Original Article

Prevalence of Polio Vaccination Hesitancy and its Contributing Factors in Garah Tajik and Nahaqi, Peshawar

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Abstract

Objective: To estimate the prevalence of Polio vaccine hesitancy and to identify associated factors among parents in the remote areas of Garah Tajik and Nahaqi, District Peshawar.

Methodology: A cross-sectional study was conducted from May to September 2024 at Emergency Satellite Hospital Nahaqi and Category D Hospital, Garah Tajik, using non-probability convenience sampling. A total of 200 parents of children under five participated in the study. Data were gathered through a structured questionnaire adapted from the WHO SAGE Vaccination Hesitancy Tool, capturing demographic information, attitudes toward polio vaccination, and perceived barriers to vaccination. Data were analysed using SPSS version 26.0 for frequencies and associations.

Results: Among the 200 participants, 15 % (30) reported hesitancy toward polio vaccination. Key factors associated with hesitancy included social pressure from local community members (9.5%, n=19), fear of vaccine side effects (8%, n=16), and concerns about the vaccine's effectiveness (5%, n=10). 68.5% (137) of participants were from low-income households and 56.5% (113) of mothers lacked formal education, underscoring socioeconomic challenges as contributors to vaccine hesitancy. Notably, 70.5% (141) of participants cited support from religious leaders as a positive influence on vaccination decisions. There was significant association between education level of fathers and vaccine hesitancy (p = 0.003).

Conclusion: Polio vaccine hesitancy in Garah Tajik and Nahaqi is influenced by a combination of social, cultural, and economic factors. Community support, especially from religious leaders, appears to mitigate hesitancy, highlighting a potential intervention point. Addressing misinformation, improving healthcare access, and engaging local leaders are essential strategies to increase vaccine acceptance and contribute to eradication efforts.

Keywords: Polio, Vaccine hesitancy, Pakistan

Introduction

Poliomyelitis is a communicable viral disease that is one of the major preventable causes of infectious paralysis.[1] It is spread via the fecal-oral route and mainly affects children under the age of five. The development of a vaccine against this deadly disease has been a remarkable feat for the scientists. The Global Polio Eradication Initiative (GPEI) has striven to eradicate polio from the world. Since its launch in 1988 and successful campaign, wild polio virus cases have been reduced by about 99%. The number of cases dropped from 350,000 in 125 endemic countries to only a few in two remaining endemic countries- Pakistan and Afghanistan.[2] In 2025, thirty cases of polio have been reported in Pakistan.[3] The persistence of cases highlights an underlying prevalence of vaccination hesitancy in the country.

Vaccination Hesitancy is defined as "delay in acceptance or refusal of vaccines despite availability of vaccination services".[4] The challenge of overcoming vaccination hesitancy against Polio has been difficult due to financial, logistical and organizational barriers that impede the progress.[5] Various studies conducted worldwide have revealed a diverse array of for hesitance against the polio vaccine. A study conducted in Turkey showed that fear of vaccine side effects was the most common reason for refusal.[6] Studies conducted in northern Nigeria and India showed that polio vaccine refusal risk was linked to households that were clustered within small areas.[7,8] A survey conducted in Ghana revealed that lack of appropriate knowledge regarding polio and its vaccine, cultural influence, lack of proper support from religious and political leaders and indifferent attitude of parents towards vaccination were the major factors contributing towards hesitancy.[9] However, educating parents, particularly women, played a positive role towards accepting the polio vaccine.[9] Studies conducted in the Galkayo District of Somalia showed both healthcare related and individual related reasons for vaccine refusal.[10] Healthcare related reasons included negative attitudes and perceived knowledge of healthcare workers, lack of supplies and infrastructure. Individual related concerns included low trust in vaccines and misinterpretation of religious beliefs.[10] In the case of Afghanistan, factors such as parental refusal, religious concerns and lack of trust in the vaccine purpose have led to hindrance in vaccine administration to children.[11]

