

Knowledge, Attitude and Practice of Mothers on Immunization in Akure North Local Government Area Ondo State South West Nigeria

Type: Research Article

Received: February 27, 2023

Published: March 20, 2023

Citation:

Tomori Michael Olabode.
"Knowledge, Attitude and Practice of Mothers on Immunization in Akure North Local Government Area Ondo State South West Nigeria". PriMera Scientific Surgical Research and Practice 1.4 (2023): 08-19.

Copyright:

© 2023 Tomori Michael Olabode. This is an open-access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Tomori Michael Olabode*

Department of Public Health, University of Central Nicaragua

***Corresponding Author:** Tomori Michael Olabode, Department of Public Health, University of Central Nicaragua.

Abstract

Background: The knowledge of mothers on immunization as a public health intervention that has greatly reduced mortality and morbidity globally is very vital as they play a great role in child care. Their ability to have the right knowledge will enhance their practice and attitude towards immunization. This study assessed the knowledge, attitude and practice of mothers on immunization and the impact of sociodemographic characteristics of children undergoing immunization. **Objective:** The aim of the study is to assess the knowledge, attitude and practice (KAP) of mothers on immunization in Akure Ondo State, South West Nigeria. **Method:** A descriptive study was conducted on mothers of children born between 26th September 2011 to 26th September 2012. A household multi-stage sampling 48-item questionnaire study design was modified, adopted and administered. Consents of respondents were sought before the administration of questionnaires. IBM SPSS Statistics version 27.0.1.0 was used in analyzing the data. **Results:** The study showed that majority of respondent (89.6%) had an overall good knowledge while 5.2% each had fair and poor knowledge. But less than 60% and 3% reported for vaccination at the stipulated time and had negative attitude towards immunization respectively. Factors that affect the knowledge of mothers on immunization from the study are educational status, marital status, religion, geopolitical zone and her and/or the father of the child been immunized as children. **Conclusion:** This study revealed that respondents had high knowledge on immunization, however it doesn't translate practice since some mothers did not complete their immunization schedule. There is a need for health promotion and education to sensitize mothers on the importance, objectives and benefits of immunization.

