

# Parental perceptions surrounding polio and self-reported non-participation in polio supplementary immunization activities in Karachi, Pakistan: a mixed methods study

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**Objective** To assess parent's knowledge and perceptions surrounding polio and polio vaccination, self-reported participation in polio supplementary immunization activities (SIAs) targeting children aged < 5 years, and reasons for non-participation.

**Methods** The mixed methods study began with a cross-sectional survey in Karachi, Pakistan. A structured questionnaire was administered to assess parental knowledge of polio and participation in polio SIAs conducted in September and October 2011. Additionally, 30 parents of Pashtun ethnicity (a high-risk group) who refused to vaccinate their children were interviewed in depth to determine why. Descriptive and bivariate analyses by ethnic and socioeconomic group were performed for quantitative data; thematic analysis was conducted for qualitative interviews with Pashtun parents.

**Findings** Of 1017 parents surveyed, 412 (41%) had never heard of polio; 132 (13%) did not participate in one SIA and 157 (15.4%) did not participate in either SIA. Among non-participants, 34 (21.6%) reported not having been contacted by a vaccinator; 116 (73.9%) reported having refused to participate, and 7 (4.5%) reported that the child was absent from home when the vaccinator visited. Refusals clustered in low-income Pashtun (43/441; 9.8%) and high-income families of any ethnic background (71/153; 46.4%). Low-income Pashtuns were more likely to not have participated in polio SIAs than low-income non-Pashtuns (odds ratio, OR: 7.1; 95% confidence interval, CI: 3.47–14.5). Reasons commonly cited among Pashtuns for refusing vaccination included fear of sterility; lack of faith in the polio vaccine; scepticism about the vaccination programme, and fear that the vaccine might contain religiously forbidden ingredients.

**Conclusion** In Karachi, interruption of polio transmission requires integrated and participatory community interventions targeting high-risk populations.

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## Introduction

Pakistan is one of only three endemic countries in the world still struggling to interrupt poliovirus transmission and meet the target of global polio eradication by 2012. Polio supplementary immunization activities (SIAs) for the home delivery of oral polio vaccine (OPV) were initiated in the country in 2000, when 119 cases of polio were reported. Although the number of cases declined to 32 in 2007, it has been rising steadily since 2008.<sup>1</sup> In 2011 Pakistan reported the world's highest number of polio cases and some fear the country may become the last remaining host of polio on earth. The situation clearly poses a serious threat to the Global Polio Eradication Initiative (GPEI).<sup>2–4</sup> In Pakistan, elimination efforts have largely relied on a robust case detection system based on surveillance of acute flaccid paralysis cases and on mass door-to-door polio SIAs, of which more than 100 have been conducted since the year 2000.<sup>5,6</sup> Every child less than 5 years of age who resides in Pakistan has to be reached during each SIA, since multiple doses of OPV are needed in countries with high endemicity for children to develop adequate immunity against polio.<sup>1–4</sup> SIAs can vary in frequency but are usually held one to two months apart.

SIAs against polio are primarily organized by government officials with support from United Nations partners, mainly the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF). SIAs are intended to complement, not replace, routine immunization against polio. They aim to interrupt poliovirus circulation through administration of the oral polio vaccine (OPV) to every child aged < 5 years in every

vaccine SIA campaign, irrespective of immunization history.<sup>7</sup> Public announcements through media coverage, posters and banners are used to create awareness about upcoming polio SIAs and encourage participation. Social marketing and community mobilization efforts are organized by UNICEF, and the staff of WHO's Polio Eradication Initiative assist local health officials in organizing, implementing and monitoring SIAs. A large cadre of vaccinators, health workers and community volunteers administer OPV to eligible children through visits to all households and at fixed health facilities.<sup>7,8</sup>

Although high coverage (> 90%) during polio SIAs has been reported in Pakistan, actual coverage is questionable. An official report of the Independent Monitoring Board of the Global Polio Eradication Initiative published in February 2012 highlighted major planning and execution gaps for polio SIAs in Pakistan.<sup>3</sup> Several factors have made the goal of eliminating polio in Pakistan elusive. These include inconsistent quality of SIAs; failure to immunize children in many areas; inaccessibility of children due to ongoing military conflict; massive floods; poor routine immunization services; a structurally weak polio eradication programme; large nomadic and internally-displaced populations, and the refusal of some parents to have their children vaccinated.<sup>9,10</sup> Many of these factors have led to the clustering of unimmunized children, who are at high risk of getting polio.<sup>11</sup>

Very few studies evaluating the results of polio SIAs in Karachi have been published. We chose Karachi for our study because polio is endemic in the city and the risk of transmission is among the highest in Pakistan. Karachi is, in fact, the only megacity

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in the world that has not yet succeeded in interrupting polio transmission. Besides, its population represents all ethnic groups in Pakistan. Given Karachi's large cultural and ethnic diversity, we studied a large representative sample of individuals living across the city, our objective being to assess parents' knowledge about polio, rates of non-participation in polio SIAs and reasons for non-participation. We ensured adequate representation of the Pashtun community, a group that comprises an estimated 35–40% of Karachi's population and yet has suffered 90% of recent polio cases in the city. This community has high rates of migration and displacement and low rates of polio vaccination.<sup>12</sup>

