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Abstract

Background: Global polio eradication is a goal yet to be achieved in countries like Pakistan. In recent years, the Polio Eradication Initiative has been making steady progress with good campaign coverage and low numbers of polio cases. However, in 2019 Pakistan reported 146 cases compared to 12 in 2018. A major factor cited for this regression was a surge in vaccine refusals by parents and caretakers.

Aims: To assess the reasons for the refusal of polio vaccination in Quetta Block, Balochistan.

Methods: The study was conducted using data acquired from 2 polio vaccination campaigns over 3 months in 2019. The data were collected in Quetta Block, a highly endemic zone having continuous transmission of the polio virus over several years. The data were analysed using the statistical software, SPSS, version 20. We used descriptive statistics to demonstrate the characteristics of the study population. Categorical variables were measured as frequencies and percent-ages.

Results: Refusal rates were almost 8.6% for the polio campaign of April and 8.1% for June 2019. Misconceptions about vaccines made up 56.4% of reasons for refusals, followed by religion 16%.

Conclusion: Misconceptions about the vaccine are the main driving force behind vaccine refusals in the study setting. Efficient strategies are required to address misconceptions in this red zone of poliovirus transmission in Balochistan.

Keywords: vaccine refusal, polio eradication, Pakistan

Citation: Zarak M; Sana H; Zara Arshad; Saleem A; Shah M; Tareen H; et.al. Understanding the reasons for refusal of polio vaccine by families in Quetta Block, Pakistan. East Mediterr Health J. 2022;28(7):498–505. https://doi.org/10.26719/emhj.22.052
Received: 28/06/21; accepted: 09/05/22

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Introduction

Global eradication of polio is a necessary goal that is yet to be achieved in countries like Pakistan, where one of the most significant surges in number of polio cases was reported in 2019 (1). Currently, Pakistan is the only coun-try, besides Afghanistan, with wild poliovirus 1 (WPV1) serotype-endemic reservoirs (2). In recent years, the Polio Eradication Initiative has been seen to be making steady progress with good campaign coverage and low numbers of cases. However, 2019 proved to be a year of regression with Pakistan reporting 146 cases compared with only 12 in 2018 (3).

A major reason given for this regression was a surge in vaccine refusals by parents and caretakers. In 2012, the World Health Organization (WHO) initiated the SAGE Working Group

on Vaccine Hesitancy to better understand the community's polio vaccine refusal. The working group highlighted factors influencing the decision by parents or caretakers to accept vaccines. It coined the term "vaccine hesitancy", which represents the delay in acceptance or refusal of vaccines despite the availability of vaccination services (4).

Confidence in vaccines is pivotal to maintaining the demand for and use of vaccines. It has been observed that providing vaccines becomes exceptionally challenging when targeting groups that refuse or delay acceptance (5).

Regardless of the challenges, in collaboration with WHO, Pakistan initiated enhanced measures, including community mobilization, community-based immunization and supplementary immunization activities (6). Generous funding from the Bill and Melinda Gates Foundation and other organizations have played a pivotal role in these efforts (6).

In this study, we attempt to explain why Pakistan has been experiencing high caseloads despite achieving record success in vaccine coverage and political and community engagement. Our goal is to understand the reasons for the great surge in vaccine refusals.

Methods

Study design and duration

The study was conducted using data acquired from the 2 polio vaccination campaigns spread over 3 months in 2019.

Setting

This study was conducted in the Quetta Block in Baluchistan province, Pakistan. This particular block is considered a highly endemic zone because of the continuous transmission of poliovirus in the last few years. Quetta Block has 3 major cities: Killa Abdullah, Pishin and Quetta. The cities are further subdivided into tehsils and union councils.

The data for Quetta city were acquired from the municipal offices of Chiltan and Zarghoon towns. Similarly, for Pishin the data were acquired from the offices of the tehsils of Barshore, Karezat and Pishin. For Killa Abdullah the data were acquired from the tehsils of Chaman, Gulistan and Killah Abdullah.

Sample

The study sample was acquired from the database of the Emergency Operation Centre for Polio Eradication Initiative, Balochistan at Quetta. The emergency operation centre is managed through a public–private partnership between the Government of Balochistan and WHO, UNICEF, the Bill and Melinda Gates Foundation, Rotary International and the Centers for Disease Control and Prevention in the United States of America.

Immunization activities in Pakistan include the routine immunization coverage by WHO and supplementary immunization activities, which include the use of bivalent oral polio vaccine (bOPV) (poliovirus types 1 and 3). There are community-based vaccination and permanent transit points, which employ community health workers in the districts that have continuous wild poliovirus reservoirs (7).