Keywords: Knowledge; attitude; practices; mothers; immunization

Introduction

Immunization according to the World Health Organization (WHO) can be defined as the process by which a person become immune or resistant to an infectious disease, through the administration of a vaccine. These vaccines stimulate the body's own immune system to protect one against subsequent infection or disease (WHO, 2013). Immunization therefore depicts the ability to develop immunity. Immunity being the state of having sufficient biological defenses to avoid infection, disease, or another unwanted biological invasion (Gherardi, 1989). Immunity also portray the size of the body to resist harmful microbes from gaining access into it. In the constant human beings' effort to combat diseases that affect their wellbeing, immunization has become the most fortunate and cost-effective tool in public health interventions. Globally, immunization in the past years has assisted in preventing more deaths when compared to any other health intervention (Awosika, 2012). In addition, immunization has been confirmed as a useful tool in managing and eradicating of life-threatening infectious disease. WHO (2013) estimated that 2 to 3 million deaths are alleviated each year as a result of immunization though 22 million infants are still missing out on basic vaccines. According to the global vaccination coverage report, the proportion of the world's children who receive recommended vaccines has remained steady for the past few years giving an instance that the percentage of infants fully vaccinated against diphtheria-tetanus-pertussis (DTP3) was 83% in 2011, 84% in 2010 and 83% in 2009. Findings also showed that more than 10 million children in low- and middle-income countries die every year before they reach their fifth birthdays. The death of most of them is because they don't access effective interventions that can fight common and preventable childhood illnesses (Lee, 2003). According to Odusanya et al. (2008), the most common cause of childhood mortality with an estimated three million deaths per year remains vaccine preventable diseases. They also observed that uptake of vaccination services does not only rely on provision of these services alone but also on other factors such accessibility to vaccination clinics and availability of safe needles and syringes, mother's knowledge and attitude and concentration of health workers. According to Kapoor and Vyas (2010), immunization is one of the most effective, safest tools in intervention programs with great effect on morbidity and mortality in childhood, however its full potential has not been achieved. The use of successful strategies on immunization made it accessible to hard to reach and vulnerable populations with its glaring involvement of targeted groups (WHO, 2013). In addition, it is very unlikely a pathogen will be carried and transmitted from person to person when immunization rates are significantly higher but decrease in vaccination rates will lead to the emergence of diseases again in the population. A case in point is the fact that Measles is now endemic in the United Kingdom, after vaccination rates dropped below 80% (Awosika, 2012). There were unfounded fears of polio vaccine in 2001 in Nigeria that result to a decline in vaccination rates and re-emergence of infection, and the subsequent spread of polio to ten other countries (Awosika, 2012). In the United States of America in 1958, a total of 552 deaths was recorded out of 763,094 cases of measles reported (Orenstein et al., 2004; CDC, 2008). However, with the introduction of novel vaccines, the number of cases dropped to fewer than 150 per year with a median value of 56. In addition, CDC (2008) also reported 64 suspected cases of measles in the United States of America with 54 of them acquired outside the country while 63 of the reported cases have never been or unsure of ever been vaccinated against measles. In response to the opposition to global immunization, WHO (World Health Organization) and UNICEF (United Nations International Children's Emergency Fund) establish the Global Immunization Vision and Strategy (GIVS, 2005). The main aim of GIVS is basically to reduce morbidity and death as a result of vaccine-preventable diseases by at least two-thirds by 2015 or earlier. However, TFI (Task Force on Immunization in Africa) recognized that the vaccine preventable diseases (VPD) disproportionate burden can be prevented through high vaccination coverage in the African Region right from the outset. Hence, they place difficult aims to ensure that their immunization performance caught up with another region's performance in 2001-2005. In peri-urban Karachi, Siddiqi et al. (2010) in their study concluded that the knowledge of mothers on Expanded Program on immunization (EPI) vaccination was quite low and not associated with their children's EPI coverage. However, mother's educational status, was significantly associated with child's coverage. Furthermore, several studies on the immunization status of children have been published in various countries at different times, and comparisons with these studies are interesting but must be made carefully (Angelilio et al., 1999). They also stated that since many factors may influence vaccination coverage, important differences should be considered, such as prevalence of vaccine-preventable diseases, availability of vaccination centers, level of knowledge and information about vaccination, and different methods used to measure immunization status.

The National Primary Health Care Development Agency in Nigeria has a National Immunization Policy that was revised in 2009 that contains Immunization Schedule designed to include all children 0-1 year. The 0-1 year old children shall receive one dose of BCG (Bacille-Calmette Guerin) to fight tuberculosis, one dose of Yellow Fever vaccine, 3 doses of DPT (Diphtheria, Pertussis and Tetanus), 3 doses of Haemophilus influenza (Hib) vaccines, 3 doses of Hepatitis B vaccines, 4 doses of (Oral Poliomyelitis Vaccine) OPV and one dose of Measles vaccine before the age of one.

In light of the need to reduce the high morbidity and mortality rate among children, especially those under 5 years, from VPDs, the present study addressed proper health education and health promotion interventions be taken as measures to enhance mothers' knowledge, attitude and practice towards immunization as a tool for disease prevention. The findings from this study may help political leaders and health program managers develop policies and interventions to improve knowledge, attitude and practice of mothers towards immunization.

The objectives of the study are:

1. To assess mother's knowledge towards immunization.
2. To determine the Attitude of mothers towards immunization.
3. To determine the Practice of mothers as regards immunization.
4. To determine the Influence of socio demographic characteristics on knowledge.

Methods

Research Design

This was a descriptive cross-sectional study that was questionnaire-based conducted between July 1st, 2022 and November 20th, 2022.

