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POTENTIAL BARRIERS AND FACILITATORS OF POLIO VACCINATION AMONG PARENTS AT A TERTIARY CARE HOSPITAL OF RAWALPINDI. A CROSS-SECTIONAL STUDY

Original Research

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ABSTRACT

Background: Poliomyelitis continues to be a critical public health challenge in Pakistan, despite decades of global eradication efforts. In addition to systemic gaps, the prevalence of cultural misconceptions, religious skepticism, and pandemic-related disruptions have hindered vaccine acceptance. The COVID-19 pandemic further interrupted immunization campaigns, leaving millions of children unvaccinated and contributing to a resurgence of cases. Understanding the determinants that influence parental decision-making is crucial to eliminating polio transmission in endemic regions such as Rawalpindi.

Objective: To identify the key barriers and facilitators affecting parental decisions regarding polio vaccination in a tertiary care setting in Rawalpindi, Pakistan.

Methods: This descriptive cross-sectional study was conducted from April to August 2024 at the Pediatric Department of Fauji Foundation Hospital, Rawalpindi. Parents of children aged 0–5 years visiting the outpatient department were recruited using convenience sampling. From a total of 120 eligible parents, 92 consented to participate, and 87 were included in the final analysis. Data were collected using a structured questionnaire assessing demographics, vaccination status, beliefs, and barriers. Descriptive statistics and chi-square tests were used for data analysis with SPSS version 27.

Results: Among the 87 respondents, 54% were male and 46% female, with 48.3% aged 30–39 years. A total of 85.1% reported that their child had received the polio vaccine. Key facilitators included healthcare provider recommendations (92%), school admission requirements (93.1%), and proximity to vaccination centers (89.7%). Significant barriers included needle fear in children (66.7%), concerns about multiple doses (64.4%), and distant vaccination sites (39.1%). A statistically significant association was observed between education level and the belief in the need for more public awareness ($\chi^2 = 11.755$, $p = 0.019$).

Conclusion: This study highlights the multifactorial nature of polio vaccine acceptance among parents in Rawalpindi. Education plays a pivotal role in shaping perceptions of vaccination campaigns. To achieve eradication goals, public health initiatives must prioritize tailored awareness strategies, accessibility, and culturally sensitive interventions.

Keywords: Awareness, Barriers, Parents, Poliomyelitis, Rawalpindi, Vaccination Uptake, Vaccine Hesitancy.

INTRODUCTION

Poliomyelitis remains a pressing global health concern despite decades of concerted efforts toward its eradication. While significant strides have been made in reducing the incidence of the disease worldwide, poliovirus transmission continues to persist in a few endemic regions, particularly Afghanistan, Pakistan, and select African countries (1). The cornerstone of polio control lies in widespread immunization; however, achieving high vaccination coverage has been hampered by pervasive vaccine hesitancy fueled by misinformation, distrust, and sociocultural barriers (2,3). In Pakistan, where polio remains endemic, overcoming these challenges has proven especially complex. Deep-rooted myths, religious misconceptions, and societal resistance to vaccination programs have obstructed eradication efforts, prompting global health agencies to classify vaccine hesitancy as a major threat to public health security (4). Understanding the sociopsychological and structural determinants that influence parental decisions regarding polio vaccination is critical to guiding effective interventions. Several studies underscore the necessity of tailored public health messaging that resonates with the specific concerns and beliefs of target populations (5). Pakistan, with a population exceeding 241 million, is home to one of the world's largest Muslim communities and presents unique public health challenges owing to its demographic diversity and complex sociopolitical dynamics (6). Although a period of progress was seen between 2017 and 2018, a significant setback occurred in April 2019 when a misinformation-driven mob incident in Peshawar triggered widespread panic and halted vaccination drives (7,8). This event reversed many gains and contributed to a resurgence of polio cases in the country (9).

