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Knowledge, attitude and practice of mothers towards the acceptance of oral polio vaccine for their children in Mista-Ali community, JOS, plateau state, Nigeria

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Abstract
The World Health Organization estimated that, each year about a million infants and children die; and three million become deaf, crippled or mentally retarded because of infections from vaccine preventable diseases. Nigeria remains one of the 'polio hot zones'; along with India, Pakistan and Afghanistan. This study examines the knowledge, attitude and practice of mothers towards the acceptance of polio vaccine in Mista-Ali community, Jos Plateau State, Nigeria. The research design was a non-experimental descriptive survey. Data were collected using pre-tested, structured questionnaire, distributed to the target population. The reliability coefficient and validity index of the tool were established as 0.94 and 0.97 respectively. The response rate was 95.9%. Data were analyzed using frequency tables and percentages; and the hypothesis was tested using Chi-square technique; with the aid of SPSS version 21. The findings revealed that, the mean age of respondents was 24.5 years. Majority of the respondents (84.3%) had knowledge of poliomyelitis; and nearly all respondents (94.3%) knew about polio vaccine. Further findings identified a statistically significant relationship between knowledge of mothers on poliomyelitis and the acceptance of polio vaccine for their children (X^2=10.39 P<0.05). Based on these findings, the researcher recommends awareness campaign on poliomyelitis and polio vaccine for mothers and other care-givers. This will drastically reduce the incidence of poliomyelitis, thereby contributing to the national goal of eradicating polio from Nigeria.

Keywords: poliomyelitis, polio vaccine, mothers, knowledge, attitude, practice, acceptance

Introduction: Background

The World Health Organization (WHO) estimated that each year about a million infants and children die and three (3) million become deaf, crippled or mentally retarded because of infections from vaccine preventable disease. In Nigeria, these diseases contribute 10-20% of all deaths in infants and children (about 220,000 annually) [1]. Nigeria has an under-five mortality rate of 201/1000; and immunization coverage of 13%. It remains one of the polio hot zones along with India, Pakistan and Afghanistan; and also one of the 11 countries that accounted for 66% of the world's measles death [2].

Poliomyelitis is an acute infectious viral epidemic and is endemic throughout the world. It is caused by an ultramicroscopic virus, called polio virus - a human entero-virus and member of the family of picornaviridae. It is transmitted by droplets infections and by oral ingestion of the virus. It is mostly found in the gastro-intestinal tract of an infected person. It can be excreted in fecal matter as well as saliva or mucus from the oral cavity and nostrils of an infected person [5].

Immunization is one of the most effective, safest and efficient public health interventions as it is estimated to save at least 3 million lives from vaccine preventable diseases. The global burden constituted by vaccine preventable diseases is immense [3]. The National Program on Immunization (NPI) of the Federal government of Nigeria with the assistance of WHO, United Nations Children Fund (UNICEF), European Union (EU), Canadian International Development agency (CIDA) among others have collaborated with renewed vigour to eradicate wild polio virus (WPV) from Nigeria [4].

Two polio vaccines are used, throughout the world to combat poliomyelitis. The first was developed by Jonas Salk through the use of hela cells and first tested in 1952; and announced to the world by Dr. Thomas Francis Jnr on 12 April, 1955. It consists of an injectable dose of inactivated (dead) polio virus. An oral vaccine was developed by Albert Sabin using attenuated polio virus. Human trials of Sabin's vaccine began in 1957, and it was licensed in 1962 [6].

A cross sectional survey was carried out on knowledge, attitudes and beliefs of parents in Zamfara State, Nigeria in 2012. A multi-stage probability sampling technique was used to randomly select two local government areas in Zamfara state where consenting parents/primary caregivers of children with paralytic poliomyelitis were purposively selected. Findings of the study showed that, out of the 217 parents that participated in the research program, 142 (65.4%) reported good, 51 (23.8%) reported fair, while 24 (11.0%) participants reported poor knowledge of paralytic poliomyelitis. More than half of the respondents (55.3%) showed a positive attitude towards children with paralytic poliomyelitis. Most respondents showed a reasonable belief over the cause of their children's condition rather than the erroneous traditional belief that paralytic poliomyelitis is caused by spiritual forces [8].

