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Original Research Article

Journey to vaccination using a heuristic approach in Pakistan: a qualitative study

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ABSTRACT

Background: Immunization has significant health benefits particularly for children. Despite the rigorous efforts, immunization coverage in Pakistan has stagnated over the last decade.
Methods: 42 in-depth interviews (IDIs) were conducted in polio high-risk areas of Pakistan involving mothers, fathers, polio workers and vaccinators to identify influencing and non-influencing factors that serve as a cue to action for childhood immunization using the heuristic approach contributing to journey to vaccination.
Results: Participants shared different underlying fears and psychosocial factors concerning vaccines such as painful neonatal experiences, doubts, fear of vaccine-related side effects, distrust, treatment, morbidity and mortality of their children. Parents in favour of vaccinating their children, when afflicted with traumatic experiences, skipped vaccines for the time being. When counselled by the health-care providers they started vaccination again. While refusal parents were very rigid and after witnessing any harrowing vaccine-related experience, their decision not to vaccinate became stronger.
Conclusions: Vaccination uptake is significantly influenced by vaccine-related traumatic life experiences which need to be explored and addressed timely as vaccine-hesitancy can become a more serious threat to global health.

Keywords: Heuristic approach, Journey to vaccination, Routine immunization, Pakistan, Psychosocial factor

INTRODUCTION

Immunization is one of the most cost-effective and successful public health strategy in reducing the health, economic and societal burden of many infectious diseases.[1] It has eliminated some of the most dreaded childhood diseases, such as polio from all over the world except a few countries.[2] From the time a child is born, till 5 years of age, administration of routine immunization and polio vaccine is vital in the prevention of infectious diseases. Through immunization, these infectious diseases and their complications can be prevented.[3] The Global coverage of vaccines dropped from 86% in 2019 to 83% in 2020 where the number of unvaccinated children was 3.4 million.[4] Whereas the inactivated polio vaccine (IPV) coverage in countries that are still using oral polio vaccine (OPV) was 80%. Despite the most comprehensive polio eradication programs, the world still could not eradicate the poliovirus. Pakistan and Afghanistan are the only two countries where the wild polio virus (WPV) persists.

The expanded programme on immunization (EPI) was launched in Pakistan in 1978 with the aims to immunize all children between 0 to 23 months against eleven vaccine-preventable diseases. These services are provided almost exclusively with the public health delivery network having fixed centres and outreach services which are managed by vaccinators with the support of community health workers

(CHW), lady health workers (LHWs), and other hospital staff. Literature shows that immunization coverage in Pakistan has stagnated over the last decade. Based on the Pakistan demographic and health survey (PDHS) findings, the coverage rate increased marginally from 35% in 1990 to 47% in 2006-07 and then 54% in 2012-2013 to 66% in 2017-18.[5-8]

Even though rigorous measures were taken to interrupt rapid transmission of poliovirus in Pakistan, the success was far from reach. Pakistan stands at risk of becoming the last active reservoir of the poliomyelitis virus in the world with reported 12 polio cases in 2018, 147 in 2019 and 84 in 2020.[9] The number of polio cases show an increasing trend along with limited signs of improvement in imposing a great challenge on its eradication. Reasons such as false beliefs, rumours, long travelling distance, missed doses, long queues, denied or delayed services, religious and cultural myths and taboos, lack of accountability at all levels, and health facilities without EPI centres were identified.[10]

Researchers in Pakistan attempted to collect data on knowledge, attitudes, and practices regarding childhood immunization and polio in Pakistan by using traditional methodological approaches some of which are under-reported and poorly understood.[11]

This identified traditional approaches' key limitation that the impact of individuals' circumstances and past experiences on vaccination decisions over time are yet not explored. Thus, researchers lack in noticing correlation of participants' tendency in relation to experiences influenced behaviours. In an effort to address these shortcomings, a new qualitative approach using heuristic approach "journey to vaccination" was adopted to inquire about the routine immunization with special focus to polio vaccination.[12-14]

This study aims to identify the perception, past experiences, influencing and non-influencing factors of childhood immunization.

METHODS

Study design

It was a qualitative study.

Study participants

Interviewed participants were the parents of the vaccinated and non-vaccinated children and health workers. Health workers and vaccinators were included in the study because of their close coordination, active role, liaison, and exposure of the community.

Sampling strategy

In-depth interviews (IDIs) were conducted in polio high-risk areas of Karachi, Pishin and Bajaur Agency (FATA), Pakistan, from February 2020 to October 2020. Participants were selected using convenient purposive sampling technique (Table 1).