## Methods

Data collection for our study, which had a mixed methods design, was completed in three months (November 2011 to January 2012). The quantitative component of the study involved a cross-sectional cluster survey in Karachi, a megacity comprising 18 towns, 1 cantonment and 178 localities known as union councils.<sup>13</sup> The sampling frame, developed for our previous vaccine research, consisted of 90 randomly selected clusters with a total population of 200 000 and between 200 and 250 households each. The sample was sociodemographically representative of the entire population of Karachi.<sup>14</sup> From this sampling frame we selected 60 clusters of low- and middle-income households. Using the probability proportionate to size technique, we calculated the number of households we would need to survey within each cluster. Table 1 shows the 18 towns and one cantonment area that make up Karachi and the number and fraction of households sampled in each town.

In our previous work we had difficulty accessing households in affluent areas of Karachi because of tight security measures. For this reason, in the current study we selected five large shopping malls as sites for approaching and interviewing the members of affluent families from different high-income areas of the city. In total, 153 eligible families – approximately 15% of the proportionally representative sampling frame – were interviewed in malls. We posed no income- or asset-related questions to avoid affecting the response rate, but these malls, considered safe, have reserved rights of admission and are visited by

Table 1. Fraction of households surveyed and number and percentage of parents who refused to have their children vaccinated with the oral polio vaccine (OPV), by town within Karachi, Pakistan, 2011

No.	Town/cantonment	Total no. (%) of households surveyed <sup>a</sup>	No. of parents (%) <sup>c</sup> who refused OPV
1	Keamari	36 (3.5)	4 (11.0)
2	SITE	72 (7.0)	6 (8.3)
3	Baldia	18 (1.8)	0 (0)
4	Orangi	117 (11.5)	17 (14.5)
5	Lyari	18 (1.8)	0 (0)
6	Saddar	36 (3.5)	0 (0)
7	Jamshed	54 (5.3)	1 (1.9)
8	Gulshan-e-Iqbal	126 (12.4)	4 (3.2)
9	Shah Faisal	27 (2.7)	0 (0)
10	Landhi	72 (7.0)	3 (4.2)
11	Korangi	63 (6.2)	1 (1.6)
12	North Nazimabad	45 (4.2)	5 (11.1)
13	New Karachi	36 (3.5)	3 (8.3)
14	Gulberg	36 (3.5)	0 (0)
15	Liaqatabad	45 (4.2)	4 (8.9)
16	Malir	18 (1.8)	2 (11.1)
17	Bin Qasim	45 (4.2)	9 (20.0)
18	Gadap	81 (8.0)	6 (7.4)
18a.	DHA/Clifton	72 (7.0)	51 (71.0)
<b>Total</b>		<b>1017 (99.1<sup>d</sup>)</b>	<b>116 (11.4)</b>

DHA, Defence Housing Authority.

<sup>a</sup> One parent was interviewed per household.

<sup>b</sup> This represents the percentage of all households in the town.

<sup>c</sup> This includes parents who were interviewed in households as well as in shopping malls.

<sup>d</sup> This does not add up to 100 due to rounding.

Note: The towns and cantonment were classified socioeconomically as follows: low-income – Keamari, SITE, Baldia, Orangi, Lyari, Shah Faisal, Landhi, Korangi, Liaqatabad, Malir, Bin Qasim, Gadap; mixed (i.e. containing low-, middle- and high-income neighbourhoods) – Saddar, Jamshed, Gulshan-e-Iqbal, North Nazimabad, New Karachi, Gulberg; high-income – DHA/Clifton.

affluent families for entertainment and shopping. Thus, people who frequent them are broadly representative of the upper classes.

We estimated the sample size using the formula for cross-sectional prevalence studies; we assumed a 30% rate of non-participation in polio SIAs, a 5% non-response rate, a 5% margin of error and a design effect of 2.0 for cluster sampling. We inflated the resulting sample size, 646, by 50% to ensure a large enough sampling of Pashtun households to allow us to evaluate any differences among ethnic groups in lack of participation in polio SIAs. This yielded a final sample of 1001 households.

Parents were eligible to participate in the survey if they were residents of Karachi and had children aged < 5 years in their household. Verbal consent was obtained from all parents who participated in the survey. We developed a structured questionnaire and pilot tested it in households drawn from neighbouring clusters. The questionnaire included

questions on demographics, knowledge about the symptoms of polio, and number of polio SIAs in which parents had participated in the two most recent months. Two SIAs were held in Karachi (September and October 2011) just before the survey. To select the households to be surveyed, trained project staff (research assistants and field workers) spun a bottle in the main street of each town to choose the direction in which to approach the first household and then used systematic random sampling with a skip pattern of two after each eligible dwelling to select the remaining households. Any parent available (mother or father of a child < 5 years old) was interviewed. In shopping malls, research assistants invited families to participate in the survey if they reported having children aged < 5 years and living in a high-income part of the city (Defence Housing Authority, Clifton, Gulshan-e-Iqbal and North Nazimabad). A senior research assistant made spot-check visits

to homes and malls and re-interviewed 5% of the respondents to ensure the quality of data collection.

