

# Poliomyelitis (polio) vaccination and associated stigma in Pakistan

## Abstract

**Background:** Poliomyelitis is debilitating illnesses which chiefly affect children and can be efficiently prevented by Poliovirus vaccine. Although once appeared possible, but till now health authorities failed to eradicate the poliovirus. Countries like Pakistan, Afghanistan and Nigeria topped the list in harboring poliomyelitis. Our objective is to address the possible factors impeding to achieve the goal of Global Polio Eradication Initiative (GPEI).

**Methods:** During a period of six months, a cross-sectional study was conducted in three provinces of Pakistan. Before participation, verbal and written informed consent was obtained from all subjects. This study included all citizens of Pakistan above 18 years.

**Results:** Of the 3000 initially recruited, 86.6% of the participants were aware of polio vaccination. In contrast, only 79% were willing to vaccinate their children. 3.6% of participants asserted that the polio vaccination programs were against the sovereignty. 0.5% of the graduates and 2.7% of uneducated perceived that the polio vaccine contained ingredients which are forbidden in their religion, such as pork since Pakistan is predominantly the Muslim country.

**Conclusion:** The stigma associated with this vaccine is a major challenge for the Government, National and International Health Organizations. Various established misconceptions should be effectively encountered if the goal of GPEI is ever going to be achieved.

**Keywords:** poliomyelitis, vaccine, stigma, sterility, Pakistan

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## Introduction

Poliomyelitis is a viral disease which is primarily transmitted by orofecal route and mainly affects children under 5 years of age.<sup>1</sup> A vast majority of the patients infected with the poliovirus remain asymptomatic; on the other hand, this can cause flaccid paralysis by involving a motor nervous system which can lead to death.<sup>2</sup> Unfortunately, there is no cure for polio, therefore, the treatment solely depends on supportive care and preventing complications. As poliomyelitis is incurable, the main focus shifts towards prevention of the disease.<sup>3</sup>

The prevention of poliomyelitis is chiefly based on vaccinations and safe environmental factors, such as hygienic food and water intake.<sup>4</sup> Polio vaccinations are of two types, Oral Polio Virus (OPV) and Inactivated Poliovirus (IPV) vaccine. OPV vaccine is cost-effective, easy to administer and demonstrated excellent results; thus making it the "vaccine of choice" in many low incomes (developing) countries. OPV vaccine has extremely rare side-effects like causing paralytic disease (1 in 750,000 recipients), which may be due to the presence of the attenuated virus. However, the benefits clearly outweigh the complications.<sup>5,6</sup> In contrast, most of the high-income countries prefer the use of IPV vaccine alone or in combination with OPV vaccine. IPV has not demonstrated to compromise the motor nervous system. Both vaccines (OPV and IPV) have some generic inflammatory side-effects such as fever, influenza-like symptoms, and allergic reactions viz: labored breathing, wheezing, urticaria, vasodilation and tachycardia.<sup>7</sup>

A global effort to wipe out poliomyelitis initiated in 1988 by joint efforts of World Health Organization (WHO), United Nations Children's Fund (UNICEF) and The Rotary Foundation.<sup>8</sup> Since then, the world has seen a rapid decrease in poliomyelitis cases from

soaring number 350,000 cases in the year 1988 to 223 cases in 2012.<sup>9</sup> Recently, poliomyelitis is rare in high-income countries. The high-risk regions declared by World Health Organization (WHO) are South Asia and Africa; only three countries remain endemic to polio, viz: Pakistan, Afghanistan and Nigeria - the first two countries being neighbors.<sup>10</sup>

Latterly, an increasing concern regarding the side-effects of polio vaccine has been observed in some countries. This trend could endanger the aims of GPEI. In Nigeria, it has been thought by some religious clerics that the polio vaccination is a conspiracy by the west to destroy their religious beliefs. Moreover, in Pakistan, there is a belief that the polio vaccination can cause various diseases, suppress the fertility rate and the recipient can become senile in early adulthood. While some believe that the vaccine ingredients are derived from pork, which is forbidden in their religions. Some people also believed that the polio vaccination teams are working for other countries as a conspiracy. These beliefs are becoming the rationale for parents refusing to vaccinate their children.<sup>11,12</sup>

The main objective of this study is to address the possible factors impeding to achieve the goal of Global Polio Eradication Initiative (GPEI) and determine the level of understanding of the people in Pakistan regarding poliomyelitis vaccination and to determine whether there has been any stigma associated with it.