As part of the official protocol, data for all children receiving the polio vaccine are collected to measure the success of the campaign and identify challenges experienced during vaccination outreaches. The data are de-identified and shared with the relevant authorities or stakeholders for research, reports and record-keeping.

The total sample we received for our study was 754 945 children aged 0–5 years residing in Quetta Block, covering 2 campaigns: the campaign for April [national immunization days (NID)] and the campaign of June [sub-national immunization days (SNID)] of the Quetta Block. NID is mass immunization campaign conducted across the country to provide polio vaccine to every child

under the age of 5 years. It is done house-to-house, and children are vaccinated and a record maintained. In comparison, SNID is an extra scheduled mass immunization campaign that is conducted only in those areas with high numbers of positive cases to ensure proper immunization.

According to a study conducted in Khyber Pakhtunkhwa, Pakistan, respondents misconceived the vaccine to be capable of causing harm to the immune system (93%), triggering adverse reactions 97.5%, to be against their social and moral values (95%), and to be

not as good as traditional methods for treating children 98.5% (8). In our study sample we aimed to identify the reasons for refusal of the polio vaccine

Data analysis

The data acquired were entered and analysed using SPSS, version 20. We used descriptive statistics to demonstrate the characteristics of the study population. Categorical variables were measured as frequencies and percentages.

Ethical review

Ethical review was carried out by the Institutional Review Board of Bolan Medical College, Quetta. The data were analysed with the permission of the emergency operation centre at Quetta.

Results

The description of the vaccination campaigns is shown in Table 1 , which shows the frequencies of the children vaccinated and refusals during the 2 campaigns. The vaccinated children were categorized into 2, vaccinated at home and vaccinated outside the home. Vaccinated outside the home had 5 sub-categories: vaccination outside the home, at fixed points, at transit points, guest vaccination and vaccination at school.

During the April campaign, a total of 735 460 children were approached for vaccination. These children were divided into 2 age groups for convenience, 0–11 months and 12–59 months. Overall, the total number of children successfully vaccinated was 672 311 (91.4%), 63 149 (8.6%) refused the vaccination. The total number of children vaccinated at home was 584 317 (79.5%), with 108 350 (14.7%) in the 0–11 months age group and 475 967 (64.7%) in the 12–59 months group. The total number of children vaccinated outside the home was 87 994 (12.0%).

During the June campaign, the total number of children approached for vaccination was 754 945. The total number successfully vaccinated was 694 075 (91.9%). The number of refusals was 60 870 (8.1%). The total number of children vaccinated at home was 598 248 (79.2%). The total vaccinated outside the home was 95 737 (12.7%).

The health care workers recorded the reasons for refusals during the campaigns using a standardized tool (tally sheet) designed by WHO. The tally sheet documents details such as

total number of children, children under the age of 6 months and children under 5 years. It has a section to record families that refuse vaccination with a column to specify the reason.

Many reasons were recorded, including: religion, misconception about the vaccine, demand for compensation (groceries, cash, materials for construction, or electricity), campaign fatigue (families tired of repeated vaccination campaigns), unavailability of children because they were not well or sleeping and refusal without reason. The unknown reasons were recorded under “other”.

Our study focused only on the reasons for refusals. The families that refused vaccines were revisited in the catch-up phase of the vaccination campaign. Since our study focused on the reasons for refusal, we documented earlier statistics to better understand the refusals.

The characteristics of vaccine refusal in each campaign (April 2019 and June 2019) for Quetta Block and its associated cities, Quetta city, Pishin city and Killa Abdullah city are shown in Table 2 .
To better understand refusal, we took the average of each refusal reason from both campaigns. Overall, the total number of refusals was 62 009. The distribution of reasons in Quetta Block is shown in
Table 2
. The most prevalent reason was misconception, reported by 34 943 (56.4%) individuals. Other factors were religion 10 110 (16.3%), children sleeping 7734 (12.5%), child was sick 4443 (7.2%), repeated campaigns 3174 (5.1%), demand for compensation 1510 (2.4%) and other reasons 96 (0.2%). There were no direct refusals.

The characterization of refusals for Quetta city was assessed individually. The total number of refusals was 35 816. Misconception remained the most reported factor at 60.2%, followed by refusal due to the children sleeping at the time of the vaccination 17.1%. The third leading cause, at 9.5%, was refusal because the child was sick. The fourth leading cause, at 8.7%, was religion, however, this was the second most reported reason in Quetta Block. Demand for compensation were the least reported, at 1.1% (Figure 1).

The total number of refusals in Pishin city was 6819. The trend in reasons for refusal was the same as in Quetta Block, however, the value for misconception was lower, 45.9% (Figure 2). Religion was the second most reported at 23.0%, which was comparatively higher than Quetta Block and Quetta city.