Pakistan has faced many challenges against Polio eradication. The refusal rates for polio vaccine have differed based on region and factors: 37.3% refusal rate reported showed no trust in vaccine quality in high-risk areas of Karachi, Sindh,[11] 32.2% of parents rejected the polio vaccine in Mardan District, Khyber Pakhtunkhwa (KPK)[12] and 56.4% of refusals in Quetta, Baluchistan were linked to misconceptions about the vaccine.[13] Some of the reported factors that lead to polio vaccine refusal in Pakistan include religious beliefs,[14] no trust in vaccine quality,[15] fear of adverse effects,[16] fear of outside conspiracies and lower education level among women.[17-18] Additionally, poor management, operational weaknesses, security threats and harsh behavior towards healthcare workers have impacted vaccine administration.[19]

Africa has been declared polio-free in August 2020.[20] It is unfortunate that a wide geographic region could be declared free of polio but Pakistan has yet to accomplish the same feat. The GPEI is working along with local Pakistani authorities to eradicate polio. Previous studies conducted in different regions in Pakistan have explored the reasons for refusal of polio vaccine, however remote locations of Khyber Pakhtunkhwa have not been targeted enough and there is not ample data to base any findings on. This study aims to estimate the prevalence of Polio vaccine hesitancy and identify the associated factors among inhabitants at two remote locations of Peshawar- Nahaqi and Garah Tajik. Also taking in consideration the outbreak of Covid-19, people's perceptions of vaccines has drastically changed. This study can provide latest information regarding the approach of people towards vaccines like polio. By comparing the data from different regions of Pakistan, we can identify any unique context specific factors.

Methodology

This was a cross-sectional study conducted at the Emergency satellite hospital in Nahaqi and Category D hospital in Gara Tajik from May 2024 to September 2024 after obtaining approval from the Ethical Review Committee (ERC). Permission was sought by the medical superintendents of both the hospitals. The sample size for this study was 200 which was determined through the WHO formula for sample size calculation (with a confidence interval of 95% and a margin of error of 5%) and non-probability convenience sampling technique was employed for sampling.

Parents of children under five who visited the paediatric outpatient department were part of the research sample. Parents whose children needed emergency management were excluded from the study.

For data collection, modified WHO SAGE Vaccination Hesitancy Tool[21] (structured questionnaire) was used. The first section of the questionnaire gathered data on demographic profile of the sample. The second section comprised of 11 questions pertaining to the various reasons that contributed to the hesitance or resistance towards the vaccine. The questionnaire was translated to Pushto and Urdu to facilitate the respondents. Face validity of the translated versions were assured by consulting experts in Pushto and Urdu language. Informed verbal consent was taken from all the participants and confidentiality was guaranteed.

For the purpose of this study, vaccination hesitancy

was defined as a delay in acceptance or refusal of vaccines despite the availability of vaccination services. Income levels were categorized as high income (available income of more than PKR 100,000 per month), middle income (PKR 50,000–100,000 per month), and low income (less than PKR 50,000 per month).

The data collected was entered to the SPSS version 26.00 and was analysed for frequencies and means. Chi-square test was used to determine any association between vaccination hesitancy and variables such as financial status and parental education. A p-value of 0.05 or less were considered statistically significant.

Results

The average age of the sample was 27.5+ 9.3 years. Among the 200 participants, 60% (120) were mothers, and 40% (80) were fathers. As shown in table 1, most mothers (56.5%) lacked formal education, while 5.5% (n=11) had attained primary education, 32.5% (n=65) had completed secondary education, and 5.5% (n=11) had pursued higher education. In contrast, the fathers displayed higher levels of formal education, with only 39% (n=78) reporting no formal education, 4.5% (n=9) being educated up to primary level, 42% (n=84) being educated up to secondary level, and 14.5% (n=29) having pursued higher education. Financially, majority of participants (68.5%) belonged to the low-income class.