## Materials and methods

### Sample size and population

A cross-sectional study was conducted during a 6 months period in which 2510 out of 3000 randomly selected subjects participated from February to July 2014. The study population included 28 local

communities situated in three provinces of Pakistan- Sindh, Punjab and Khyber Pakhtunkhwa (KPK). A sample of 2500 respondents was required to obtain a 95% confidence interval. To allow for an expected 80% response rate to the questionnaire, 3000 questionnaires were distributed.

**Inclusion criteria**

We included all Pakistani citizens over 18years of age irrespective of sex, creed, religion, culture, educational and socio-economic status. Questionnaires were self-administered and efforts were made to assess the level of knowledge about polio vaccination.

**Study protocol**

Verbal and written informed consents were taken from participants before the start of the study and were briefed regarding its nature. Explanations associated with the procedures were given to illiterate people through an assigned investigator. Related information about polio disease and vaccination was provided to the participants in the form of written materials and oral presentations after questionnaires were filled. The participants were offered to ask freely if they had any query regarding the disease or the research study. All statistical analyzes were performed by using IBM SPSS version 17.0 (IBM Corporation, Somers, NY).

**Results and discussion**

**Results**

Out of the 3000 initially recruited, the total numbers of participants were 2510 with a response rate of 83.6%. 15% (201/1340) of the males were uneducated, 57% (764/1340) had primary/secondary education and 28% (375/1340) graduated or above. Among females, 26% (303/1170), 57.5% (673/1170) and 16.5% (194/1170) were uneducated, primary/secondary educated and graduates or above, respectively. 33% (830/2510) of the participants were Punjabi, 32% (801/2510) were Sindhi while 35% (879/2510) were Pathans-native of the province KPK (Table 1a &1b).

**Table 1a** Demographics (Gender) of the participants (N=2510)

Educational Status	Male N=1340 (% of Male)	Female N=1170 (% of Female)	Total N=2510 (% of Total)
Uneducated*	201 (15)	303 (26)	504 (20)
Primary or Secondary**	764 (57)	673 (57.5)	1437 (57)
Graduate or above	375 (28)	194 (16.5)	569 (23)

\*Uneducated: Never attended school

\*\* Secondary education is equivalent to high school in the United States schooling system

**Table 1b** Demographics (Ethnicity) of the participants (N=2510)

Ethnicity	Male N=1340 (% of Male)	Female N=1170 (% of Female)	Total N=2510 (% of Total)
Punjabi	470(35)	360(31)	830 (33)
Sindhi	453(34)	348(30)	801 (32)
KPK*	417(31)	462(39)	879 (35)

\*KPK: Khyber Pakhtunkhwa Province

Overall 86.6% (2174/2510) of the participants have heard about polio vaccine with male to a female odds ratio (OR) of 1.0 (95% CI was 0.19-4.14). Only 79% (1981/2510) participants were willing to vaccinate their children with a male to a female odds ratio (OR) of 1.1 95% CI was 1.53-5.38 (p-value is 0.03). 3.6% (90/2510) of sample size asserted that the polio vaccination programs were against the sovereignty of their country. 3.8% (52/1340) of the males, 3.2% (38/1170) of the females (Table 2).

All of the participants who were graduates/above (100%) were aware of the polio vaccine. However, only 50.6% (255/504) of the uneducated participant were aware of polio vaccination. 88% (1267/1437) of primary/secondary educated and 97% (554/569) graduate/above respondents were willing to vaccinate their children. In contrast, only 31.7% (160/504) of the uneducated participants were willing for vaccination. Only 0.5% (3/569) of the graduate and 2.7% (14/504) of uneducated people believe that polio vaccine ingredients are derived from pork, which is forbidden in their religion (Table 3).

**Table 2** Perception regarding Polio vaccination (Gender Breakdown)

Questions	Male N=1340 (% of Male)	Female N=1170 (% of Female)	Total (%) N=2510	Male/Female Or (95% C.I)
Heard about Polio vaccine	1204 (90)	970(83)	2174(86.6)	1.08 (0.19-4.14)
Willing to vaccinate their child	1123 (84)	858(73.3)	1981(79)	1.1 (1.53-5.38)
Fear of side effects and sterility in children	134 (10)	201(17.1)	335(13.3)	0.58 (0.43-4.38)
Polio vaccination programs are against sovereignty of country	52 (3.8)	38(3.2)	90(3.6)	1.2 (3.5-24.4)
Contain ingredient forbidden in their beliefs	18 (1.3)	14(1.1)	32(1.2)	1.2 (0.3-24.8)