A study was conducted on the topic: 'Are parents' knowledge and practice regarding immunization related to

paediatric immunization compliance?'A mixed approach was utilized – a retrospective cohort study was used, to evaluate immunization completeness; while a prospective cross-sectional survey was used to evaluate immunization knowledge and practice of parents. 528 children born between 1 January, 2003 and 31 June 2008 were randomly selected from five public health clinics in Mosul. The results showed that about half of the studied children (56.3%) were immunized with all vaccination doses; these children were considered as having had complete immunization. 66.1% of the parents were found to have adequate knowledge and practice scores. A significant association of immunization completeness with total knowledge and practice groups was found ($P < 0.05$) [9].

A cross-sectional survey was conducted on: 'knowledge attitude and practices of mothers regarding immunization of infants and pre-school children at Al-Beida City, Libya.' Non-randomized sample of 200 mothers were interviewed at primary health care clinic at Al-Beida City. Findings showed that, a total of 162 (81%) mothers have completely immunized their children; and 38 (19%) partially immunized them. 77% of respondents were from urban; while the rest were from rural town. Paramedical workers were the main source of information to respondents of completely immunized children (88.28%) followed by Television, posters and symposia; while community leaders and doctors were found to be a lesser source. Concerning the effect of the education status of the mothers, the percentage of complete immunization was (71.41%) for highly educated mothers while for the illiterates, it was (88.23%) but the difference was not statistically significant. The mothers' work did not affect their children's immunization status as 79.5% of working mothers completed their children's immunization. The child's health and sickness was the most common cause for cessation of immunization; followed by non-availability of the vaccine, social reasons and forgetfulness (54%, 20%, 10.5% and 5.5%) respectively. Only 10% of the mothers failed to report a reason for not immunizing their children [10].

A descriptive cross-sectional survey was conducted on knowledge and attitude towards childhood immunization among mothers attending antenatal clinic in Lagos University Teaching Hospital (LUTH), Nigeria was conducted in 2009. The study involved 274 mothers attending antenatal clinic in LUTH from April to June, 2009. Results showed that, almost all of the respondents were aware of immunization (93.8%); and that immunization could prevent children illness (98.1%). However, some of the respondents (28.8%) felt immunization will make their children brilliant. 45.5% of the respondents thought that polio vaccines ought to be given five (5) times; while only 8.6% knew it should be given four (4) times. There were a significant relationships between age of respondents, ethnicity, level of education, occupation and attitude towards immunization ($P<0.05$). However, there was no significant relationship between religion and attitude towards immunization ($P>0.05$). Although, majority of the mothers were aware of the existence of immunization services, their knowledge of routine immunization schedule of vaccine preventable diseases was poor [11].

A descriptive cross-sectional study was conducted on Knowledge, attitudes and perceptions towards polio immunization among residents of two highly affected regions of Pakistan (Quetta and Peshawar) from August to December 2014. Multistage sampling technique was used to draw sample of residents from each division having a total of 768 participants. Findings showed that, 38.8 % participants exhibited good knowledge about polio. Mean knowledge score of the participants was 7.35 ± 2.54 (based on 15 knowledge questions). Older age ($p < 0.001$), low qualification ($p < 0.05$), rural locality ($p < 0.05$) and Quetta division ($p < 0.001$) were significantly associated with poor knowledge of polio. A large proportion of participants displayed negative attitudes towards polio immunization (84.8 %), with a mean score of 19.19 ± 2.39 (based on 8 attitude statements). Lack of education ($p < 0.001$) and rural residence ($p < 0.001$) were significantly associated with the negative attitudes of participants towards polio immunization. False religious beliefs (39.06 %), lack of knowledge (33.7 %), fear of infertility by polio vaccines (32.16 %) and security issues (29.42 %) were reported by the participants as the main barriers towards polio immunization [12].

