIDs). Persistent efforts across the globe lead to clearance from most parts of the world except a few areas, including South Asia and some parts of Africa.¹⁹

Over the last decade feverish activity for eradication of polio had south Asia (India and Pakistan) as one of its focus areas. India got rid of the scourge around 2012.²⁰ But despite intense

international focus Pakistan still remains sanctuary for the polio virus.

In a WHO meeting in Geneva in 2010, it was shown that parental lack of knowledge is a key factor in immunization failure.¹¹ There have been very few studies in Pakistan studying maternal knowledge regarding polio immunization.²¹

One community based cross-sectional study conducted in Peshawar, in 2010, by Department of Community Medicine, Khyber Medical College is interesting in this regard. It was conducted to study polio immunization coverage as well as to probe for reasons for non-immunization. Randomly selected 548 parents of children four years and below were interviewed via questionnaire. A meager 64.2% children were immunized. The results indicated that the reasons for not vaccinating (n=197) were many but lack of awareness was the highest (23.8% n=47). Others were family problem/mother busy (20.8% n=41), centre too far (21.3% n=42), wrong ideas e.g. sterility (10.2% n=20), fear of reaction from the vaccine (7.6% n=15), child illness (5.6% n=11) and miscellaneous/other causes (10.6% n=21). The results also clearly showed a pattern of low immunization among uneducated and high immunization among educated families (p<0.001). Education levels in this study were illiterate (41.1%), higher education (26.7%), primary education (12.4%), Matric (11.7%), Middle (5.8%), and Madrassa (2.4%). Parents' knowledge about vaccination (as judged by their questionnaire) was: 34.1% having little knowledge, 30.5% enough, 17.2% moderate, 11.7% with no knowledge and 6.6% knew everything. Due to difference in questionnaire from my study, community setting of the study, random sampling, and inclusion of both parents, I cannot directly compare the parental knowledge reported their in to my study. But the association of lower education with lack of awareness is consistent with my results. The study also interviewed 40 EPI staff. The EPI staff was also quoted as reporting lack of awareness among people as the main hurdle in immunization. The study concluded that "The main reasons for non-immunization are lack of awareness, poor economic conditions, family problems/ parents being busy, misconceptions regarding immunization and low literacy rate".²²

A South Indian study conducted in 2011, whose questionnaire I used for my study,¹⁷ also showed low awareness level among those interviewed, but this was despite relatively good educational level. In this study most of those questioned were either Secondary educated (41.9%), or Pre-University educated (14.1%). Only 1% were illiterate. This is in sharp contrast to both my study and the community based study in Peshawar described above. Also the Indian study had 82.8% hindus and 10.6% muslims while my study had 96.3% muslims and 0.9% hindus. Mode of transmission of polio was known only to 10.9% of participants while in my study it was known to 18.5%. The majority of participants (59.7%) of Indian study were housewives. This is very close to my figure of 58.8%. Overall, Performance scores of participants showed that 150(46.9%) were well aware, 125(39.1%) were moderately aware and 45(14.1%) were poorly aware of poliomyelitis and supplementary polio immunization and this was significantly associated with the level of education ($\chi^2 = 13.668$, DF=6, P=0.033).¹⁷ This result is also consistent with the results of my study where level of knowledge regarding supplementary polio immunization when crosstabulated against education level of the mothers, association was significant ($\chi^2=45.793$, DF=8, P=0.00).

So, the only significant association my study seems to have unraveled (i.e. between knowledge of mother about supplementary polio immunization and maternal educational level) is consistent with findings of both the community based Peshawar study and the Indian study. My results did not show a significant association of knowledge regarding SPI with either maternal age, occupation, or religion.

CONCLUSION

Overwhelming majority of mothers has heard something about polio and supplementary polio immunization. But their knowledge

regarding supplementary polio immunization is still much less than ideal. My study found, among the factors studied, educational level to be the only statistically significant association of knowledge regarding supplementary polio immunization.