Research Study Area

The study area for this research is Ondo State specifically Akure North in South West Nigeria. The peoples' major language here is Yoruba and they engage in trading and farming. Akure North Local Government Area of Ondo State has a population of about 376,327 (NPC, 2006). The records of the month of August 2012 at the immunization Centre in the Ministry of Health, Akure were also studied and the information required extracted.

Study Population

The population for this study comprises of mothers of children born between 26th September 2011 to 26th September 2012.

Sample Size Determination

The minimum sample size was calculated using the Cochran's formula for descriptive Studies.

$$n = z^2pq/e^2$$

Where n is the minimum sample size needed.

z is the confidence level of 1.96,

e is the desired level of precision which is 0.05,

p is the estimated proportion of the population of mother's knowledge on immunization (which is 0.5), q is 1-p.

Hence,

$$N = (1.96)^2 \times 0.5 \times (1-0.5) / (0.05)^2$$

10% non-response rate was set to account for non-responsive respondents, hence approximately sample size of 423 was used in the study.

Sampling Technique

A multi-stage sampling technique was employed in the study. Respondents selected from the study were then administered with questionnaires by the trained research assistants.

Study Instrument

A pre-tested questionnaire was used to collect information from the respondents. The questionnaire comprised of four different sections: the socio-demographic characteristics, the level of knowledge towards immunization; the attitude of mothers towards immunization; and the practice of mothers towards immunization. The questionnaire was translated into Yoruba language, for easy comprehension by the respondents.

Reliability and validity of data

Test-reliability was done by administering the questionnaire to 10 mothers in various wards of Akure North metropolis, questionnaires were pretested to observe response of mothers and ascertain the appropriateness of the questions and after 2 weeks, the same questionnaire was re-administered to the same mothers and the reliability was calculated to be 0.77.

Data collection

The data was collected through the use of a structured questionnaire through trained research assistants between 26th August 2022 to 25th September 2022. The questionnaire was administered to the respondents and was retrieved after it had been duly responded to. All the subjects were oriented on the purpose of the study and instructed on how to complete the questionnaire. Completed copies of the questionnaire were retrieved after the time frame. The data analysis was based on responses of 232 respondents whose questionnaires were correctly completed and returned.

Data Analysis

The data collected in this study was analyzed using SPSS software version 27.0.1.0 after sorting out the questionnaires. Descriptive analysis in the form of frequency distribution and percentages were used to describe the data and also chi-square was used to find the association between variables at a level of significance of $P < 0.05$. Consistency of data entered was done by random checking.

Ethical approval

Ethical clearance was obtained from the Research Ethics Committee National Open University. Informed consent was also obtained from each respondent. Utmost care was taken to take care of privacy and confidentiality.

Informed consent was obtained from National Open University Ethical Committee Akure each of the respondents in the study area.

Results

A total of three hundred and fifty-five (423) questionnaires were distributed through trained research assistants but two hundred and thirty-two (232) questionnaires were completely filled and retrieved in Akure North local government area and analysed using frequency and percentage distribution.

The following data were collected and interpreted:

Socio-demographic variables of the respondents

Age	Frequency	Percentage
<25	49	21.1
25-30	103	44.4
31-40	71	30.6
>40	9	3.9
Total	232	100.0

Table 3.1: Distribution of the age of mothers sampled.

The result in Table 3.1 showed that mothers were largely between the ages of 25-30 years (44.4%) which is the reproductive period for most women. Only about 4% were above 40 years of age.

Status	Frequency	Percentage
Single/separated/divorced/widowed	17	7.3
married	215	92.7
Total	232	100.0

Table 3.2: Marital Status of the mothers.

Table 3.2 showed that almost 93% of the mothers were married while the remaining percentages were single, separated, divorced or widowed.

Education	Frequency	Percentage
Primary	28	12.1
Secondary	131	56.5
Tertiary	64	27.6
None	9	3.9
Total	232	100.0

Table 3.3: Mothers' education.