Sample size

A total of 42 face-to-face IDIs were conducted including 3 mothers and fathers from each vaccinated and non-vaccinated category from all identified study sites. Moreover, 6 frontline workers including 3 CHW/LHW and 3 vaccinators were also selected from the same study sites. A total of 18 IDIs were done from Karachi, 12 from Pishin and 12 from Bajaur (Table 1).

Heuristic approach

A vast body of research had demonstrated that when people were unable to assess risk using statistical reasoning they often relied on heuristics, an experience-based and intuitive approach which serve as cue to action for decision-making.[15-17] Using heuristic approach, journey to vaccination was adopted to reach a comprehensive understanding of the factors, influencing and non-influencing for the vaccination. Important components of this approach for the present study focused on action or triggers, internal or external stimulus, traumatic or past health related experiences, underlying needs, fears, and some touchpoints which prompted or uphold the people from vaccination their children were explored.

Ethics and confidentiality

The study was approved by the ethical review committees of Aga Khan University. Consent was taken from all the participants. The anonymity of the respondents and confidentiality of the entire data was ensured throughout the study. After collecting data, each respondent was given a unique study identifier (identification number). All the data was kept confidential and no one had access to the data except the core research team and principal investigator.

Data management and analysis

IDIs were conducted in Urdu, Sindhi, and Pashto languages. Audio recordings were transcribed by bilingual speakers and then translated into English. Content analysis were guided by the stated research objectives and additional concepts as they emerge.[18,19] For further thematic analysis software package "NVivo 10" was used. This involved: data coding, segmenting and sorting of the coded data, and generating "grounded" themes that emerged inductively from the analysis.[20] Open coding was done for each section, based upon its underlying meaning i.e. two identical codes, one for vaccinated and other for

non-vaccinated, were produced to code most of the data. To ensure that the analysis was systematically verifiable, we revised the validated interview guides derived from our earlier work. The inductive process of coding entailed further analysing the data for sub-themes, main themes, and variations related to themes.[18,19]

Ethical approval

The study was approved by the ethical review committees of the Aga Khan University. Consent was taken from all the participants.

Table 1: Description of study participants.

Study population	Karachi	Bajaur	Pishin	Total
Categories	**Number of IDIs**			
Mother				
Vaccinated	3	2	2	7
Non-vaccinated	3	2	2	7
Father				
Vaccinated	3	2	2	7
Non-vaccinated	3	2	2	7
Frontline health workers				
CHW/LHW	3	2	2	7
Vaccinator	3	2	2	7
Grand total	18	12	12	42

RESULTS

Perspective on child health

Acuity about health

Several participants perceived that their children are healthy as they take good care of their diet and hygiene. Shared observations were evidences that their children are energetic, eat and sleep well, play actively, growing fast without any physical and mental health issues, only fall sick seasonally and recover speedily.

"Thanks to Allah! My children are healthy. Neither fat nor thin and they don't fall sick frequently" (mother, Karachi).

However, few of the health care workers considered that child health is not good. The reasons provided by them were malnutrition, low immunity, pollution, birth-spacing, overburdened mothers, negligence in childbearing, childrearing, breastfeeding, and preference to top feed. The children are habitual of eating street foods, play in a dirty environment living in small houses with large family size.

"Mothers usually do not have much knowledge. They think that Allah has blessed them with children so he will take care of them" (CHW, Karachi).

Information sources

Reliable sources for child health and vaccine-related information included doctors, LHWs, Polio workers, community mobilizers, vaccinators, traditional healers, mothers-in-laws, family elders, neighbours, and relatives. Very few categorised internet, Facebook and television. However, Radio was also considered as the most reliable source in Bajaur.

"Our elders guide us about the child rearing and suggest home remedies in health-related matters. Their advices are valuable and accepted for us" (mother, Pishin).

Analysis revealed that efforts of community health workers (CHWs) and lady health workers (LHWs) are highly admired as they have been recognized in the community for their abilities of delivering basic care and preventative services for the mother and child health. Similarly, CHWs and LHWs spoke high about their acceptance and appraisal in community, highlighting their rigorous hard work.

"LHWs come to our house regularly they provide information regarding vaccines. Whenever we need their help, we call them, and they come to visit us" (mother, Bajaur).

Knowledge about routine immunization (RI)

Interviewed participants had adequate knowledge of RI and polio related symptoms. However, majority of the participants didn't perceived polio as life threatening disease and failed to link it with the current environmental conditions for a reason that their children are already receiving polio drops. Thus, they are not prone to develop this disease. Some participants were also found confused about whether polio is treatable. On the other hand, polio disease is perceived treatable by few of the respondents.

Positive and negative aspects of vaccination

Regarding RI, positive opinions were shared by the respondents about RI; along with some negative aspects like misconceptions, underlying fears, rumours, side-effects, and concerns.