REFERENCES

1. Provincial EPI Cell, Health Department Khyber Pakhtunkhwa. Expanded Programme on Immunization: Immunization Schedule [Internet]. Khyber-Pukhtunkhwa (PK): Governemnet of Khyber-Pukhtunkhwa; 2017 [cited 2019 Aug 25]. Available from: <http://www.epikp.gov.pk/Shedule.php>
2. UNICEF. Eradicating Polio Introduction [homepage on internet]. [updated 2018 Dec 23; cited 2019 Aug 25]. Available from: <http://www.unicef.org/immunization/polio/index.html>
3. WHO. WHO vaccine-preventable diseases: monitoring system. 2014 global summary. Incidence time series for Pakistan [home page on the internet]. WHO; [updated 2019 Jul 15; cited 2019 Aug 25]. Available from: http://apps.who.int/immunization_monitoring/globalsummary/incidences?c=PAK
4. UNICEF. Immunization Summary A statistical reference containing data through 2017 [homepage on internet]. [cited 2019 Aug 25]. Available from: http://www.childinfo.org/files/immunization_summary_2012_en.pdf
5. PM forms task force to monitor polio campaign [Internet] 2011 Jan 14 [updated 2019 Jan 14; cited 2019 Aug 25]. Available from: <http://dawn.com/2011/01/15/pm-forms-task-force-to-monitor-polio-campaign/>
6. Pakistan announces sweeping changes to polio eradication effort. [Internet] 2019 Nov 29 [updated 2011 Nov 19; cited 2019 Aug 25]. Available from: <http://www.polioeradication.org/tabid/408/tid/179/Default.aspx>
7. PM launches nationwide anti-polio drive [Internet] 2012 Jul 14 [updated 2019 Jul 14; cited 2019 Jul 16]. Available from : <http://www.brecorder.com/top-news/108-pakistan-top-news/67801-pm-launches-nationwide-anti-polio-drive-.html>
8. Shahid Afridi to front Pakistan polio fight [Internet] 2012 Jul 03 [updated 2019 Jul 03; cited 2019 Jul 16]. Available from: <http://dawn.com/2012/07/03/cricket-star-afridi-to-front-pakistan-polio-fight/>
9. More polio cases surface in KP, Fata. [Internet] 2019 Oct 28 [updated 2013 Oct 28; cited 2019 Mar 11]. Available from : <http://www.dawn.com/news/1052413/more-polio-cases-surface-in-kp-fata>
10. Anti-polio drive in KPK, Fata starts today. [Internet] 2012 October 15 [updated 2019 Oct 15; cited 2019 Mar 11]. Available from : <http://www.nation.com.pk/national/15-Oct-2012/anti-polio-drive-in-kpk-fata-starts-today>
11. Rasanathan K, Eggers R. Why do some children remain unvaccinated ? . Global Immunization Meeting ; 2020 February 1-3; Geneva: WHO; 2020 p.17.
12. Okwo-Bele JM. Global Immunization Overview. Global Immunization Meeting ; 2019 February 1-3; Geneva: WHO; 2019 p. 8.
13. Global Polio Eradication Initiative. KAP studies - understanding barriers to immunization [Internet]. Global Polio Eradication Initiative ; [updated 2018; cited 2019 November 2]. Available from: <http://www.polioeradication.org/Research/PolioPipeline/No2Autumn2008/KAPstudies.aspx>
14. Nath B, Singh JV, Awasthi S, Bhushan V, Kumar V, Singh SK. KAP Study on Immunization of Children in a City of North India – A 30 Cluster Survey. Online J Health Allied Scs. 2018;7(1):2
15. UNICEF . India Communication Update [homepage on the Internet]. India: UNICEF; [updated 2019 January; cited 2019 July 28]. Available from: http://www.unicef.org/india/India_Communication_Update_January_2009.pdf
16. UNICEF. Summary of 2007 KAP survey [home page on the internet]. WHO; [updated 2019 July 16; cited 2018 October 5]. Available from: http://www.unicef.org/immunization/index_46109.html
17. Joseph N, Subba SH, Nelliyanil M, Kotian SM, Haridath AC, Kishor N, Attavar S, Poornima P, Rane DV, Chaithali H, Husain J. A study of the knowledge and attitude about pulse polio immunization in semi urban areas of South India. AMJ 2011, 4, 2, 81-86 Doi: <http://dx.doi.org/10.4066/AMJ.2018.532>
18. Peshawar is the world's largest poliovirus reservoir. [Internet] 2014 January 17 [updated 2018 Jan 17; cited 2019 Mar 11]. Available from : <http://tribune.com.pk/story/659940/peshawar-is-the-largest-poliovirus-reservoir-of-the-world-who/>
19. Burrill CP, Westesson O, Schulte MB, Strings VR, Segal M, Andino R. Global RNA structure analysis of poliovirus identifies a conserved RNA structure involved in viral replication and infectivity. J Virol. 2019 Nov;87(21):11670-8.
20. Belov GA, Nair V, Hansen BT, Hoyt FH, Fischer ER, Ehrenfeld E. Complex Dynamic Development of Poliovirus Membranous Replication Complexes. J. Virol. 2019;86(1):302-312.
21. Davis R, Wright PF. Circulating Vaccine Derived Poliovirus and the polio eradication endgame. The Pan African Medical Journal. 2019;12:109.
22. Angez M, Shaukat S, Alam MM, Sharif S, Khurshid A, Zaidi SSZ. Genetic relationships and epidemiological links between wild type 1 poliovirus isolates in Pakistan and Afghanistan. Virology Journal. 2019;9:51.