

Risk Factors Associated With Parental Polio Vaccine Hesitancy In Peshawar, Pakistan



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Abstract: *Background* Vaccinated hesitancy is main contributing factor to low oral polio vaccination coverage in Pakistan. The purpose of this study was to assess the relationship between age and knowledge of parents' polio vaccine hesitancy. *Methods* Cross-sectional study was conducted in Peshawar, from Jun 2019 to January 2020. Fathers of unvaccinated children of ages from 2 months to less than 5 years of age who refuse polio vaccination for any reason were included in the study. A total of 380 questionnaires were filled in from the participants by visiting their houses about demographics, education of the family earner, occupation and income, number of children, reason for refusal and views regarding vaccines were recorded. *Results:* A cohort of 31–40 years found 34.7% dominate in vaccine hesitancy. Further, respondents also show higher literacy 55.5%. Respondents were found higher in adequate knowledge 60% and mistrust 40.7%. *Conclusion:* Lack of knowledge about the polio vaccine and trust in the state were found hindering factors of vaccine coverage.

Keywords: Risk, Vaccine, Hesitancy, Polio, Parents, Peshawar

1. Introduction

Childhood vaccination efforts have played a crucial role in preventing infectious diseases on a global scale (Monguno, 2013). In Pakistan, mass polio vaccination campaigns have been ongoing since 1994, to eradicate polio disease. However, despite these dedicated efforts, the country continues to face challenges in achieving a polio-free state. Over the last seven years, there have been fluctuations in polio cases, with 8 cases reported in 2017, 12 in 2018, 147 in 2019, 84 in 2020, 1 case in 2021, 13 cases in 2022, and 1 case in 2023, respectively (Pakistan Polio Eradication Program, 2023). Several factors contribute to this, including issues related to law and order, fund deficiencies, and most significantly, parents' hesitancy to child vaccination (Anwar et al.,

2021; Ilusanya & Oladosun, 2016).

Despite the proven effectiveness of polio vaccines in combating the poliovirus (Ilusanya & Oladosun, 2016), parental attitudes play a critical role in influencing vaccination rates (Ataullahjan et al., 2021; Lorenz & Khalid, 2012). Various factors contribute to this hesitancy, including misinformation about vaccine side effects and perceived risks associated with vaccinations. Additionally, a lack of knowledge regarding vaccine indications and contraindications leads to a poor vaccine coverage rate. For instance, some parents mistakenly believe that vaccines should not be administered during mild febrile illnesses, resulting in missed vaccination opportunities for their children (Qutaiba B Al-Iela et al., 2014). These misconceptions perpetuate the prevalence

of poliomyelitis in certain areas of Pakistan due to low vaccination rates.

Numerous studies conducted in Pakistan shed light on the awareness, knowledge, and attitudes among parents of children under 5 years. These studies emphasize the significant challenge posed by parental vaccine hesitancy to polio eradication efforts (Abbasi et al., 2023; Habib et al., 2017; Saeed & Hashmi, 2021). For instance, a study in Swabi, Pakistan, involving 828 children, found that 52% of unvaccinated children resulted from parents' hesitancy, misinformation, and lack of knowledge (Shah et al., 2022). The primary sources of false information for parents are often the media and their immediate surroundings (Ittefaq et al., 2021).

Polio vaccine hesitancy among parents in Pakistan arises from various factors. Some studies suggest that misconceptions have a more significant impact than religious influence on vaccine hesitancy (Jamal et al., 2020; Zarak et al., 2022). Additionally, a lack of trust in vaccine administration and concerns about adverse reactions to the polio vaccine contribute to hesitancy (Rashid & Waheed, 2020). Furthermore, parent socio-economic status has been associated with vaccine refusal in the western region of Pakistan (Khattak et al., 2021).

While only a few studies focus on demographic factors associated with parental attitudes toward polio vaccination, a study involving people and polio workers in Peshawar found that some parents believe the polio vaccine could make their children sick (Shafique et al., 2021). Understanding the demographic risk factors associated with parental polio vaccine hesitancy is crucial for designing targeted interventions and strategies to address the challenges posed by polio eradication efforts in Pakistan.