A total of 15% (30) of participants were reported to be hesitant to vaccinate their children, with 20 parents outright refusing to vaccinate their children against polio. The primary factors that contributed towards this hesitancy, as shown in figure 1, were external influence from locals (n=19), fear of vaccine side effects (n=16), and concerns about the effectiveness of the vaccine (n=10). Also, in some cases a combination of these factors led to hesitancy. Other, less common reasons for hesitancy included negative information from the media, lack of knowledge about the vaccine or its availability, previous negative experiences with vaccination, religious reasons, and misinformation from local sources.

Cultural and ethnic factors also played a role in vaccination uptake, with 8.5% (n=17) of participants reporting challenges specific to certain ethnic or religious groups. Among this subset, 11 parents chose not to vaccinate their children, 4 felt unwelcome at health services and 2 perceived that these services did not cater to their needs. Several logistical barriers to vaccination were identified by participants (Figure 2). Specifically, 8% (n=16) of the sample reported difficulties related to distance, time, and cost in accessing vaccination services. Furthermore, 7.5% of the parents (n=15) cited external life pressures, particularly family pressure (n=8), as potential obstacles to vaccination.

Information about the polio vaccine was obtained from several sources (Figure 3), with polio workers being the most frequently reported source (35.5%, n=71), followed by locals (30%, n=60), family members (18%, n=36), other healthcare workers (11%, n=22), and the media (5%, n=10). Only one participant acknowledged religious scholars as the source of information. A positive finding was the support of local leaders for vaccination, particularly the religious leaders. 70.5% of participants (n=141) reported that religious leaders in their locality were in favour of polio vaccination. 37.5% (n=75) of participants reported receiving negative information about the polio vaccine. However, a substantial portion i.e; 68 participants still chose to vaccinate their children, indicating that negative information does not necessarily result in vaccine refusal.

A significant association was observed between fathers' education level and vaccine hesitancy ($p = 0.003$), suggesting that higher paternal education may be linked to lower reluctance toward polio vaccination. However, no significant associations were found between hesitancy and maternal education ($p = 0.496$) or household financial status ($p = 0.536$).

Discussion

The findings of this study provide important insights into the landscape of polio vaccination hesitancy in Garah Tajik and Nahaqi, reflecting broader patterns

Table 1. Demographic Profile of the sample

Demographic Variable	Subcategory	Frequency (%)
Gender		
	Male	80 (40%)
	Female	120 (60%)
Education Status (Male)		
	No education	78 (39%)
	Primary	9 (4.5%)
	Secondary	84 (42%)
	Higher	29 (14.5%)
Education Status (Female)		
	No education	113 (56.5%)
	Primary	11 (5.5%)
	Secondary	65 (32.5%)
	Higher	11 (5.5%)
Financial Status		
	Low income	137 (68.5%)
	Middle income	63 (31.5%)

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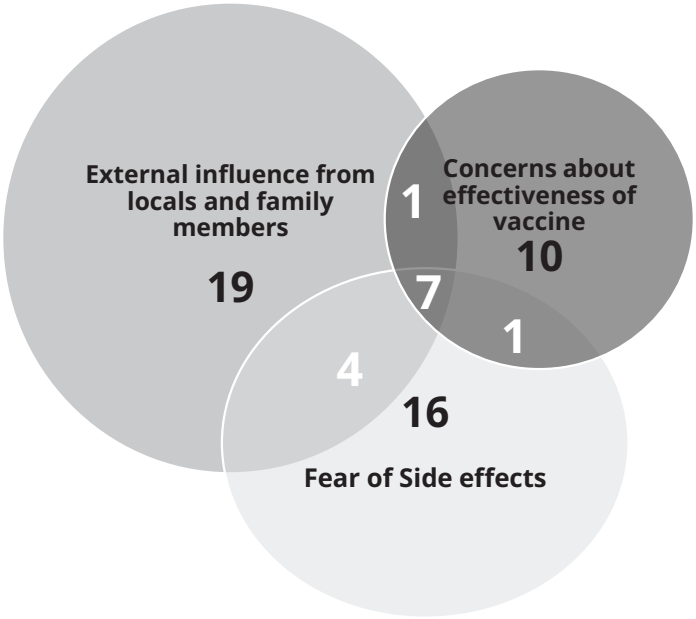