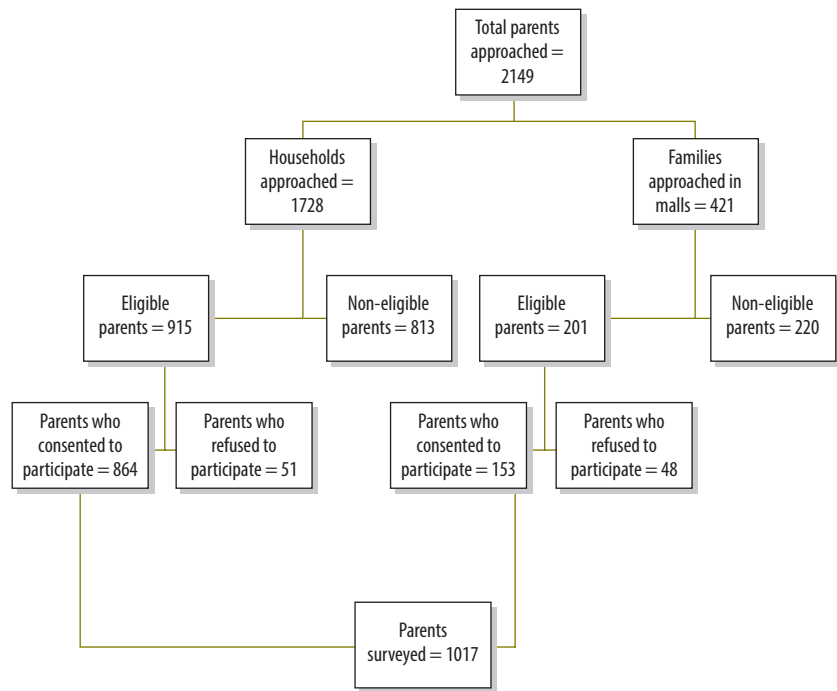
For the qualitative assessment, parents who refused to have their children receive the OPV or who reported that their eligible children did not participate in the two most recent polio SIAs were purposively selected from the Pashtun population and invited for in-depth interviews. Only ethnic Pashtuns were interviewed because migration and displacement are common among them and their children have the highest rate of confirmed cases of polio in Pakistan and the highest risk among all ethnic groups. Only fathers were interviewed because they are the main decision-makers in Pashtun families. A native Pashto-speaking male medical student (SAK in his final year was trained to conduct these interviews. Data saturation was reached after 30 in-depth interviews. Written notes were transcribed and thematic analysis was conducted on emerging themes surrounding the reasons for children not having received or having refused to receive the OPV. The survey data were entered electronically in real time and analysed on SPSS version 19 (SPSS Inc., Chicago, United States of America).

Descriptive analysis was performed and proportions were compared for three groups: (i) low-income Pashtun families; (ii) low-income families of other ethnicities (non-Pashtun); and (iii) middle- and high-income families of any ethnic background. Income group was based on area of residence (Table 1). Differences between these groups in terms of knowledge about polio, participation in SIAs and reasons for non-participation are expressed as odds ratios (ORs) with 95% confidence intervals (CIs). This study received ethical approval from the ethics review committee of Aga Khan University in Karachi.

## Results

A total of 2149 parents were approached at households in the community and shopping malls, and 1116 were found eligible to participate in the study. Among eligible parents, 51 (5.6%) and 48 (24%) refused to participate in households and at malls, respectively (Fig. 1). Of the 1017 parents who agreed to participate, about 90% were mothers of the children aged < 5 years; 441 (43.4%), 423 (41.6%) and 153 (15%) of the respective

Fig. 1. Flowchart of participants in study of parental knowledge and perceptions surrounding polio and of participation in polio vaccine supplementary immunization activities in Karachi, Pakistan, 2011



families were categorized as low-income Pashtun, low-income non-Pashtun, or middle- or high-income, regardless of ethnic background.

The children were 3.2 years old on average (standard deviation, SD:  $\pm 1.5$ ); 52% were male and 48% were female. Of the parents interviewed, 412 (40.5%) reported never having heard about "polio disease" (Table 2) and 246 (24%) reported not having heard about recent polio SIAs in their area in 2011; of parents in this last group, 193 (78% of the parents interviewed) belonged to low-income Pashtun households. Only 728 (72%) parents reported that their children had participated in both the September and October polio SIAs; 157 (15.4%) reported that their children had not participated in either SIA. There were 34 (21.6%) parents who reported having had no contact with a vaccinator in their home, 116 (73.9%) reported having refused the vaccination and 7 (4.5%) said that their child was not at home when the vaccinator had visited (Table 3). Refusals clustered in low-income Pashtun (43/441; 9.8%) and high-income (71/153; 46.4%) populations, whereas low- and middle-income non-Pashtun populations had high

rates of SIA participation, with only 2% (9/423) having received no dose of OPV in both polio SIA campaigns. Pashtun parents stated as the primary reasons for refusing to have their children vaccinated fear of potential harm from the OPV (16%) and lack of permission from family elders (77%). Among high-income respondents interviewed in malls, the main reason given was the belief that the vaccine was harmful (72%) or unnecessary (8.5%) (Table 4). Vaccine refusal rates in the 18 towns and one cantonment of Karachi ranged between 0% and 70%, with the highest refusal rates reported from the high-income areas of Defence Housing Authority and Clifton (Table 1).