The total number of refusals reported in Killa Abdullah city was 19 373. The trends were similar to Pishin. Misconception (52.9%) was the most reported reason, and religion (28.0%) the second most commonly reported (Figure 3).

Discussion

Our study showed that misconceptions (distinct from religion) about vaccines contributed the most to vaccine hesitancy or refusal. Although poliovirus has been eliminated in most parts of the world, Pakistan and Afghanistan remain the only 2 countries with endemic poliovirus infections. After successfully keeping the number of polio cases as low as 8 in 2018, the spike to 146 cases in 2019 is concerning for the Polio Eradication Initiative in Pakistan (9). Of these 146 cases, there were 12 cases of wild poliovirus from Baluchistan, where 6 were from Quetta block. Of the total cases in Quetta Block, 5 were reported in Killa Abdullah district (10).

Research has shown multiple reasons for under-vaccination in developing countries, with vaccine hesitancy/refusal being the main one (11,12). Vaccine refusal is complicated and must be understood in its social, cultural, religious and epidemiological contexts (12).

Our study articulates the reasons for the surge in vaccine refusals as a triad of religion, misconception and political factors. Misconception and low vaccine literacy collectively accounted for 59% and 46% respectively of the reasons for refusals in a study conducted in Nigeria (14). Religions reasons contRepeated vaccinations 52% of the total refusals in the same study. In another study conducted in Quetta and Peshawar, a negative perception of vaccines (84.8%) along with religious beliefs (39.06%) were the main reasons for vaccine refusal (15). In northern Nigeria, some prominent religious figures spread the rumour that polio vaccination was a conspiracy of the Western intelligence agencies to spread HIV or cause infertility among Muslim children (16).

Previous analysis of political factors indicates fears due to suspicion of health workers as agents of foreign governments. This fear was linked to the discovery of Osama bin Laden’s residence in Pakistan. It alleged that one of the doctors administering the polio vaccination door-to-door used it as camouflage to access bin Laden’s residence . This rumour has impacted polio vaccination severely (17) and health workers are viewed with suspicion and not allowed to conduct door-to-door campaigns (18). Some areas have been affected more by this incident than others (6). However, the exact impact of these reasons have still not been extensively studied.

Younger maternal age, older child (age group 5 and 6 years), uneducated parents and delaying the vaccination of sick children are other reasons that play a role in vaccine refusal (19). Poor awareness programmes, low literacy rates and vaccine hesitancy (13) are also significantly associated with high rates of refusal.

Reasons for vaccine refusal are distinct for different countries (11) and may vary in different regions of the same country. These reasons should be investigated within each context to understand the dynamics and address them appropriately.

In our study of 2 polio vaccination campaigns, we observed that 9% of 735 460 children in April 2019 and 8% of 754 945 children in June were not vaccinated due to refusal. Overall, the most common reason for refusals in Quetta Block was misconception, religion, children unavailable because they were sleeping or because they were sick. A minor, but new, reason for refusal was the community demanding compensation such as cash, food items or materials related to electricity and construction in exchange for getting their children vaccinated.

In November 2015, the government of Pakistan established the Islamic Advisory Group on Polio Eradication (IAG), enlisting the help of clerics to help raise community awareness about the benefits of polio vaccine and affirm that vaccination does not conflict with the teachings of Islam (20). The IAG held multiple sessions with health care providers to discuss every aspect of polio vaccination and campaigns. The group developed literature on polio vaccination based on the Quran and Hadith and promoted it via electronic and print media to help counter negative religious beliefs about polio vaccine. The efforts of the IAG had a positive impact on the polio campaigns and helped decrease the rate of refusals. However, efforts need to continue as vaccine refusals still comprise a significant reason for the continuing endemicity of vaccine-preventable diseases like polio. The IAG is positioned to strengthen polio vaccination and contribute to the eradication of polio polio from Pakistan (15). It is noteworthy that refusal based on religious beliefs significantly declined when approached in a context-appropriate manner, indicating that sustained efforts by the IAG can result in significant decline of vaccine refusals due to religious beliefs.

This study is significant compared with previous studies because instead of relying on qualitative or descriptive methods of data collection by female health workers, health workers or community members/mothers (21,22), it used targeted data of the exact number of community refusals from the emergency operation centre in Balochistan. This means that each count of refusal is verified, adding to the validity of the data.