Figure 1: Factors Contributing towards Hesitancy against Polio Vaccine

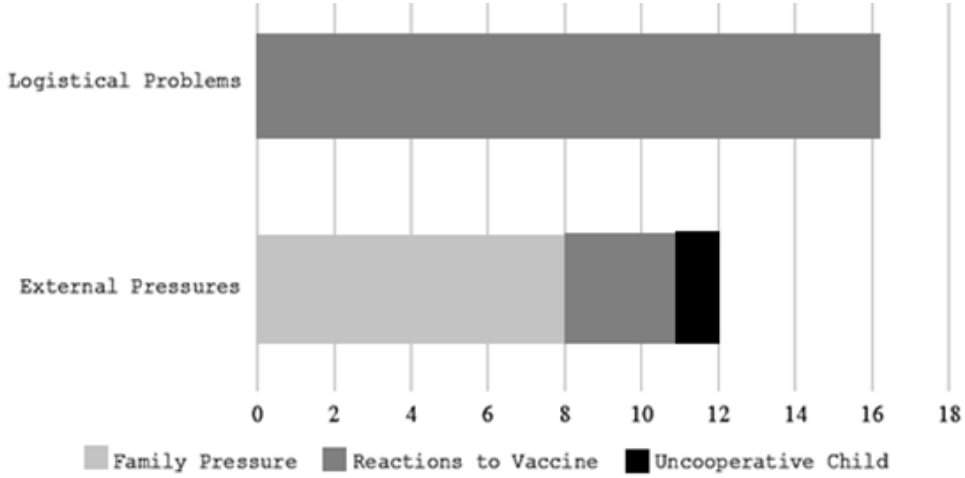

Figure 2: Potential barriers to Polio vaccination

observed in other high-risk areas. Despite substantial advancements in the global effort to eradicate polio, the persistence of vaccine hesitancy highlights the need for a comprehensive approach to public health interventions.

To contextualize the prevalence of polio vaccination hesitancy in Garah Tajik and Nahaqi, the study findings were compared with several studies from high-risk and polio-endemic regions across Pakistan: Abbasi et al.[12] reported vaccine hesitancy among 21% of respondents in Karachi, with external influences such as misinformation playing a major role, similar to this study. However, in Karachi, religious misbeliefs were more significant, contrasting with this study where 70.5% of religious leaders supported vaccination efforts. This could also explain why the refusal rate here (15%) was lower compared to Karachi. Zarak et al.[14] found a higher vaccine refusal rate of 28% in Quetta, largely due to low socioeconomic status and lack of maternal education, similar to study findings. However, the engagement of healthcare workers and religious leaders in Garah Tajik and Nahaqi appears to have mitigated hesitancy to a greater extent. Another study conducted in Northern Pakistan reported a vaccine hesitancy rate of 17% with community-based misinformation and concerns about vaccine side effects being significant contributors.[16] Similar concerns were noted in this study, although the higher education levels among fathers (14.5% with higher education) may have contributed to slightly low-

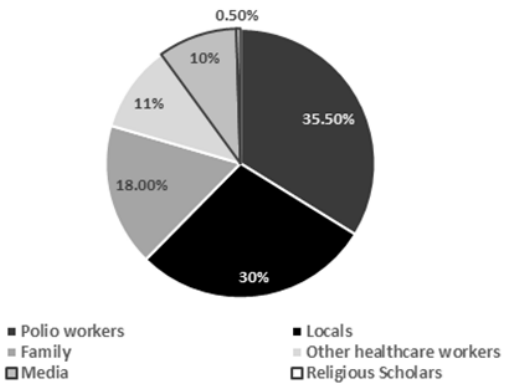

Figure 3: Sources of Information about Polio Vaccine

er refusal rate. Rahim et al.[15] documented a 25% refusal rate in the former Federally Administered Tribal Areas (FATA), driven by distrust in healthcare providers and government initiatives. While 8.5% of participants reported feeling unwelcome at health services, this level of mistrust was less pronounced here than in FATA, potentially due to more positive engagement with health care workers in Garah Tajik and Nahaqi.