Televised health campaigns have so far failed to dismantle the patriarchal barriers that marginalize maternal voices in healthcare decisions, despite the fact that mothers typically serve as primary caregivers (10). Further compounding the issue was the emergence of the COVID-19 pandemic, during which approximately 40 million children in Pakistan missed polio vaccinations due to suspended immunization activities (11). The lack of effective counseling by polio staff in some regions, as reported in studies from Sindh, has also contributed to public mistrust (12). Tragically, negative perceptions have escalated to violence, with health workers becoming targets of fatal attacks in various parts of the country (13). In Pakistan's fourth-most populous city, Rawalpindi, where limited research has been conducted on this topic, there remains a critical knowledge gap regarding the drivers of vaccine rejection (14). Addressing this gap is essential for formulating communication strategies that are not only culturally sensitive but also effective in influencing health behavior. The current study will be conducted at Fauji Foundation Hospital in Rawalpindi, a tertiary care facility known for its pediatric services and dedicated polio vaccination center. This research seeks to identify and analyze the multifaceted factors contributing to parental reluctance toward polio vaccination within a clinical setting. By examining elements such as exposure to misinformation, cultural beliefs, educational attainment, and socioeconomic background—as well as the role of healthcare professionals and media influences—this study aims to uncover actionable insights. Ultimately, the objective is to inform policy and communication strategies that can foster vaccine acceptance and reinforce immunization programs in Pakistan's urban healthcare systems.

METHODS

This descriptive cross-sectional study was conducted over a five-month period, from April 2024 to August 2024, at the Pediatric Department of Fauji Foundation Hospital, Rawalpindi, Pakistan. Ethical clearance for the study was obtained from the Ethical Review Committee of Fauji Foundation Hospital and the Pediatrics Department, and informed consent was obtained from all participating individuals prior to data collection, ensuring adherence to ethical research practices. Participants included parents of children aged 0 to 5 years who visited the pediatric outpatient department during the study period. The inclusion criteria were parents or primary caregivers aged 18 years or older with at least one child in the specified age group. Exclusion criteria involved individuals without children in the specified age range, those under 18 years of age, and individuals with cognitive impairments or mental health conditions that could interfere with their ability to care for a child or provide informed responses (15).

The sample size was calculated to be 92 participants, derived from an estimated population size of 120 using Raosoft's online sample size calculator. The calculation was based on a 95% confidence level, a 5% margin of error, and an assumed 50% prevalence of vaccine hesitancy among parents, which is standard when no prior estimate is available. Convenience sampling was used for participant recruitment, which, while practical for preliminary or exploratory research, can limit generalizability due to potential selection bias.

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Data were collected through a structured, interviewer-administered questionnaire developed after reviewing relevant literature to ensure content validity. The questionnaire encompassed demographic information, socioeconomic status, educational background, and attitudes towards polio vaccination. The tool was piloted on a small subset of respondents to ensure clarity and appropriateness before formal use. Descriptive statistical analysis was conducted using the Statistical Package for Social Sciences (SPSS) version 27. Categorical variables such as gender, education level, ethnicity, and parental attitudes were expressed in terms of frequencies and percentages. The Chi-square test was applied to examine associations between categorical variables at a 95% confidence interval. Statistical significance was set at a p-value less than 0.05.

RESULTS

A total of 87 participants were included in the study, with a slightly higher proportion of males (54%) compared to females (46%). The largest age group among respondents was 30–39 years, accounting for 48.3% of the sample, followed by those aged 40–59 years (33.3%). The predominant ethnic group represented was Punjabi (70.1%). Educational status varied, with 33.3% having completed secondary school, 32.2% attaining college or university education, 16.1% with postgraduate qualifications, and smaller proportions with no formal education (12.6%) or primary schooling (5.7%). Income levels were distributed across categories, with 34.5% reporting no income, 21.8% earning below PKR 50,000, and 19.5% earning between PKR 70,000–90,000 monthly. Nearly half of the participants belonged to nuclear families (50.6%), while the remainder lived in joint family systems (49.4%). Regarding their children's health status, 83.9% reported no chronic illness. A substantial majority (85.1%) indicated that their child had received the polio vaccine. Moreover, 88.5% believed polio vaccination to be the best protection against the virus, and an equal proportion advocated for more public awareness campaigns. Despite being a Muslim-majority population, only 20.7% considered the vaccine to be non-halal, while 79.3% affirmed that vaccination aligns with Islamic teachings. Furthermore, 88.5% dismissed the misconception that vaccines cause infertility.