Table 3.3 revealed that most of the mothers have had some form of secondary education, this accounted for over 56%. However, 3.9% never had any formal education.

Zone	Frequency	Percentage
North-central	175	75.4
North-west	7	3.0
North-east	8	3.4
South-south	0	0
South-west	17	7.3
South-east	25	10.8
Total	232	100.0

Table 3.4: Geopolitical zones distribution of mothers.

Table 3.4 portrayed that a large majority of mothers were from the north central (75.4%) geopolitical zone of the local government area.

<i>Religion</i>	<i>Frequency</i>	<i>Percentage</i>
Christianity	215	92.7
Islam	17	7.3
Total	232	100.0

Table 3.5: Religion of mothers surveyed.

Table 3.5 Most of the respondents 215(92.7%) are Christians.

<i>Occupation</i>	<i>Frequency</i>	<i>Percentage</i>
Housewife	55	23.7
Business/trading	121	52.1
Civil servant	32	13.8
Corporate organization	12	5.2
student	12	5.2
Total	232	100.0

Table 3.6: Mothers' occupation.

Table 3.6 More than half of the respondents 121(52.1%) are business/trader.

	<i>Yes N (%)</i>	<i>No N (%)</i>	<i>I don't know N (%)</i>
Heard about immunization	230 (99.2)	1(0.4)	1 (0.4)
Immunization prevents childhood disease	218 (94.0)	5 (2.2)	9 (3.9)
It stops children from developing properly	10 (4.3)	207 (89.2)	15 (6.5)
<i>Vaccine preventable diseases catered for in Nigeria</i>			
Tuberculosis	184 (79.3)	12 (5.2)	36 (15.5)
Malaria	136 (58.6)	55 (23.7)	41 (17.7)
Diphtheria	105 (45.3)	24 (10.3)	103 (44.4)
Pertussis	114 (49.1)	19 (8.2)	99 (42.7)
HIV	61 (26.3)	118 (50.9)	53(22.8)
Measles	203 (87.5)	15(6.5)	14 (6.0)
Influenza	113 (48.7)	44(19.0)	75 (32.3)
Poliomyelitis	213 (91.8)	8 (3.4)	11 (4.7)
Hepatitis	187 (80.6)	20 (8.6)	25 (10.8)
Tetanus	182 (78.4)	22 (9.5)	28 (12.1)
Yellow fever	202 (87.1)	8 (3.4)	22 (9.5)

Table 3.7: Assessment of Knowledge.

Table 3.7 Revealed that most of the respondents had knowledge on immunization and how it can prevent disease in childhood.

<i>Knowledge</i>	<i>Frequency</i>	<i>Percentage</i>
Good	208	89.6
Fair	12	5.2
poor	12	5.2
Total	232	100.0

Table 3.8: Cumulative assessment of knowledge.

Table 3.8 Showed that 208(89.6%) of the respondents had good score in knowledge assessment while 12(5.2%) had fair and poor score in knowledge assessment respectively.

<i>Vaccine</i>	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>
BCG	130 (56.0)	27 (11.6)	70 (30.2)	-	5(2.2)
DPT	94 (40.5)	41(17.7)	72 (31.0)	18 (7.8)	7 (3.0)
Hepatitis	92 (39.7)	35 (15.1)	75 (32.3)	23 (9.9)	7 (3.0)
OPV	93 (40.1)	37 (15.9)	75 (32.3)	20 (8.6)	7 (3.0)
Measles	116 (50.0)	18 (7.8)	76 (32.8)	-	22 (9.5)
Yellow fever	112 (48.3)	19 (8.2)	76 (32.8)	-	25 (10.7)

Table 3.9: Assessments of practices.

Table 3.9 Classified the children and their level of immunization depicting the practice of their mothers. Over 30% were immunized against each of the diseases but, there was poor documentation practice as the immunization cards weren't available for to validate the data. There were also cases of incomplete dosage for vaccines uptake while some children don't receive at all.