1. Material and methods

Cross-sectional research was conducted in four towns of Peshawar, Pakistan from Jun 2019 to January 2020. A sample size of 380 vaccine-refusing fathers was calculated by applying the Yamane sample size estimation formula (Yamane, 1967) out of 34,507 total population. This data was collected from the Pakistan Polio

Eradication Program Peshawar office in January 2019.

The sample was selected according to inclusion criteria: All respondents with children 0-59 months refuse to vaccinate their children. The male member of the family was selected because of the dominance of the father in decision-making due to culture (Aslam & Kingdon, 2012). The respondent must reside in a geographical area for a year.

A questionnaire was designed with agreed-upon indicators of hesitancy. The tool was pretested in a pilot study of 40 people. Then, ethical approval was taken from the University of Peshawar Advance Research Study Board. Before data collection informed consent was taken from participants.

Using a multi-stage sampling technique. Firstly, stratified sampling was used Peshawar was divided into 4 towns. Secondly, the proportionate allocation was calculated for each town according to its population. Then, participants were selected by simple random sampling.

Data were analysed using SPSS version 22. For the demographic understanding of the respondent, frequency tables were formulated. Then variables were tested by the Chi-square test for independence. Further, $p < 0.05$ were considered a significant association.

2. Result

The majority of respondents' age category was 31-40 years standing at 34.7%. Literate respondent was 55.5% and business was a prominent occupation 38.9%. A joint family system was observed for 66.1% of respondents. Fathers with 3 and 2 children under 5 were 39.2% and 35% respectively. For the second age category, $n=101$ people did not believe in the polio virus's existence and $n=80$ respondents in the third age category did not have adequate knowledge about polio disease. Similarly, vaccines as Western agenda stands highest in the first three age categories and health authorities were a major factor in people convincing in all age categories. Respondents consider this virus as punishment for their sins $n=59$ for the second

age category and pray to God for protection n=40 for the third age group. Further literacy comparison shows that for n=83 literate respondents, vaccines are a Western agenda and educated respondents of n=118 consider vaccines demoralizing our younger generations. While literate individuals of n=85 consider

protection from disease through pray and n=73 consider it is due to their sins. The final comparison of the father's knowledge about vaccination and the number of children shows that n=108 for 3 children under 5 years. Results are shown in Tables 1-4.

Table 1 Demographic variables n=380

Variable	Categories	Frequency	Percentage
Age	20-30	69	18.2
	31-40	132	34.7
	41-50	110	28.9
	51+	69	18.2
Literacy	Literate	211	55.5
	Illiterate	169	44.5
Occupation	Farmer	61	16.1
	Businessman	148	38.9
	Employee	94	24.7
	Other	77	20.3
Family type	Nuclear	80	21.1
	Joint	251	66.1
	Extended	49	12.9
Residential status	Local	176	46.3
	Non-Local	204	53.7
Housing	Own house	232	61.1
	Rent House	148	39.0
Children under 5 years	1	68	17.9
	2	133	35.0
	3	149	39.2
	4+	30	7.9

Table 2 Cross table of Age vs respondent perception variables n=380

Variables	Age					Total	χ^2	df	P
		20-30	31-40	41-50	51+				
Belief in virus existence	Yes	21	31	23	26		56.971	6	0.00
	No	48	101	87	43				
Adequate knowledge	Yes	30	67	30	25		14.545	3	0.02
	No	39	65	80	44				
Refusal Reason	Religious	4	8	13	17		71.575	15	0.000
	Sterilization	13	21	12	12				
	Affect sex	5	9	8	5				
	Disease	4	19	5	8				
	Western Agenda	33	45	68	9				
	Useless	10	30	4	18				
Convinced by Authority	Political	9	13	8	12		72.305	12	0.000
	Community	8	30	13	4				
	Health	22	75	77	40	214			
	Religious	4	5	8	4				
	NGOs	26	9	4	9				
Protection from polio	Medical treatment	8	13	12	8		20.702	9	0.014
	Pray God	31	30	40	23				
	Punishment of sins	14	59	30	17				
	Do not Know	16	30	28	21				