"When my child received first injection, it caused swelling and fever. I got worried and started crying then my mother-in-law told me that it happens" (mother, Karachi).

Contrary to this, almost all parents of non-vaccinated children were found rigid, reluctant, and unconvinced for vaccinating their children. They believed that Allah is the best protector and vaccine is nothing.

"As Allah is the best protector; he has given us children then he will protect them too. We don't believe anyone other than Allah, these vaccinations are not bigger than Him" (father, Bajaur).

Interestingly, most of the participants were unable to correlate childhood vaccination with child health except few. They only considered good diet, hygiene, and healthy environment.

Journey to vaccination

Participants were asked using a heuristic approach about their traumatic experiences, beside generic reasons. They shared distressing events, morbidity, mortality, vaccine reactions, disability, rumours, underlying fears, and doubts which influenced their thoughts and behaviours for not vaccinating their children for the time being. When they were counselled by health workers and family; considering all the psychosocial factors, they started giving vaccination again by leaving behind these reasons rationally to save their children (Tables 2 and 4).

Journey to non-vaccination

Non-vaccinators were found to be very rigid and after having or witnessing any harrowing vaccine-related experience, their decision of not to vaccinate got stronger as an influence of such incidents (Tables 3 and 4).

Table 2: Harrowing experiences leading towards journey to vaccination.

Attributes	Participants	Former experiences
Perceived threat	**Vaccinated mother** (Karachi)	"An incident occurred with my cousin's daughter, when after vaccination blister was formed, leg got swollen and become shrink and weak. Our family believed that it wouldn't have happened if the vaccination was not given to the child."
Traumatic experiences	(Bajaur)	"My child got hospitalized as she fainted after vaccination and got high grade fever. After treatment, she was stable. This incident frightened and made me doubtful about all vaccines due to which I refused for all vaccinations but when counselled by community people, neighbours and LHWs, I resumed her vaccination again."
	Vaccinated father (Karachi)	"Last year after vaccination, some children complaint about abdominal pain, some fainted and I think one or two children expired, whole hospital was filled with patients in emergency. The trust of people is broken as the team and vaccines belonged to the Government."
	(Karachi)	"I didn't give typhoid vaccine to my daughter as it was costly (4000 PKR). Later, my daughter suffered from typhoid which had high treatment cost. It made me realize that if I would have tolerated the expense of vaccine earlier, it might have prevented her from the illness."
	CHW (Pishin)	"One of my rigid refusal's daughter died during measles outbreak. Later she noticed that the children who received vaccine, stayed healthy and were protected from measles. Witnessing this, she vaccinated her other children."

Table 3: Harrowing experiences leading towards journey to non-vaccination.

Attributes	Participants	Former experiences
Mistrust	**Non-vaccinated mother** (Karachi)	"I don't trust health care providers as their practice is unethical and immoral. I have witnessed a case where the doctor implanted birth control pill without taking consent after delivery, which had made me doubtful, for RI as well."
Traumatic experiences	**Father** (Pishin)	"18 years ago, my three children became disabled after receiving polio drops. Initially, I thought that they are allergic and got reacted but when the same occurred with my nephew, then after this incident I stopped giving vaccination to all my children as it is poison, not at all beneficial for our children."
	Mother (Karachi)	"My 2 children are disabled; one of them since birth as her feet were twisted whereas, the second one was born with calcium deficiency. So, I always refuse to give polio vaccine to my other children, to save them from paralysis because polio related misconceptions and rumors are circulating all over the country ever since that these polio drops cause paralysis."
	(Karachi)	"Our whole family is reluctant and have a rigid perspective about polio drops and vaccination because my mother-in-law's child got sick and died in result of vaccination."
	Father (Karachi)	"I have lost my 2 children, both were hospitalized and mishandled by the overdose of the injections. I have forbidden my wife for all kind of injections and vaccination after this traumatic incident. I also realized that my family elders have never been vaccinated and yet healthy. Only those of my children who received injections, died."

Continued.

Attributes	Participants	Former experiences
Fear	(Karachi)	"Initially, I was not a refusal for vaccination but since my daughter got paralyzed even after receiving polio drops, I became so frightened that I refused vaccination for my other children as I got doubts that this vaccine causes paralysis."

Table 4: Underlying causes serving as cue to actions.