Significant differences in knowledge about polio and in participation in SIAs were observed between low-income Pashtuns and low-income non-Pashtuns (Table 5). The odds of knowing nothing about polio were 2.2 (95% CI: 1.1–4.3) times greater among low-income Pashtun parents than among low-income non-Pashtuns (Table 5). Low-income Pashtun parents were 6 times (95% CI: 4.3–8.8) more likely to have never heard about a polio SIA campaign in their area than low-income non-Pashtuns.

Table 2. **Parental knowledge and perceptions surrounding polio and polio vaccination and self-reported participation in polio supplementary immunization activities conducted in September and October 2011, by ethnicity and income group, Karachi, Pakistan**

Variable	No. (%) of parents			
	Low-income Pashtuns (n = 441)	Low-income non-Pashtuns (n = 423)	Middle- or high-income <sup>a</sup> (n = 153)	Total (n = 1017)
<b>Have you ever heard of a disease called polio?</b>				
Yes	86 (19.5)	324 (76.6)	153 (100)	563 (55.4)
No	326 (74)	86 (20.3)	0 (0)	412 (40.5)
Don't know	29 (6.5)	13 (3.1)	0 (0)	42 (4.1)
<b>What is the risk of getting polio in Pakistan compared with other countries?<sup>b</sup></b>				
Same as in other countries	18 (20.9)	53 (16.4)	49 (32)	120 (21.4)
Higher	44 (51.2)	113 (34.9)	101 (66)	258 (45.8)
Lower	3 (3.5)	16 (4.9)	3 (2)	22 (3.9)
None	0 (0)	2 (0.6)	0 (0)	2 (0.4)
Don't know	21 (24.4)	140 (43.2)	0 (0)	161 (28.5)
<b>In your opinion, what does polio do to a child?<sup>b</sup></b>				
Paralysis	86 (100)	309 (95.4)	152 (99.3)	547 (97.2)
Other symptoms	0 (0)	14 (4.3)	0 (0)	14 (2.4)
Could not name any symptoms	0 (0)	1 (0.3)	1 (0.7)	2 (0.4)
<b>Have you heard about polio vaccine campaigns<sup>c</sup> in your area this year?</b>				
Yes	248 (56.2)	373 (88.2)	147 (96.1)	768 (75.5)
No	193 (43.8)	47 (11.1)	6 (3.9)	246 (24.2)
Don't know	0 (0)	3 (0.7)	0 (0)	3 (0.3)
<b>Participation in two most recent polio vaccine campaigns?</b>				
No dose in September and October 2011	59 (13.4)	9 (2.1)	89 (58)	157 (15.4)
Either September or October 2011	44 (10)	86 (20.3)	2 (1.4)	132 (13)
Both September and October 2011	338 (76.6)	328 (77.5)	62 (40.5)	728 (71.6)
<b>What is your opinion about the polio vaccine campaign held every month?</b>				
Very much needed	124 (28.1)	353 (83.5)	97 (63.4)	574 (56.4)
Any other	3 (0.7)	0 (0)	1 (0.7)	4 (0.4)
Don't know	314 (71.2)	70 (16.5)	55 (35.9)	439 (43.2)

<sup>a</sup> All ethnicities.<sup>b</sup> Addressed only to parents who had heard about polio (n = 563).<sup>c</sup> Supplementary immunization activities are better known as polio vaccine campaigns.Table 3. **Reasons reported by parents for their children not having participated in the two most recent polio supplementary immunization activities, by ethnicity and income group, Karachi, Pakistan, 2011**

Reason	No. (%) of parents			
	Low-income Pashtuns (n = 59)	Low-income non-Pashtuns (n = 9)	Middle- or high-income <sup>a</sup> (n = 89)	Total (n = 157)
No vaccinator came to the house	14 (23.7)	6 (66.7)	14 (15.7)	34 (21.6)
Family elder or husband refused	43 (72.9)	2 (22.2)	71 (79.8)	116 (73.9)
Child not at home when vaccinator visited	2 (3.4)	1 (11.1)	4 (4.5)	7 (4.5)

<sup>a</sup> All ethnicities.

Moreover, children of low-income Pashtun parents were 7 times (95% CI: 3.5–14.5) more likely to have failed to participate in polio SIAs than children of low-income non-Pashtun parents.