Note: DPT and Hepatitis were taken as single dose or as in PENTA

Key:

- A- Vaccinated at the stipulated time.
- B- Vaccinated but not at the stipulated time.
- C- Mothers history.
- D- Incomplete doses.
- E- Not vaccinated.

Hypotheses Testing

The section would be analysed using chi-square distribution which is a non-parametric test which is used to determine whether there would be an association between each of the socio-demographic variable and the knowledge.

The null hypothesis states that there is no association between respondent demographic profile and knowledge.

Decision rule: If probability value (p-value) < α , where the level of significance (α) is set at 5% level of significance, reject the null hypothesis, otherwise, do not reject.

Characteristics	knowledge			Chi-square	p-value
	Good n=208	Fair n=12	Poor n=12		
<u>Sex</u>				0.486	0.784
Female	100(88.5%)	7 (6.2%)	6 (5.3%)		
Male	108 (90.8%)	5 (4.2%)	6(5.0%)		
<u>Mothers age</u>				3.722	0.714
<25	42 (85.7%)	3(6.1%)	4(8.2%)		
25-30	94(91.3%)	4(3.9%)	5(4.9%)		
31-40	64(90.1%)	5(7.0%)	2(2.8%)		
>40	8(88.9%)	0(0.0%)	1(11.1%)		
<u>Mothers Marital Status</u>				14.766	0.001*
Single/separated/divorced/ widowed	(64.7%)	4(23.5%)	2 (11.8%)		
married	197 (91.6%)	8 (3.7%)	10 (4.7%)		
<u>Mothers Education</u>				22.846	0.001*
None	6 (66.7%)	0 (.0%)	3 (33.3%)		
Primary	22(78.6%)	4(14.3%)	2(7.1%)		
Secondary	120 (91.6%)	7 (5.3%)	4 (3.1%)		
Tertiary	60 (93.8%)	1 (1.6%)	3 (4.7%)		
<u>Geopolitical Zone</u>				46.747	0.000*
North-central	160 (91.4%)	8 (4.6%)	7 (4.0%)		
North-west	2 (28.6%)	1 (14.3%)	4 (57.1%)		
North-east	6 (75.0%)	1 (12.5%)	1 (12.5%)		
South-south					
South-west	17 (100.0%)	0 (0.0%)	0 (0.0%)		
South-east	23 (92.0%)	2 (8.0%)	0 (.0%)		
<u>Mother's Occupation</u>				14.540	0.069
Housewife	44 (80.0%)	3 (5.5%)	8 (14.5%)		
Business/trading	110 (91.7%)	7 (5.8%)	3 (2.5%)		
Civil servant	30 (93.8%)	1 (3.1%)	1 (3.1%)		
Corporate organization	12 (100.0%)	0 (0.0%)	0 (0.0%)		
student	12 (92.3%)	1 (7.7%)	0 (0.0%)		
Religion				24.324	0.000*
Christianity	198 (92.1%)	10 (4.7%)	7 (3.3%)		
Islam	10 (58.8%)	2 (11.8%)	5 (29.4%)		
Mother's immunized				31.933	0.000*
Yes	179 (92.3%)	9 (4.6%)	6 (3.1%)		
No	7 (50.0%)	2 (14.3%)	5 (35.7%)		
I don't know	22 (91.7%)	1 (4.2%)	1 (4.2%)		
Father's immunized				27.757	0.000*
Yes	134 (95.7%)	3 (2.1%)	3 (2.1%)		
No	6 (50.0%)	3 (25.0%)	3 (25.0%)		
I don't know	68 (85.0%)	6 (7.5%)	6 (7.5%)		
Birth order				5.532	0.699
1 st	70(93.3%)	3 (4.0%)	2 (2.7%)		
2 nd	61 (91.2%)	2 (2.9%)	4 (6.0%)		
3 rd	42 (85.7%)	3 (6.1%)	4 (8.2%)		
4 th	13 (86.7%)	1 (6.7%)	1 (6.7%)		
>4 th	21 (84.0%)	3 (12.0%)	1 (4.0%)		

Table 4.0: Influence of socio demographic characteristics on knowledge.