Fears	Queries/concerns	False perception about treatment of polio affected children	Religious beliefs
External conspiracy against Pakhtoon community	Medicine and vaccines are for sick, not for the healthy individuals	If a child is taken to the doctor, he can treat polio effected child with medication and injections as nowadays every kind of treatment is possible	Allah is a creator and he will save our children
Vaccine contain monkey's urine and kidney	Why Government don't focus on the basic needs and emphasize so much on polio vaccine	If Allah wants, he will even heal and recover the polio-affected children	Vaccination is purposeless, we recite Quran and spiritually heal our children
Polio vaccine is made to kill the children of the world	None of the elders have ever been vaccinated and still they are healthy	Polio disease is treatable if it is diagnosed in the initial stage	Allah is the best protector these vaccinations are not bigger than Allah
After receiving vaccination children act like animals and don't obey their elders	Why even after vaccination, the children are still at risk of disease	Possible treatment for polio would be a polio vaccine	.
Vaccine is haram	Vaccines cause death	.	
Vaccines lead to early puberty in the children	Why government and police force to vaccinate, there is a hidden agenda behind it		
It causes infertility	Even though our children live in polluted area and have never been vaccinated but still they are healthy	.	
Expired vaccine are being used		.	
Fears of side effects	.		
Negative media coverage			
Rumors			
Untrained workers			
Improper maintenance of cold chain			

DISCUSSION

This study described the psychosocial factors, heartrending experiences which influenced parents' mindset concerning childhood immunization. Information channels play an important role in the practices of the people mostly acquire through health workers, doctors, elders, and radio specifically in Bajaur. Participants' knowledge about immunization was reasonably accurate. However, majority of them reflected limited knowledge about the treatment of polio disease. Alarmingly, most of the respondents couldn't correlate childhood vaccination with child's health, and only considered good food as the main contributing factor.

Community mobilization has been considered as a cornerstone for vaccine confidence and acceptance; It is strongly supported by the present study where frontline health workers were prominently admired and encouraged for their hard-work and provided services by the participants in favor of immunization as they minimize their concerns, fears and address their queries. Literature showed that the involvement of the frontline health workers had a positive effect on vaccine coverage rate.[21] Evident by the shared comments of health workers that change has been evident in the community mindset. Over

the time, zero dozers graph has drastically declined because of the rigorous efforts of health workers along with stakeholder and community mobilization. Researches showed that development of trusted relationship is the key to influence parental decision-making about vaccines.[22,23]

However, refusal parents had distrust towards anyone except their elders. They showed very little trust for the doctors and consider visiting them only in case of emergency. They have firm belief on Allah and do not allow health workers to visit their houses even refrain their women to talk to them. Immunization has significant health benefits particularly for the children; however, researches exhibited that people in developing countries, do not vaccinate their children.[24,25] Observations during the interview mirrored that only if these parents permit and discuss vaccine-related concerns with frontline workers then definitely, it will minimize to the maximum capacity as unaddressed queries leads to rigid misconceptions which result in refusal. Conversely, participants were found negatively influenced with the experiences of the relatives and friends with traumatic experiences which serve them as cue to action for vaccination refusal.[26]

Although structural barriers and generic reasons are known limiters to the coverage, but psychosocial factors also found affecting vaccination uptake. Perceived susceptibility, vaccine safety and effectiveness concerns were the significant documented vaccine-behavior influencers.[13,27] In Pakistan, geographic proximity, expenses, familiarity with providers are the influencing factors for the use of health services.[28]

Using heuristic approach, parents shared their journey to vaccination or non-vaccination which were heartrending such as painful neonatal experiences, mishandling, doubts, fear of vaccine-related side effects, distrust, treatment, morbidity and mortality of their children which were hard to find in the traditional methods or setups (Tables 2 and 3). Parents in favor of immunization, skipped vaccination doses after experiencing traumatic events. Sharing their thoughts when they realized that it cannot be generalized so by leaving behind these thoughts rationally, counseled by health workers and stakeholders they started giving vaccination again. Vaccine confidence is the most widespread determinant of the acceptance and refusals of the vaccination program.[29] Surprisingly, Health workers comments were more of generic nature, patterns of which were traced throughout the interviews. Study expectations were high from frontline workers because of their close link with the community but regretfully found unaware of parents' painful experiences. There is a need to avail this opportunity to find out real life traumatic events with rapport building, dialogues, and good interpersonal communication for promoting multi-perspective approach rather than having a fixed approach.

Contrary, refusal parents became more rigid when afflicted with distressful event, displayed reluctance toward vaccination and didn't share any positive aspect of the vaccines. These refusals play vital role in changing the mindsets and influence community decision-making directly. Despite of it, vaccination hesitancy remains most prominent factors to determine the course of eradication program.[30,31]

CONCLUSION

To the best of our knowledge, this is the first study of its kind which is done mainly in Pakistan. The dependency of vaccine uptake largely pertains to the psychosocial determinants that affect the decision to vaccinate or not to vaccinate. This study contributes towards context specific conceptual information about vaccine hesitancy. Hence, such cases should be determined and addressed timely.

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