### Qualitative analysis

In-depth interviews revealed parental perceptions surrounding polio and polio vaccination and why some children did

not received the OPV during the two most recent polio SIAs. Most of the parents thought that the polio vaccine caused sterility in adulthood. Some also considered polio vaccination cam-

Table 4. **Reasons reported by parents for having refused to have their children vaccinated with the oral polio vaccine, by ethnicity and income group, Karachi, Pakistan, 2011**

Reason	No. (%) of parents			
	Low-income Pashtuns (n = 43)	Low-income non-Pashtuns (n = 2)	Middle- or high-income <sup>a</sup> (n = 71)	Total (n = 116)
Vaccine is unnecessary	1 (2.3)	0 (0)	6 (8.5)	7 (6)
Vaccine is harmful	7 (16.3)	0 (0)	51 (71.8)	58 (50)
Family elders/husband did not allow vaccination	33 (76.7)	2 (100)	5 (7)	40 (34.5)
Other reason	2 (4.7)	0 (0)	9 (12.7)	11 (9.5)

<sup>a</sup> All ethnicities.

Table 5. **Results of univariate analysis comparing knowledge and perceptions surrounding polio and participation in polio supplementary immunization activities among low-income Pashtun and low-income non-Pashtun parents, Karachi, Pakistan, 2011**

Indicator	No. (%) of parents		OR (95% CI)
	Low-income Pashtuns (n = 441)	Low-income non-Pashtuns (n = 423)	
Never heard of polio	29 (6.5)	13 (3.1)	2.2 (1.1–4.3)
Don't know how the risk of getting polio in Pakistan compares with the risk in other countries (n = 410 parents who had heard of polio)	21 (24.4)	140 (43.2)	0.42 (0.2–0.72)
Don't know if polio can be prevented (n = 410 parents who had heard of polio)	1 (1.2)	4 (1.2)	0.94 (0.10–8.5)
Have not heard about polio vaccine campaign <sup>a</sup> this year (2011)	193 (43.8)	47 (11.1)	6.2 (4.3–8.8)
Did not participate in either of the two most recent polio vaccine campaigns	59 (13.4)	9 (2.1)	7.1 (3.47–14.5)
Reason for non-participation in polio vaccine campaigns (n = 68)			
No vaccinator came to the house	14 (23.7)	6 (66.7)	1.2 (0.08–15.46)
Family elder or husband refused	43 (72.9)	2 (22.2)	10.8 (0.66–174.6)

CI, confidence interval; OR, odds ratio.

<sup>a</sup> Supplementary immunization activities are better known as polio vaccine campaigns.

paigns to be part of a conspiracy against Muslim nations, including Pakistan. “Polio vaccine is prepared in the West and sent here. It is then given to our children in order to destroy their ability to reproduce in the future.” Moreover, about one third of the parents reported “no belief” in the polio vaccine and considered it useless or ineffective against polio. “It is of no good, because one of my friends has polio even though he was vaccinated against it.” Other parents felt that since their children had received several doses of polio vaccine in the past, they did not need to get vaccinated again. Some voiced doubts about the government’s “disguised policy” of conducting exhaustive efforts against polio. “Why do the government and health system give so much emphasis to polio vaccine? There are so many other diseases that should be addressed first. There must be some other reason (negative reason) for their giving so much importance to polio vaccine.” Another important theme was concern that the vaccine could contain

religiously forbidden “non-halal” ingredients. “I was allowing my children to receive polio vaccine until last year, when I learnt that the material used is un-Islamic (*haraam*).... if we are given proof that this material is not *haraam*, then we will allow our children for polio vaccine.” A few parents also mentioned other reasons, including a bad cold chain, difficulty in communicating with the polio vaccinator because of a language barrier and fear of side-effects (fever, bloating of skin, weakness, etc.).

## Discussion

In Karachi, parental refusal was the most common reason given for the failure of children to participate in the two most recent polio vaccine SIAs. It accounted for non-participation in 74% of the cases. A clustering of vaccine refusals among ethnic low-income Pashtun and high-income populations was noted and varied by town. Lack of knowledge about polio, lack of faith in the vaccine’s effectiveness, misperceptions about vaccine-

related adverse events (e.g. infertility) and mistrust among Pashtuns make it highly likely that poliovirus transmission will continue in this population unless specific targeted activities are undertaken to promote vaccination.

Our overall findings pertaining to why some parents refuse to have their children vaccinated are in line with those of previous studies that have identified misperceptions regarding disease susceptibility and vaccine efficacy and concerns about safety.<sup>15,16</sup> Moreover, lack of trust in vaccines and in those who deliver them (e.g. health-care providers, governments and international agencies) has been identified as an important hindrance to routine OPV immunization and polio elimination.<sup>17,18</sup>

This study was undertaken in the wake of extensive media reports of an allegedly fake vaccination campaign organized by the United States Central Intelligence Agency to try to track down Osama Bin Laden by surreptitiously obtaining blood samples from his family members for deoxyribonucleic acid



(DNA) testing. The campaign was run by a Pashtun government physician from the tribal area of Khyber Agency who had worked in polio vaccine campaigns.<sup>19,20</sup> Although we prudently avoided explicit references to this in our in-depth interviews, several Pashtun families gave distrust of government-run programmes as the reason for having refused to get their children vaccinated. The publicity surrounding the bogus vaccination campaign is probably not the only reason for people's mistrust of the polio vaccine, since vaccine refusals had been documented in the Pashtun population even before the incident. However, reports of the incident may have reinforced or perpetuated negative perceptions. The long-term impact of this incident on polio eradication efforts in Pakistan remains to be determined.