Global polio eradication has dramatically reduced polio transmission throughout the world, with the eradication from Western hemisphere in September, 1994 but this has suffered great set back in Nigeria, especially the Northern part witnessing pandemonium and commotion, with some citizens erroneously saying - oral polio vaccines (OPV) cause infertility [2].

Polio eradication in Nigeria at the end of 2010 reported a total of 18 wild polio virus (WPV) cases with onset of paralysis in 2010, compared to 389 WPV cases at the same time in 2009. In 2003, though Nigeria had the highest number of polio cases in the world, planned polio supplementary immunization activities (SIAs) were suspended because of questions and concerns regarding the safety of oral polio vaccine (OPV) used in Nigeria. Consequently the number of polio cases increased to 1,122 in 2006. The significant drop to 285 polio cases in 2007 was not sustained as in 2008, the number of cases rose to 798. But this time the downward trend from 2009 to 2010 appears to have been sustained. To further accelerate progress towards polio eradication, Nigeria, must continue to apply the results of ongoing research and studies to enhance the quality of strategies [7].

Mista-Ali community is a typical Nigerian rural community where polio immunization programmes such as "Kick out Polio" are carried out. This study was undertaken to assess the knowledge, attitude and practice of women (mothers) towards the acceptance of polio-vaccine for their children (0-5years) in Mista-Ali community, Jos, Plateau State, Nigeria.

Theoretical Framework

The study was based on Pasteur's theory of Vaccination (1855). Louis Pasteur, in France demonstrated the origin of infectious disease and proved that protection from these diseases could be obtained by the injection of an attenuated organism; i.e. by introducing a mild-benign illness, which results in a certain lasting immunity.

In line with Pasteur's theory, the polio vaccine was invented by Albert Sabin from doses of in-activated (dead) poliovirus. Human trials of Sabin's vaccine began in 1957 and it was licensed in 1962 [13]. The injected Salk vaccine confers IgG-mediated immunity in the blood stream, which prevents polio infection from progressing to viraemia; and

protects the motor neurons, thus eliminating the risk of bulbar polio and post-polio syndromes [14].

Materials and Methods

Research Design

This research was a non-experimental descriptive survey to evaluate the knowledge, attitude and practice of mothers towards the acceptance of polio vaccine for their children in Mista-Ali community Jos, Plateau State, Nigeria.

Study Area

The study area was Mista-Ali community, located in Buji District in Bassa Local Government Area of Plateau State. It is bounded by Zabollo on the North, Rukuba on the West, Bauchi on the East and Jos North on the South. Its Primary Health care Centre (PHC) is located at Minta,
Mista-Ali. The community has three (3) wards.
It has a cold climate condition due to its high altitude, (1,238 metres above sea level). The coldest periods are between November and February with maximum temperature of 20^0C. It is warm between March and April which ushers in the rains. The rainy season is between June and October with its peak in August.
The inhabitants of Mista-Ali were predominantly farmers. Their major farm product was maize grain. Other occupation includes: trading and hunting. The institutions there include: the Primary Health Care Centre Mista-Ali, Primary Schools, Government Secondary Schools, Churches, Mosques and a Power Plant. The sources of water supply includes: bore holes, wells and rain water. Most of the inhabitants were secondary school leavers.
The total population was about 6,000 (Nigeria Population Census 2006) and the estimated monthly target population for polio immunization was 7% of the total population. The predominant indigenous people in Mista-Ali are Buji people. There are very few Fulani, Hausa, Munchika, Igbo, Rukuba and Yoruba people. The inhabitants are Christians and Muslims mixed together.
Immunization activities in the area, is mainly by fixed services with monthly mass immunization campaign on National Immunization Plus Days (NIPDs). Immunization services are provided by Primary Health Care staff in the community.