Key barriers to vaccination included needle phobia in children, cited by 66.7% of parents, and perceived distance to vaccination centers, reported by 39.1% of respondents. Despite these concerns, 86.2% believed that vaccines prevent polio, and 75.9% accepted that even healthy children should be vaccinated. Approximately 64.4% agreed to repeat vaccinations if necessary, and 85.1% rejected the belief that the vaccine could cause infections. Crucial facilitators for vaccine acceptance were identified. Medical advice played a pivotal role, with 92.0% likely to follow their doctor's recommendation. School admission requirements were influential for 93.1% of parents. Government mandates were accepted by 87.4%, and 93.1% wanted more research on vaccine safety to support their decision. Community endorsement influenced 73.6%, while 65.5% stated that incentives would encourage vaccination. Proximity to healthcare services was important to 89.7% of participants, and 92.0% would be inclined to vaccinate if trusted healthcare workers visited their homes. Additionally, 90.8% of respondents valued spousal approval in the decision-making process.

Table 1: Demographic Characteristics &General Beliefs of Study Participants (N=87)

Variable	Frequency	Percentage (%)
Age		
18-29	13	14.9
30-39	42	48.3
40-59	29	33.3
≥60	3	3.4
Gender		
Male	47	54
Female	40	46
Education Level		
No formal education	11	12.6

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Variable	Frequency	Percentage (%)
Primary School	5	5.7
Secondary School	29	33.3
College/University	28	32.2
Postgraduate	14	16.1
Income Level (Rupees)		
No Income	30	34.5
<50,000	19	21.8
50,000-70,000	12	13.8
70,000-90,000	17	19.5
>90,000	9	10.3
Family Type		
Nuclear	44	50.6
Joint	43	49.4
Child Has Chronic Disease		
Yes	14	16.1
No	73	83.9
Child Received Polio Vaccine		
Yes	74	85.1
No	13	14.9
Polio Vaccine Is Best Protection		
Yes	77	88.5
No	10	11.5
More Public Awareness		
Yes	77	88.5
No	10	11.5
Vaccine Is Not Halal		
Yes	18	20.7
No	69	79.3
Vaccine Causes Infertility		
Yes	10	11.5
No	**77**	**88.5**

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Table 2: Barriers & Facilitators Associated with Polio Vaccination

Variable	Frequency	Percentage (%)
Vaccine Prevents Polio		
Yes	75	86.2
No	12	13.8
Healthy Child May Require Vaccine		
Yes	66	75.9
No	21	24.1
Child Dislikes Needles		
Yes	58	66.7
No	29	33.3
Multiple Vaccinations		
Yes	56	64.4
No	31	35.6
Vaccination Center is Far		
Yes	34	39.1
No	52	59.8
Missing	1	1.1
Vaccine Causes Infection		
Yes	13	14.9
No	74	85.1
Doctor Recommends		
Yes	80	92
No	7	8
School Admission		
Yes	81	93.1
No	6	6.9
Government Mandate		
Yes	76	87.4
No	11	12.6
Studies Showed Safety		
Yes	81	93.1
No	6	6.9
Community Vaccination		
Yes	64	73.6
No	23	26.4
Incentives		
Yes	57	65.5
No	30	34.5
Closer Centers		

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Variable	Frequency	Percentage (%)
Yes	78	89.7
No	9	10.3
Trusted Workers Visited		
Yes	80	92
No	7	8
Spouse Approval		
Yes	79	90.8
No	**8**	**9.2**