At the community level, conventional communication efforts surrounding polio are largely conducted by female workers or mobilizers who primarily target adult females in the households.<sup>21</sup> Male family decision-makers or community and religious leaders are insufficiently engaged and are usually absent during the day time when vaccinators visit households.<sup>22</sup> In Pashtun populations in particular males are the primary decision-makers. They have strong religious beliefs and are key to polio eradication efforts. Our inter-

views showed that religious authorities of two or three of the main religious institutions (*madrasahs*) heavily influence the opinions of Pashtun men in Karachi. To enhance social mobilization, integrated participatory interventions targeting communities at high risk for polio need to be implemented.<sup>23,24</sup> These interventions should include parental counselling, targeted particularly at male decision-makers; the creation of community networks involving trusted religious authorities, and role modelling by parents who approve of the polio vaccine. The strategy of involving religious opinion leaders in efforts to increase acceptance of polio immunization has already been employed in northern India and Nigeria.<sup>11,25</sup> More formative and evaluative research is needed to identify the most effective strategies.

A high proportion (24%) of eligible high-income families declined to participate in the survey at malls primarily because of "lack of time". Worth noting is the fact that vaccination refusal rates were high among those who did participate in the survey. The upper class has little trust in government services and seeks health care and immunization services in the private sector. Evidence suggests that the high-income population is adequately immunized and that most children in this group have received injectable and oral polio vaccines

through private paediatric practices (Zaidi AK, unpublished data). Although children from high-income families are at little risk of contracting polio, the widespread belief in this social group that repeat doses of OPV are harmful may undermine the overall success of the polio eradication programme, since the wealthy are often opinion leaders and trendsetters.<sup>26-28</sup>

This is the first study to identify the main perceptions associated with lack of participation in polio SIAs in the ethnic group with the highest polio incidence in Pakistan. This high-risk group needs targeted educational messages and we believe that our findings will contribute to their development. Operational research on increasing polio vaccine acceptance by offering packages of health and non-health interventions during polio SIA campaigns should also be explored.

Although our study was conducted in Karachi, some findings may be generalizable to other parts of Pakistan that are important for polio eradication efforts, since outside Karachi endemic polio transmission is primarily restricted to Pashtun majority areas. ■

**Competing interests:** None declared.

## ملخص

### تصورات الآباء حول شلل الأطفال وعدم المشاركة المبلغ عنها ذاتياً في أنشطة التمنيع التكميلية ضد شلل الأطفال في كراتشي، باكستان: دراسة باستخدام نهج الأساليب المختلطة:

13٪) منهم في أحد أنشطة التمنيع التكميلية ضد شلل الأطفال ولم يشارك 157 (15.4٪) منهم في أي من النشاطين. وأبلغ 34 (21.6٪) من بين غير المشاركين عن عدم تلقي اتصال من عامل التطعيم؛ وأبلغ 116 (73.9٪) عن رفضهم للمشاركة وأبلغ 7 (4.5٪) عن غياب الطفل عن المنزل عند زيارة عامل التطعيم. وتجمعت حالات الرفض بين البشتون منخفضي الدخل (43/441؛ 9.8٪) والأسر مرتفعة الدخل من أي خلفية عرقية (71/153؛ 46.4٪). وزادت احتمالية عدم مشاركة البشتون ذوي الدخل المنخفض في أنشطة التمنيع التكميلية ضد شلل الأطفال عن غير البشتون ذوي الدخل المنخفض (نسبة الاحتمال: 7.1؛ فاصل الثقة 95٪، فاصل الثقة 3.47 إلى 14.5). وكان ضمن أسباب رفض التطعيم التي أثرت بين البشتون على نحو شائع الخوف من العقم ونقص الإيمان بلقاح شلل الأطفال والتشكيك في برنامج التطعيم والخوف من احتمالية احتواء اللقاح على مكونات محظورة دينياً. الاستنتاج يتطلب قطع سراية شلل الأطفال في كراتشي تدخلات مجتمعية متكاملة وتشاركية تستهدف الفئات السكانية المعرضة لمخاطر شديدة.

الغرض تقييم معرفة الآباء وتصوراتهم حول شلل الأطفال والتطعيم ضد شلل الأطفال، والمشاركة المبلغ عنها ذاتياً في أنشطة التمنيع التكميلية ضد شلل الأطفال (SIA) التي تستهدف الأطفال الذين تقل أعمارهم عن 5 سنوات، وأسباب عدم المشاركة. الطريقة بدأت الدراسة التي تستخدم نهج الأساليب المختلطة بمسح متعدد القطاعات في كراتشي، باكستان. وتم إجراء استبيان منظم بغية تقييم معرفة الآباء بشلل الأطفال والمشاركة في أنشطة التمنيع التكميلية ضد شلل الأطفال التي تم إجراؤها في أيلول/سبتمبر وتشرين الأول/أكتوبر 2011. وبالإضافة إلى ذلك، تم إجراء مقابلات متعمقة مع 30 من الآباء ذوي الأصول العرقية البشتونية (فئة معرضة لمخاطر شديدة) الذين رفضوا تطعيم أطفالهم بغية تحديد السبب. وتم إجراء تحليلات وصفية وثنائية المتغيرات للبيانات الكمية حسب الفئة العرقية والاجتماعية الاقتصادية؛ وتم إجراء تحليل مواضيعي للمقابلات النوعية مع الآباء ذوي الأصول البشتونية. النتائج لم يسمع 412 (41٪) من إجمالي 1017 من الآباء الذين تم إجراء المسح عليهم عن شلل الأطفال على الإطلاق؛ ولم يشارك 132