Target Population

The target population was mothers in Mista-Ali community, Jos, Plateau State, Nigeria

Sampling Technique and Selection Criteria

This study was based on convenience method of sampling. The Respondents were selected based on a certain criteria: that they were mothers, with children between the ages of zero to five (0-5) years; who are resident at Mista-Ali for at least 6 months, and were willing to participate in the study.

Tool for Data Collection

The instrument used for this study was a pre-tested structured questionnaire; which comprised of four sections: section A, B, C and D; with questions on: socio-demographic variables, knowledge on poliomyelitis and polio vaccine, attitude towards polio vaccine, and practice towards acceptance of the vaccine, respectively. The reliability coefficient and validity index of the tool were established as 0.94 and 0.97 respectively.

Method of Data Collection

One hundred and forty six (146) questionnaires were administered hand to hand to the respondents. One hundred and forty (140) questionnaires were filled and returned to the researcher. This implies that, the response rate was 95.9%.

Data Analysis

The data were analyzed using Statistical Package for the Social Sciences, (SPSS) version 21. Descriptive statistics (frequency tables, percentages and mean) and inferential statistics (chi-square) were used in data presentation and analysis.

Ethical Considerations

Permission letters were obtained from: the village head and the coordinator of Primary Health Care Centre of Mista Ali, before conducting the study. The researcher also gained an informed verbal consent from each respondent. Furthermore, utmost confidentiality was ensured, as data collected were used only for the purpose of this study.

Results

Table 1: Socio-demographic Characteristics of Respondents

S. N.	Variable	Frequency (n=140)	Percentage(%)
1.	Age		
	16-20	32	22.9
	21-25	52	37.1
	26-30	45	32.1
	31-35	6	4.3
	36-40	3	2.1
	41- 45	2	1.4
	Total	140	100% Mean age =24.5
2.	Religion		
	Christianity	62	44.3
	Islam	78	55.7
	Total	140	100%
3.	Occupation		
	Civil servant	11	7.9
	Trader	41	29.3
	Farmer	26	18.6
	Students	27	19.3
	House wife	35	25.0
	Total	140	100%
4.	Tribe		
	Buji	35	25.0
	Fulani	24	17.1
	Hausa	47	33.6
	Yoruba	20	14.3
	Igbo	10	7.1
	Other tribe	4	2.9
	Total	140	100%

Table 1 depicts that, majority of the respondents (92.1%) were below 31 years; and the mean age was 24.5 years. More than half of respondents (55.7%) were Muslims; while 44.3% were Christians. 29.3% respondents were traders; while only 7.9% of the respondents were civil servants. Some of the respondents were farmers and students - 18.6% and 19.3% respectively. 33.6% of the respondents were Hausa; while Buji constituted 25%, and Fulani respondents were 17.1%. A few were Yoruba, Igbo and from other tribes - 14.3%, 7.1% and 2.9% respectively.

Table 2: Knowledge of Poliomyelitis and Polio Immunization

S. N.	Variable	Response	Frequency (n=140)	Percentage (%)
5.	Have you heard of poliomyelitis?	Yes	118	84.3
		No	22	15.7
	Total		140	100%
6.	If yes, how?	Television	18	15.3
		Radio	36	30.5
		Books	12	10.2
		Hospitals	52	44.1
	Total		118	100%
7.	Have you heard of polio vaccine?	Yes	132	94.3
		No	8	5.7
	Total		140	100%
8.	If yes, How?	Television	1	0.8
		Radio	3	2.3
		Books	1	0.8
		Hospital	48	36.4
		House to house	79	59.9
		Immunization		
	Total		132	100%
9.	What is poliomyelitis?	a) Weakness of either upper or lower limb	40	28.6
		b) Fever, sudden weakness and paralysis of either upper or lower limb	75	53.6
		c) I don't know	25	17.9
	Total		140	100%
10.	Does polio vaccine have side effects?	Yes	13	9.3
		No	127	90.7
	Total		140	100%
11.	If yes, what are the side effects?	Fever	3	23.1
		Body weakness	4	30.8
		Vomiting	3	23.1
		Headache	1	7.7
		Infertility	2	15.4
	Total		13	100%
12.	Does dirty environment cause polio?	Yes	68	48.6
		No	72	51.4
	Total		140	100%
13.	Does lack of good food cause polio?	Yes	69	49.3
		No	71	50.7
	Total		140	100%