Our study is also unique because it was an analysis and comparison of 2 campaigns. Compared with smaller studies in north-west Pakistan analysing responses from 200 female health workers and 210 mothers for their perspective/perception of vaccine and vaccine refusals (21), our study recorded 754 945 individual responses from community data in 2 vaccination campaigns conducted in the Quetta Block in 2019. This data is significant in terms of sample size and validity. No previous study from Pakistan on polio vaccine refusal has reported such a large volume of data or presented community data from Balochistan (21,22). The data presented here are based on 2 different campaigns in the same region over 3 months. This emphasizes the ability of our data to represent refusal status over an extended period. Previous research did not shed light on anything more than a single-period data; 2 studies by Khan et al. presented KAP analysis of residents and religious scholars towards the polio vaccination in Quetta and Peshawar blocks (15,23). Our analysis captured a more diverse array of reasons for vaccine hesitancy/refusal in Balochistan (21,22). Hence our study makes a significant contribution to the scientific literature about polio vaccine refusals in Balochistan, specifically the Quetta Block.

Our study provides detailed evidence behind refusals and identifies misconceptions about polio vaccine as the most significant factor in the community's refusal of polio vaccination.

This study has limitations. Pakistan and Afghanistan share a porous border without immigration control; Quetta Block has a significant number of residents who are not necessarily accounted for, making it hard to assess the coverage of polio vaccination campaigns. Quetta Block is multi-ethnic and multicultural, the blending of its local community with the Afghan immigrants/refugees can be viewed in 2 ways. First, being of 2 different nationalities may influence their refusal of a vaccine. Second, the closeness of the community, with similar social, ethnic and religious backgrounds may influence the reasons for refusing the vaccine. However, this effect cannot be ascertained unless the 2 communities are studied and compared separately.

However, reflecting on recent efforts to boost COVID-19 vaccine acceptance rates, Pakistan found itself in a unique situation to generate demand for a new vaccine in a country that was still rife with vaccine hesitancy due to a history of misinformation and myths. As a significant step towards promoting vaccines and mitigating misinformation around vaccines, the Government of Pakistan collaborated with UNICEF to track vaccine uptake trends through social media analysis and research surveys. This action allowed the government to design content (flyers, social media posts, mainstream media news, advertisements) that address the rumours and underlying fear among the public. The Ministry of Health expanded the polio vaccination helpline in the country to include COVID-19 and allow easy public access to vaccines and information

about them (25).

Addressing vaccine hesitancy and understanding the reasons behind them is a crucial step, and examples like the ones shared in this paper hold a promising prospect for achieving the goals for vaccine coverage.

Conclusion

Contrary to popular belief that religion contributes most most to vaccine hesitancy, our study confirms that misconceptions are of far greater significance. Targeted efforts to address existing and emerging reasons for refusal must be made to improve the community's acceptance and perception of the polio vaccine. We want to reiterate that the Quetta Block represents a high-risk area and can compromise national eradication efforts if not addressed immediately.

Funding: None.

Competing interests: None declared.

Comprendre les raisons pour lesquelles les familles rejettent le vaccin antipoliomyélitique dans le bloc de Quetta (Pakistan)

Résumé

Contexte : L'éradication mondiale de la poliomyélite est un objectif qui n'a pas encore été atteint dans des pays comme le Pakistan. Ces dernières années, l'Initiative pour l'éradication de la poliomyélite a réalisé des progrès constants caractérisés par une bonne couverture de la campagne et un faible nombre de cas de poliomyélite. Cependant, en 2019, le Pakistan a notifié 146 cas, contre 12 en 2018. Une raison majeure citée pour expliquer cette régression est l'augmentation du nombre de parents et d'aidants qui rejettent la vaccination.

Objectifs : Évaluer les raisons du rejet de la vaccination antipoliomyélitique dans le bloc de Quetta, au Baloutchistan.

Méthodes : L'étude a été réalisée à partir des données acquises lors de deux campagnes de

vaccination antipoliomyélitique menées pendant trois mois en 2019. Les données ont été recueillies dans le bloc de Quetta, une zone fortement endémique où la transmission du poliovirus est continue depuis plusieurs années. Les données ont été analysées à l'aide d'une plateforme logicielle d'analyse statistique. Nous avons utilisé des statistiques descriptives pour mettre en évidence les caractéristiques de la population d'étude. Les variables catégorielles ont été mesurées sous forme de fréquences et de pourcentages.

Résultats : Les taux de rejet étaient de près de 8,6 % et 8,1 % pour les campagnes antipoliomyélitiques d'avril et de juin 2019, respectivement. Les idées fausses au sujet des vaccins représentaient 56,4 % des raisons justifiant le rejet du vaccin, suivies par la religion pour 16 %.

Conclusion : Les idées fausses concernant les vaccins sont les principales causes de rejet de la vaccination. Des stratégies efficaces sont nécessaires pour lutter contre ces idées fausses dans la zone rouge de circulation du poliovirus au Baloutchistan.

[illegible]

[illegible]

[illegible] 8.1% [illegible] / [illegible] [illegible] 8.6% [illegible] : [illegible] 56.4% [illegible] .2019 [illegible] / [illegible] .16% [illegible]

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