P-value is 0.03

**Table 3** Perception regarding Polio vaccination (Educational Status Breakdown)

Questions	*Uneducated (% Of Uneducated) N=504	**Primary and Secondary Educated (% Of P&S Educated) N=1437	Graduate And Above (% Of Graduate And Above ) N=569	Total (%) N=2510
Heard about Polio vaccine	255 ( 50.6)	1350(94)	569(100)	2174(86.6)
Willing to vaccinate their child	160 ( 31.7)	1267(88.1)	554(97.3)	1981(79)
Fear of side effects and sterility in children	142(28.1)	179(12.4)	14(2.4)	335(13.3)
Polio vaccination programs are against sovereignty of country	40(7.9)	46(3.2)	4(0.7)	90(3.6)
Contain ingredient forbidden in their beliefs	14(2.7)	15(1.0)	3(0.5)	32(1.2)

\*Uneducated: Never attended school

\*\* Secondary education is equivalent to high school in the United States schooling system

**Table 4** Perception regarding Polio vaccination (Ethical Breakdown)

Questions	Punjabi (% of Punjabi) N=830	Sindhi (% of Sindhi) N=801	*Kpk (% of Kpk) N=879	Total (%) N=2510
Heard about Polio vaccine	714 (86)	734 (91.6)	726 (82.6)	2174 (86.6)
Willing to vaccinate their child	692 (83.3)	732 (91.3)	557 (63.3)	1981 (79)
Fear of side effects and sterility in children	81 (9.7)	32 (4.0)	222 (25.2)	335 (13.3)
Polio vaccination programs are against sovereignty of country	23 (2.7)	9 (1.1)	58 (6.6)	90 (3.6)
Contain ingredient forbidden in their beliefs	12 (1.4)	4 (0.5)	16 (1.8)	32 (1.2)

\*KPK: Khyber Pakhtunkhwa Province

The fear of sterility and other side effects of polio vaccination like fever and influenza-like symptoms in children were found highest in the province of KPK (25.2% - 222/879), followed by Punjab( 9.7%-81/830) and Sindh(4%- 32/801). 6.6% (58/879) of KPK residents thought that the polio vaccination programs were against the sovereignty of the country. While only 1.1% (9/801) of the Sindhi (People of Sindh) believed the same (Table 4).

### Discussion

Since the 1980s, the world has come close to eradicate the polio virus from humans. However, challenging situations in certain low-income countries made it a public health scientists’ distant dream. Our study revealed that all of the participants with a graduate degree or higher were aware of polio vaccine compared to 50% of uneducated respondents. This huge gap of knowledge among highly educated compared to uneducated people clearly demonstrated the contrast in the educational system of Pakistan and its influence.<sup>13</sup>

This study demonstrated that over 13% of the respondent’s feared adverse effects of polio vaccine such as sterility. In a study, conducted in Karachi (Sindh), evaluating the perceived risk factors of sterility, 35% of the sample population believed that sterility was caused by polio vaccine.<sup>14</sup> The variation of results between the two studies mentioned above was probably due to the fact that this study was conducted in rural and urban areas of the three largest provinces of Pakistan and had a greater number of populations assessed in comparison to the latter study which was conducted solely in Karachi.

An interesting trend was observed regarding polio vaccine among the participants of KPK, where 6.6% (58/879) believed that the polio vaccination programs were violating the sovereignty. Therefore compared to other provinces of Pakistan, In KPK, the rate of parents’ willingness to vaccinate their children is the lowest. KPK is the province with the highest rate of poliovirus infections in the whole country and one of the highest in the world. The stigma associated with the ingredients of the vaccine, fear of side effects of the vaccine and worsening law and order situation in this province (neighboring Afghanistan) are the major factors associated with high prevalence of the virus.

The major strength of this study is that it was conducted in three out of four provinces of Pakistan, hence increased the generalizability of the study. It measured the variable of education which yielded the obvious difference in knowledge and overall perception of polio vaccine among the participants. The major limitation of this study is that it did not investigate the reasons for non-immunizations and it did not evaluate the number of parents of children who had not vaccinated.

### Conclusion

The awareness of polio vaccine in different regions of Pakistan varies. The KPK was the province with the highest social

misconceptions and religious misinterpretations. The Government should timely and swiftly address this grave public health concern with mass media campaigns to deal with the stigma associated with vaccination and increase overall awareness on this issue.

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### Conflicts of interest

Author declares there are no conflicts of interest.

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