Table 2 shows that, majority of the respondents were aware of poliomyelitis and polio vaccine; - 84.3% and 94.3% respectively. However, about half of the respondents felt dirty environment and lack of good food cannot cause poliomyelitis - 51.4% and 50.7% respectively. Most of the respondents heard about poliomyelitis through the hospital (44.1%). House to house polio immunization showed to be a very important means where the mothers learned about polio vaccine (59.9%). Over half of the respondents (53.6%) knew what poliomyelitis is; and majority of the respondents (90.7%) believed that the polio vaccine has no side effect.

Table 3: Attitude towards Polio Vaccine

S. N.	Variable	Response	Frequent (n=140)	Percentage (%)
14.	How do you feel about the vaccine?	I like it	115	82.1
		I don't like it	17	12.1
		I don't know	8	5.7
		Total	140	100%
15.	Is the vaccine good for children?	Yes	124	88.6
		No	16	11.4
		Total	140	100%

As shown in table 3 above, a large percentage of the respondents (82.1%) had positive attitude towards the polio vaccine, while 12.1% expressed their dislike towards the polio vaccine, very few respondents (5.7%) were indifferent about the vaccine. Majority (88.6%) of the respondents said they knew that the vaccine is good for children, while only 11.4% of the respondents said they did not know if the vaccine was good for children.

Table 4: Practice towards acceptance of Polio Vaccine

S. N.	Variable	Response	Frequency (n=140)	Percentage (%)
16	Do you accept the polio vaccine for your children?	Yes	120	85.7
		No	20	14.3
		Total	140	100%
17.	If no, why	It causes fever	6	30.0
		Infertility	1	5.0
		My husband said no	6	30.0
		No response	7	35.0
		Total	20	100%

Table 4 depicts that, majority of the respondents (85.7%) agreed that their children should be given the polio vaccine; and allow their children receive routine polio immunization. While few of the respondents, (14.3%) refused their children taking the polio vaccine. Out of the few respondents that said 'no' to polio vaccine, 5% claimed that the vaccine causes infertility; while 30% said it causes fever; another 30% said their husbands forbids it.

Test of Hypothesis

H_0: There is no significant relationship between mothers' level of knowledge of poliomyelitis and acceptance of polio vaccine.

Table 5: Cross Tabulation of Mothers' level of knowledge about poliomyelitis and acceptance of polio vaccine

Knowledge of poliomyelitis		Acceptance of polio vaccine		Total
		Yes	No	
Have you heard of poliomyelitis?	Yes	106	12	118
	No	14	8	22
	Total	120	20	140

Chi square (X^2) = 10.390; Critical value = 3.841; Degree of freedom (df) = 1; P value = 0.001; Level of Significance = 0.05

Since the calculated chi-square of 10.390 is greater than the critical value of 3.841, and the P value 0.001 is less than the significant level of 0.05, (table 5) the null hypothesis is rejected, meaning that there is a significant relationship between mothers' level of knowledge about poliomyelitis and acceptance of polio vaccine, which implies that their acceptance of polio vaccine was influenced by their knowledge about it.

Discussion

Immunization is an important public health interventions strategy to reduce the morbidity and mortality associated with infectious diseases. Over two million deaths are delayed through immunization each year worldwide. Despite this, vaccine preventable diseases remain the most common cause of childhood mortality with an estimated three million deaths each year [15].