Table 4.0 Showed that mother’s marital status, education and geopolitical zone are significantly associated with knowledge of immunization.

Table 4.0 Showed that mother’s marital status, education, geopolitical zone, religion, status of mother and father’s immunization are significantly associated with knowledge of immunization.

<i>Reason</i>	<i>Frequency</i>	<i>Percentage</i>
Mother was too busy	6	2.7
There was a family problem	6	2.7
The vaccine was not available	5	2.3
The time for immunization was not convenient	3	1.3
I postponed going until another time	3	1.3
The child was ill-was brought but not immunized	3	1.3
The child was ill-was not brought	3	1.3
Wasn't aware of the need for a second or third dose	3	1.3
don't believe in the vaccine	2	0.9
Was not aware of the need for immunization.	2	0.9
Heard bad things about immunization	2	0.9
Did not know the place and time for immunization	1	0.4
Long queue and waiting time	1	0.4
Strike (industrial action by health workers)	1	0.4
Lack of money	1	0.4
Total	42	18.5

Table 4.1: Reasons for negative attitude toward immunization.

Table 4.1 Showed the reasons for mother's poor attitude towards immunization. Most respondents 6(2.7%) picked been busy and family problems for their negative attitude to immunization.

Records of immunization at the epidemiologic unit

Children that received vaccination in the epidemiologic unit were investigated in the month of August 2022 and the information below was obtained.

<i>Sex</i>	<i>Completed</i>	<i>Did not complete</i>	<i>Total</i>
	N (%)	N (%)	N (%)
Male	57(11.1)	199(38.8)	256(49.9)
Female	63(12.3)	194(37.8)	257(50.1)
Total	120(23.4)	393(76.6)	513(100)

Table 4.2: Children that completed or did not complete their immunization schedule at the unit.

Table 4.2 Showed only 120(23.4%) of children that had their first immunization in the unit returned for the subsequent immunizations until they complete the schedule. 393(76.6%) remaining did not show up at the unit to complete the immunization schedule indicating that non-adherence to the immunization schedule was clearly visible.

Discussion

Findings from the study showed that some socio-demographic factors have effects on the knowledge of mothers. One of the factors was marital status of the mothers that were observed to significantly affect their knowledge on immunization ($p=0.001$) than single mothers. This finding contradicts that of Odusanya et al. (2008) where the marital status of the mother has no significant effect on their level of immunization. The finding in the study can be as a result of accessibility of married mothers to education compared to single mothers who in most cases have more responsibility of taking care of their children rather than seeking for education. In addition, the supportive role of the partners of married mothers may possibly improve her knowledge especially if both partners together seek for

ways to better the health status of their offspring. Furthermore, from the study the level of education of mothers also have a significant effect on their knowledge of immunization ($p=0.001$). Hence, the higher the level of education of the mother, the greater their knowledge on immunization. This finding agrees with Angellilo et al. (1999) and Odusanya et al. (2008). This is expected because those with higher educational standards would have greater ability to process information generally than those who are not. The geopolitical zone of the mother also significantly ($p=0.000$) affected their level of knowledge on immunization. Those from the south and west had the highest rate (100%) compared to those from the north-west who had the least (28.6%) rate of people with good knowledge and the highest rate (57.1%) with poor knowledge. This finding agrees with the findings of the Nigeria Demographic and Health Survey, NDHS (2003) which noted that widespread inequities persist in immunization coverage to the disadvantage of children of parents in the lowest socio-economic quintile such as parents with no education and parents in the rural areas, mostly in the northern region of the country (Aina & Ejembi, 2013). The poor knowledge and practice by mothers from this zone may be due to the misinformation that vaccines can serve as contraceptives. The religion of the mother was also observed to have a significant effect ($p=0.000$) on the knowledge of the mothers. This finding may also be linked to the geopolitical zone since certain religions are more acceptable in zones. A higher percentage (92.1%) among the Christian women had good knowledge compared to the Muslims (58.8%). The practice of "purdah" where the women are not permitted to freely come into the society, serves as a form of restriction that hinders their access to relevant information. To overcome this challenge imams and other Islamic leaders must be enlightened on the need of immunization as a disease prevention exercise. Church leaders and traditional rulers should also be properly informed. The fact that the mothers were immunized as children also significantly ($p=0.000$) affect their knowledge on immunization.