Table 3: Education Level vs Belief About Vaccine Being Halal

Education Level	Vaccine Halal (Yes)	Vaccine Halal (No)
No formal education	6	5
Primary school	3	2
Secondary School	25	4
College/University	24	4
Postgraduate	11	3

Table 4: Income Level vs Belief About Vaccine Being Halal

Income Level (PKR)	Vaccine Halal (Yes)	Vaccine Halal (No)
No income	20	10
<50,000	15	4
50,000–70,000	11	1
70,000–90,000	14	3
>90,000	9	0

Table 5: Barriers and Facilitators to Polio Vaccination

Variable	Percentage (%)
Vaccine Prevents Polio	86.2
Healthy Child Needs Vaccine	75.9
Child Dislikes Needles	66.7
Multiple Vaccinations Acceptable	64.4
Center is Far	39.1
Vaccine Causes Infection	14.9
Doctor Recommends	92.0
School Requirement	93.1
Government Mandate	87.4
Studies Show Safety	93.1
Community Influence	73.6
Incentives Effective	65.5
Close Centers	89.7
Trusted Workers Visit	92.0
Spouse Approval	90.8

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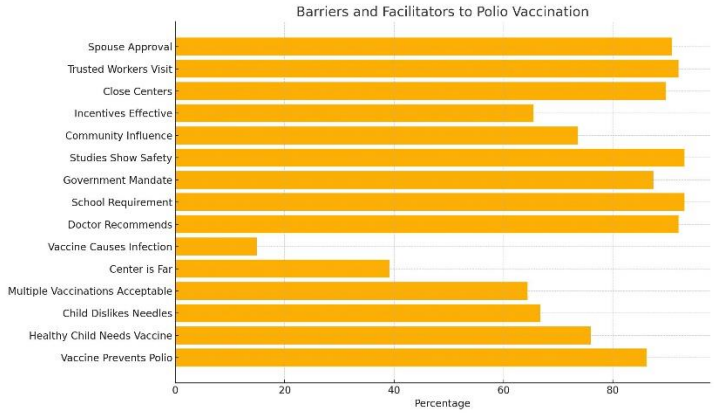

Figure 1 Barriers and Facilitators to Polio Vaccination

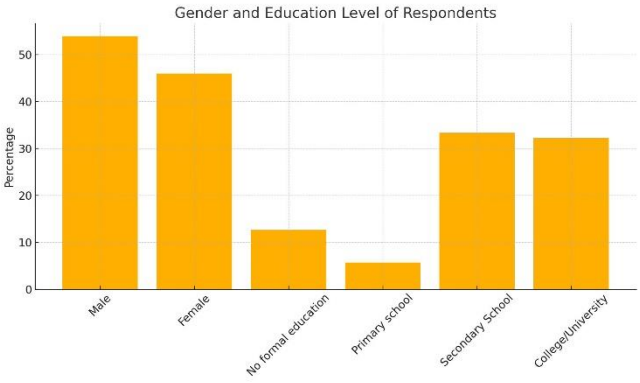

Figure 2 Gender and Education Level of Respondents

DISCUSSION

The descriptive cross-sectional study conducted in Rawalpindi, Pakistan, offers critical insights into the complex interplay of social, cultural, and systemic factors influencing parental decisions regarding polio vaccination. The primary aim was to derive actionable conclusions to strengthen public health communication strategies and support Pakistan's ongoing polio eradication efforts. Findings from the study affirm that while general awareness and positive attitudes toward vaccination prevail, entrenched barriers and sociocultural dynamics continue to impede universal vaccine uptake. Demographically, the participant pool was reflective of the local population, with the majority aged between 30–39 years and predominantly of Punjabi ethnicity. A notable proportion of respondents had attained secondary or higher education, indicating a population with a moderate to high potential for health literacy. This trend may have contributed to the encouraging statistic that 88.5% of participants acknowledged the polio vaccine as the best protection against the virus. Similarly, the widespread demand for increased public awareness (94.3%) supports the notion that communities are open to engaging with educational interventions, provided these are appropriately targeted and accessible (16,17).