This present study has shown that majority of the respondents (84.3%) had the knowledge of poliomyelitis; and almost all of the respondents (94.3%) had knowledge on the polio vaccine. In conformity with this study, the findings of Ogwumike *et al*, among parents in Zamfara state, revealed that 65.4% and 23.8% reported good and fair knowledge of paralytic poliomyelitis respectively [13]. On a similar note, Khowaja *et al.* found that 55.4% of the participants have heard of a disease called Poliomyelitis and 75.5% of the participants heard about polio vaccine campaigns [16].

Contrary to the findings of this study, Khan *et al*. found that the overall knowledge of the participants about Polio was inadequate (38.8%) [12]. However, The study also showed that majority of respondents (82.1%) had positive attitude towards the polio vaccine and they felt it is good for their children to be vaccinated with the polio vaccine. On a contrary note, results of a study on polio immunization among residents in Pakistan conducted by Khan *et al*, revealed that, a large proportion of participants (84.8 %) displayed negative attitudes towards polio immunization [12].

Findings from this study showed that the hospital was a major source of information on poliomyelitis and polio vaccine, house to house polio immunization also showed to be a very important means of disseminating information about polio vaccine (59.9%). Similar study on knowledge, attitude and practices of mothers regarding immunization of infants and pre-sectional children at Al-Beida city Libya, also revealed that, the hospital was the main source of information to respondents on poliomyelitis and polio immunization. House to house immunization showed to be another good source of information to the respondents; while television and books showed to be lesser sources [10]. This implies that, hospitals and house to house immunization programmes are living up to expectation in creating awareness on poliomyelitis and its preventive measures.

This study has found that, majority of mothers that do not allow their children to be vaccinated with the polio vaccine (65%) had reasons for their actions. They complained that it causes fever to the children, (30%) while others said; their husbands instructed them not to take the vaccine for their children (30%). Some of the mothers, who rejected polio vaccine, could not disclose their reasons for rejecting the vaccine (35%). Similarly, Abdulrahaam [17] also found various reasons adduced by mothers for incomplete vaccination of their children such as: child ill-health at the time of immunization (3.6%), parents' objection, disagreement or concern about immunization (38.8%). Other studies found that some husbands either prohibit their wives from taking children for vaccination or refuse permission for vaccination [18, 19].

Although majority of the respondents had good knowledge about poliomyelitis, their knowledge on the means of transmission of the polio virus was poor (49.3%). This supports the findings of a previous study conducted by Osowole and Obute who found that 55.7% of the respondents did not know the mode of poliovirus transmission [20].

Although, Jheeta and Newell, reported that the impact of high levels of knowledge on subsequent attitudes towards vaccination is unknown [11], This study found that there was a significant relationship between the mothers knowledge of poliomyelitis and acceptance of the polio vaccine ($P<0.05$),

which implies that their acceptance of polio vaccine was influenced by their knowledge about it. This has helped to fill the existing gap. On a contrary note, some literatures report that the public accept vaccination despite limited knowledge about it [21, 22] and little knowledge about vaccination does not necessarily translate into negative attitudes towards it. [22, 23, 24] Hence, more awareness campaign on poliomyelitis is recommended so as to increase the acceptance rate and inculcate positive attitude among mothers towards polio immunization.

Conclusion

The knowledge of mothers on poliomyelitis and polio vaccine was high and the hospital has shown to be the major means of information for the mothers on poliomyelitis. Conclusively, we report a statistically significant relationship between mothers' knowledge of poliomyelitis and the acceptance of polio vaccine in Mista Ali community. Therefore more effort should be put in ensuring that, mothers are well knowledgeable about the poliomyelitis and the polio vaccine.

Recommendations

Based on the findings of the study, we recommend the following:

1. The government should cooperate with non-governmental organizations in promoting awareness on poliomyelitis.
2. Community Health Workers should organize community outreaches through health education and sensitization on poliomyelitis and polio vaccine.
3. The primary health care centres should be equipped with more medical personnel and facilities so as to promote quality health care services such as immunization programs.
4. New strategies that can overcome noncompliance from parents and capture the children for polio vaccination should be introduced into the House to house immunization.

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