## 摘要

### 巴基斯坦卡拉奇家长围绕脊髓灰质炎的认知以及自我报告的不参加脊髓灰质炎强化免疫活动的情况：混合方法研究

**目的** 评估家长围绕脊髓灰质炎和脊髓灰质炎预防接种的认知和理解、自我报告的参加针对5岁以下儿童的脊髓灰质炎强化免疫活动（SIA）的情况以及不参加的原因。

**方法** 混合方法研究从在巴基斯坦卡拉奇的横断面调查开始。使用结构式问卷展开调查，以评估家长对脊髓灰质炎的认知以及对2011年9月和10月进行的脊髓灰质炎强化免疫活动的参加情况。此外，对拒绝让其孩子接受疫苗接种的30位普什图族（高风险群体）家长进行深入访谈，以确定原因。按照种族和社会经济群体执行定量数据的描述性和二元化分析；对与普什图人家长的定性访谈执行主题分析。

**结果** 在接受调查的1017位家长中，412位（41%）家长从未听说过脊髓灰质炎，132位（13%）有一次SIA没有参

加，157位（15.4%）家长没有参加过任一次SIA。在未参加者中，有34位（21.6%）报告接种员没有联系过，116位（73.9%）报告已拒绝参加，而7位（4.5%）则报告在接种员前来时孩子不在家中。拒绝群体集中于低收入普什图人（43/441，9.8%）和任何种族背景的高收入家庭（71/153，46.4%）。低收入普什图人比低收入非普什图人更倾向于不参加脊髓灰质炎SIA（优势比，OR：7.1；95%置信区间，CI：3.47-14.5）。普什图人拒绝接种疫苗普遍提及的原因包括害怕不育、对脊髓灰质炎疫苗缺乏信任、对疫苗接种计划的怀疑以及担心这种疫苗可能包含宗教禁止的成分。

**结论** 在卡拉奇，阻断脊髓灰质炎的传播需要针对高危人群的综合性和参与式的社区干预。

## Résumé

### Perceptions parentales relatives à la polio et non-participation autodéclarée aux activités de vaccination supplémentaires contre la polio à Karachi, au Pakistan: une étude des méthodes mixtes

**Objectif** Évaluer les connaissances et les perceptions des parents relatives à la polio et à la vaccination contre la polio, la participation autodéclarée à des activités de vaccination supplémentaires (AVS) contre la polio ciblant des enfants âgés de moins de 5 ans, mais aussi les raisons justifiant la non-participation.

**Méthodes** L'étude des méthodes mixtes a commencé par une enquête transversale à Karachi, au Pakistan. Un questionnaire structuré a été distribué afin d'évaluer les connaissances parentales relatives à la polio et à la participation aux AVS contre la polio, en septembre et octobre 2011. En outre, 30 parents d'origine ethnique pachtoune (un groupe à haut risque) ayant refusé de faire vacciner leurs enfants ont été interrogés de manière approfondie afin de déterminer les raisons de leur refus. Des analyses descriptives et bivariées par groupe ethnique et groupe socio-économique ont été réalisées pour les données quantitatives. Et une analyse thématique des entretiens qualitatifs avec les parents pachtounes a été effectuée.

**Résultats** Sur 1017 parents interrogés, 412 (41%) n'avaient jamais entendu parler de la polio, 132 (13%) n'avaient pas participé à une AVS et

157 (15,4%) n'avaient participé à aucune AVS. Parmi les non-participants, 34 (21,6%) ont déclaré ne pas avoir été contactés par un vaccinateur, 116 (73,9%) ont déclaré avoir refusé de participer, et 7 (4,5%) ont déclaré que l'enfant n'était pas à la maison lors de la visite du vaccinateur. Les refus se concentraient dans les familles pachtounes à faible revenu (43/441; 9,8%) et dans celles à revenu élevé de toute origine ethnique (71/153; 46,4%). Les Pachtounes possédant un faible revenu étaient plus susceptibles de ne pas avoir participé à des AVS contre la polio que les non-Pachtounes possédant un faible revenu (rapport des cotes, RC: 7,1; intervalle de confiance, IC de 95%: 3,47 à 14,5). Les raisons souvent citées par les Pachtounes pour le refus de la vaccination incluaient la peur de la stérilité, le manque de confiance dans le vaccin contre la polio, le scepticisme à l'égard du programme de vaccination et la crainte que le vaccin puisse contenir des ingrédients interdits par la religion.

**Conclusion** À Karachi, l'interruption de la transmission de la polio nécessite des interventions communautaires intégrées et participatives, ciblant les populations à risque élevé.