One of the most striking observations from the data is the role of external influences, particularly local community leaders and misinformation. This mirrors findings in other regions of Pakistan, where negative information, whether spread through word of mouth or media, continues to be a major factor in vaccine hesitancy.[22] In this study, 75 of participants reported receiving negative information about the polio vaccine. However, a positive takeaway is that 68 out of those individuals still chose to vaccinate their children, indicating that misinformation, while potentially harmful, can be overcome through targeted interventions and education. This aligns with a study conducted by Murakami et al.,[16] who found that even in areas with widespread misinformation, strategic public health messaging could counter hesitancy. Moreover, the involvement of trusted figures, such as religious leaders, proved to be an effective strategy. With 70.5% of respondents reporting that religious leaders supported vaccination efforts, this finding is consistent with the notion that community leaders can play a pivotal role in combating vaccine refusal. Religious endorsement has been crucial in rural and conservative regions, where their support helps get rid of myths, as noted in the systematic review by Ezezika et al.[23] on polio eradication challenges in similar settings.

This study also highlights the significant impact of socioeconomic status and education on attitudes towards vaccination, a finding validated by similar research in other polio-endemic regions.[24] The data showed that 68.5% of participants were from low-income backgrounds, and many mothers lacked formal education. This socioeconomic gap parallels findings from previous study in Quetta, Pakistan, where lower income and education levels were found to directly correlate with higher rates of vaccine refusal.[14] Addressing these barriers through targeted outreach, especially to women, is essential, as mothers are often the primary caregivers responsible for healthcare decisions. The need for focused educational efforts for mothers has been similarly emphasized in research from Cameroon, where maternal education levels were strongly associated with vaccine uptake.[25]

Barriers related to access to healthcare facilities, including distance, time, and associated costs, emerged as significant hurdles for some families. This was also observed in other regions of Pakistan and in Nigeria, where logistical difficulties frequently obstruct vaccination. The study found that 8% of participants faced problems accessing clinics, the finding suggests that improving access to healthcare facilities, perhaps through mobile vaccination units or community-based clinics, could enhance vaccine coverage in underserved areas.[7,17]

Cultural and group dynamics also played a critical role in vaccine acceptance. As 8.5% of participants reported challenges related to ethnic or religious affiliations, with some families feeling unwelcome at health services. This is consistent with findings from studies conducted in northern Nigeria and India, where minority groups often face social exclusion or mistrust in healthcare providers. Overcoming these challenges requires culturally sensitive interventions that engage with these communities in a more inclusive and respectful manner.[26,27]

Conclusion

The research conducted in Garah Tajik and Nahaqi underlines several factors that remain an influence in parents vaccinating their children. Even though global hesitancy towards vaccinations as a whole has trended down, in Pakistan it still remains a problem. Some of the roadblocks presented are logistical challenges, the feeling of exclusion upon visiting health care facilities and for a majority having low income or inadequate educational backgrounds. However, some positive points noted were the endorsement of vaccinations by trusted religious figures which may continue to prove fruitful in future vaccination programs in the region. Educational interventions targeting mothers in particular and strengthening the role of health care workers are likely to help achieve complete community vaccination coverage.

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Authors' Contribution Statement

FAS contributed to the conception, design, acquisition, analysis, interpretation of data, and drafting of the manuscript. KNA contributed to the conception, design, acquisition, analysis, drafting of the manuscript, critical review of the manuscript, and final approval of the version to be published. SA contributed to the acquisition, analysis, interpretation of data, and drafting of the manuscript. ZA contributed to the acquisition, analysis, interpretation of data, and drafting of the manuscript. SZ contributed to the acquisition, analysis, interpretation of data, and drafting of the manuscript. SM contributed to the acquisition, analysis, interpretation of data, and drafting of the manuscript. AN, IF, and TK contributed to the analysis, interpretation of data, and drafting of the manuscript. All authors are accountable for their work and ensure the accuracy and integrity of the study.

Conflict of Interest

Authors declared no conflict of interest

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None

Data Sharing Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.