Despite high levels of acceptance, key psychological and logistical barriers remain prevalent. Needle phobia was reported by 66.7% of respondents, aligning with other studies where needle fear emerged as a common reason for immunization hesitancy in both children and adults (18). Misconceptions about the risks of multiple vaccinations were also significant, with 64.4% expressing concern. This mirrors findings from earlier studies that identified misinformation about vaccine safety and necessity as major deterrents to compliance (19). These cognitive barriers necessitate robust behavior change communication strategies that address fears through empathy, visual education, and peer modelling. Furthermore, 39.1% of participants reported that distance from vaccination centers posed a challenge, suggesting that logistical constraints continue to affect access, particularly in peri-urban or underserved areas. Facilitators of vaccination uptake were also clearly identified. Medical endorsement was the most influential factor, with 92.0% of participants more likely to vaccinate their children upon a healthcare provider's recommendation. Previous literature supports this finding, showing a strong correlation between provider recommendation and vaccine compliance across various populations and vaccine types (20). Requirements for school admission influenced 93.1% of respondents, reinforcing the effectiveness of institutional mandates in driving vaccine coverage. Similar strategies have proven successful in school-based HPV vaccination programs (21). Community and familial influence also emerged as powerful motivators, with a significant number of participants citing trusted workers, neighbors, and spousal support as determinants of their decision-making process.

The chi-square analyses further substantiated the role of education in shaping vaccine attitudes. A statistically significant association was observed between education level and belief in the necessity of public awareness campaigns ($p = 0.019$), reaffirming the positive influence of educational attainment on public health engagement. However, no significant associations were found between gender or age and beliefs about vaccine efficacy or halal status. This contrasts with broader global evidence where gender norms and religious beliefs have frequently emerged as barriers in low- and middle-income countries (22,23). Although 79.3% believed the vaccine to be halal, the remaining segment highlights the residual presence of religious skepticism, necessitating collaboration with faith leaders and

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culturally embedded messaging. The strength of this study lies in its comprehensive approach to evaluating both barriers and facilitators within a clinical setting. It captures a nuanced understanding of parental perceptions, drawing correlations with sociodemographic variables and presenting a clear roadmap for targeted intervention. However, limitations must be acknowledged. Conducting the study within a hospital inherently selects for participants already engaged with the healthcare system, potentially underestimating the hesitancy present in the broader community. The small sample size and single-center design restrict generalizability, and the cross-sectional nature precludes causal inference. Furthermore, the study relied on self-reported data, which can be subject to recall or social desirability biases.

Future research should adopt a multicenter approach encompassing both urban and rural regions across multiple provinces, ideally incorporating longitudinal elements to observe behavioral shifts over time. Integration of qualitative methods could also uncover deeper contextual insights into cultural narratives and interpersonal dynamics influencing vaccine decision-making. Additionally, digital literacy and the role of media—both conventional and social—should be explored further as vectors for both information and misinformation. In summary, this study underscores the multifaceted nature of polio vaccine acceptance and hesitancy in Pakistan. By addressing identified psychological, educational, and structural barriers, and reinforcing existing facilitators through culturally tailored and evidence-based strategies, public health stakeholders can enhance vaccine coverage. Such a multifactorial approach is essential not only for eradicating polio but also for strengthening the overall immunization infrastructure and health resilience of the population.

CONCLUSION

This study concludes that educational attainment and public awareness play a pivotal role in shaping parental attitudes toward polio vaccination. When parents are better informed about the risks of polio and the benefits of immunization, they are more likely to support and advocate for vaccination. To achieve meaningful progress in eradicating polio in Pakistan, it is essential to prioritize health education in marginalized communities and implement culturally sensitive awareness campaigns. Enhancing accessibility through strategically located vaccination centers can further empower parents, especially in working-class populations, to participate actively in immunization efforts, ultimately strengthening community-wide protection against polio.

AUTHOR CONTRIBUTION

Author	Contribution
Shaista Zulfiqar	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Roshanay Akram	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Jawaria Khan*	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published

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