Table 3 Literacy and perceptions comparison

Variables	Literate			Total	χ^2	df	P
		Yes	No				
Reason of refusal	Religious	22	20		12.626	5	0.027
	Sterilization	34	24				
	Change Sex	22	5				
	Diseases	23	13				
	Western agenda	83	72				
	Useless	27	35				
Vaccines demoralizing the younger generation	Yes	118	51		17.265	2	0.000
	No	63	73				

	Do not know	42	33				
	Medical	25	16				
	Pray God	85	39				
Protection from polio	Sins Punishment	73	47		36.488	3	0.00
	Unsure	28	67				

Table 4 Comparison of awareness of parents and No of children

	No of Children					χ^2	df	P
	1	2	3	4 +	Total			
Adequate knowledge								
Yes	34	65	41	12	152	16.870	3	0.001
No	34	68	108	18	228			

3. Discussion

Polio vaccination coverage needs improvement in Pakistan. Issues such as trust in the state and knowledge about vaccines may contribute to polio eradication. This study found very poor knowledge about the polio vaccine in 228 (60%) fathers. Almost 40% of respondents considered the polio vaccine as a Western agenda and conspiracy against them which is found in a similar study that it is Jewish agenda (S. A. Khan et al., 2020).

In our study, all the respondents were male fathers of children under 5 years who refuse polio vaccination for their children. Moreover, 55.5% were literate and 66.1% reside in a joint family system. While 38.5% were businessmen by profession but still refusing vaccine a confirmation of early study found higher socioeconomic status with more hesitancy (Khattak et al., 2021). Although polio vaccines are available free in Pakistan coverage is not satisfactory. As this study reported 100% vaccine refusal due to lack of trust and lower knowledge other studies found similar results (Aliya et al., 2020; Jamal et al., 2020; Zarak et al., 2022). Most parents refuse vaccination because still, the majority of them lack sufficient knowledge about polio vaccination. An early study in Swabi found 52% of parent hesitancy due to a lack of knowledge (Shah et al., 2022)

Many factors are responsible for parents' vaccine refusal including socioeconomic status.

The parent knowledge of vaccination varies with age. In this study, most of the middle age participants lack sufficient knowledge 101 (31-40 years) did not believe in the existence of the virus in line with late adulthood associated with hesitancy (K. Khan et al., 2022). A major segment of 59 (31-40 year) diseases like polio is the punishment of sins from God as was reported early that better education and knowledge are associated positively with vaccination coverage (Abbasi et al., 2023; Matta et al., 2020). This situation is found significantly worse as lack of knowledge is found to be associated with the number of children, 108 ignorant participants have 3 children. Contrary to this, other studies from Peshawar associated refusal with religious influences (Shafique et al., 2021).

Moreover, a lack of trust in the state and vaccine administration is prevalent among study participants. As 83 literature participants consider polio vaccination as a Western country's conspiracy against them. Further, 118 literate participants thought that the polio vaccine is demoralizing their younger generation. This indicates a severe mistrust of polio vaccination as some studies found it early (Abbasi et al., 2023; Habib et al., 2017; Kaleem et al., 2021; Murakami et al., 2014) and in contradiction with studies associate illiteracy with hesitancy (Soofi et al., 2023). Further for convincing and building trust non of the community actors were involved effectively except health authorities which stands 214

(56.3%). While many studies stress holistic efforts of political, religious, health and community actors to eradicate polio effectively (Ahsan et al., 2021).

4. Conclusion

This study highlights the pressing need to enhance polio vaccination coverage in Pakistan by addressing the factors contributing to vaccine hesitancy. Trust in the state and vaccine efficacy, as well as knowledge gaps among parents, emerged as significant barriers. The findings underscore the importance of tailored interventions to educate and engage parents, particularly those in the middle age group, who exhibit lower awareness and misconceptions about vaccines. Moreover, addressing concerns about the Western agenda and involving various community actors beyond health authorities is vital for building trust and improving vaccination rates. A holistic approach is crucial to achieve successful polio eradication efforts and safeguard public health in Pakistan.

Conflict of Interest

The authors declare no conflict of interest and no funds were granted for this study.

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