## Резюме

### Представления родителей о полиомиелите и собственное неучастие в дополнительных мероприятиях по иммунизации против полиомиелита в г. Карачи, Пакистан: смешанное исследование

**Цель** Оценить знания и представления родителей о полиомиелите и вакцинации от полиомиелита, собственное участие в дополнительных мероприятиях по иммунизации против полиомиелита (ДМИ) детей, не достигших пятилетнего возраста, а также причины неучастия.

**Методы** Смешанное исследование началось с проведения перекрестного обследования в г. Карачи, Пакистан. Предписывалось проведение структурированного опроса для оценки знаний родителей о полиомиелите и участия в ДМИ против полиомиелита, проведенных в сентябре и октябре 2011 г. Кроме того, проводился подробный опрос 30 родителей пуштунской этнической группы (группы повышенного риска) с целью

определения причин их отказа от вакцинации детей. Проводился описательный и бивариантный анализ количественных показателей этнических и социально-экономических групп, а также тематический анализ в целях изучения качественного опроса родителей пуштунской этнической группы.

**Результаты** Из 1017 опрошенных родителей, 412 (41%) никогда ранее не слышали о полиомиелите, 132 (13%) не принимали участия в одном из ДМИ, и 157 (15,4%) не участвовали ни в одном из в ДМИ. Из числа не принимавших участия, 34 (21,6%) опрошенных сообщили, что вакциниатор не связывался с ними, 116 (73,9%) отказались принимать участие, и 7 (4,5%) указали, что ребенок отсутствовал дома во время визита вакциниатора. Отказы

от вакцинации преобладают среди пуштунов с низким уровнем дохода (43/441; 9,8%) и среди семей с высоким уровнем дохода любого этнического происхождения (71/153; 46,4%). Пуштуны с низким уровнем дохода имели более высокую склонность не участвовать в ДМИ, чем непуштуны с низким уровнем дохода (отношение шансов, OLS: 7,1; 95% доверительный интервал, ДИ: 3,47–14,5). Причины отказа от вакцинации среди пуштунов

часто включают страх за стерильность, отсутствие веры в полиомиелитную вакцину, скептицизм в отношении программы вакцинации, опасение насчет того, что в вакцине могут содержаться запрещенные религиозные компоненты.

**Вывод** В г. Карачи для предотвращения передачи полиомиелита требуются интегрированные и коллективные меры вмешательства, направленные на группы населения повышенного риска.

## Resumen

### Las percepciones de los padres en torno a la poliomiélitis y la no participación notificada por los mismos en las actividades suplementarias de inmunización antipoliomiéltica en Karachi, Pakistán: un estudio de métodos mixtos

**Objetivo** Evaluar el conocimiento y las percepciones de los padres en torno a la poliomiélitis y la vacuna antipoliomiéltica, la participación en las actividades suplementarias de inmunización antipoliomiéltica (ASI) para niños menores de 5 años y las razones por las que no se participó en ellas.

**Métodos** El estudio de métodos mixtos comenzó con una encuesta transversal en Karachi, Pakistán. Se proporcionó un cuestionario estructurado para evaluar el conocimiento de los padres acerca de la poliomiélitis y la participación en ASI antipoliomiélticas llevadas a cabo en septiembre y octubre de 2011. Con objeto de determinar el porqué, se entrevistaron de manera adicional a 30 padres de etnia pastún (grupo de alto riesgo) que se negaron a vacunar a sus hijos. Se llevaron a cabo análisis descriptivos y divariados según el grupo étnico y socioeconómico para obtener datos cuantitativos y se realizaron análisis temáticos para obtener entrevistas cualitativas con padres de etnia pastún.

**Resultados** De los 1017 padres encuestados, 412 (41%) nunca habían oído hablar de la poliomiélitis, 132 (13%) no habían participado en una

ASI y 157 (15,4%) no habían participado en ninguna ASI. Entre los que no habían participado, 34 (21,6%) notificaron que el vacunador no se había puesto en contacto con ellos, 116 (73,9%) informaron que se habían negado a participar y 7 (4,5%) que el niño no estaba en casa cuando el vacunador realizó la visita. Las negativas se agruparon en las familias pastunes con ingresos bajos (43/441; 9,8%) y familias con ingresos altos de cualquier grupo étnico (71/153; 46,4%). La probabilidad de que los pastunes con ingresos bajos no hubieran participado en ASI antipoliomiélticas fue más alta que entre los grupos no pastunes con ingresos bajos (razón de posibilidades, OR: 7,1; intervalo de confianza (CI) del 95%: 3,47–14,5). Las razones citadas más comúnmente entre los pastunes para rechazar la vacunación incluyeron el temor a quedar estériles, la falta de confianza en la vacuna antipoliomiéltica, el escepticismo acerca del programa de inmunización y el temor a que la vacuna pudiera contener ingredientes prohibidos por su religión.

**Conclusión** La interrupción de la transmisión de la poliomiélitis en Karachi exige intervenciones comunitarias integradas y participativas que tengan como objetivo las poblaciones de alto riesgo.

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