The study seeks for determinants of health-related outcomes which are the factors that often increase or decrease a person's risk to a specific health outcome- which in this study is immunization- revealed that a high percentage (99.2%) of mothers reported that they have heard about immunization. About 90% also reported that they knew that vaccines are meant to prevent childhood diseases rather than cause harm to the children. This could responsible for the 89.6% of mothers rated with good knowledge among the respondents. However, the fact that only 2.6% of the mothers had excellent knowledge about all VPDs children are immunized for should raise alarm among all stakeholders. Hence, there is an urgent need for targeted information, education and communication. While more than 90% knew about poliomyelitis- which one can easily attribute to the continual door-to-door immunization and the constant jingles being aired on television and radio- less than 50% knew about influenza, diphtheria and pertussis. Tetanus, tuberculosis, hepatitis and yellow fever were also readily identified by about 80% of the women. Angelillo et al. (1999) also reported similarly that only 20% knew that pertussis, measles, mumps, and rubella were diseases that are vaccine-preventable in children while carrying out a survey in Italy. Therefore, poor knowledge of mothers on VPDs is quite detrimental in achieving a high percentage of coverage during immunization. Mothers who are not adequately educated on the diseases their children are meant to be immunized against, won't possibly know the importance of the vaccines. One of the Millennium Developmental Goals (MDGs) is to reduce child mortality and this would not be achieved significantly if mothers are not aware of these VPDs. In addition, lack of knowledge also covers the appropriate time for each vaccine to be taken. Just as a vast population has been sensitized with regards to poliomyelitis, other diseases should also be given a similar enlightenment. Such enlightenment is bound to urge mothers to present their wards for immunization. This requires health promotion in the form of health education where persuasive communication could be utilized in passing the information on by gaining the attention of the people, relaying the message in such a manner that the content would be comprehended and accepted by the people.

Only a small percentage of women (less than 3%) gave reasons for their failure in availing their children for immunization. The most popular reasons given were mother being too busy and there was a family problem. Most of the reasons proffered by the women only show the lack of education on the part of women. If mothers were better educated on the importance of immunization and the need for it to be taken at the right time, they probably would not have excuses for not showing up for immunization. Hence, adequate information should be passed to the women on importance of immunization. It is also important to note that lack of money should not so much as be an issue in Akure North because the government has provided a facility that is very reliable and the services offered in the facility is free including the vaccines given. This further stress the fact that ignorance is a major reason for mothers not immunizing their children. Health education must be utilized to promote health protection through vaccination in order to prevent these childhood

killer diseases.

In terms of showing up for immunization at the right time (within one month of the expected date) it was observed that almost 60% of mothers brought their children promptly for the first immunization- BCG. This huge turnout could be due to the fact that women who give birth in hospitals, clinics or maternity homes are usually given this vaccine immediately or advised to go to approved centers. Antai (2009) had also stated that the proportion of mothers that delivered in a hospital setting is a predictor of child immunization uptake. Further noting that hospital delivery is one of the most important preventive measures against maternal and child health outcomes, and an important determinant of full immunization. It has also been observed (during data collection and brief interviews at the child immunization unit) that mothers that have their babies at home often are not aware of the vaccines or turn up very late for the vaccines especially if they begin to suspect ill health in their children. For DPT, Hepatitis and OPV, a slight drop to a lower rate (about 40%) was observed which may not be unconnected to mothers not being aware of the actual date they are expected to return for another vaccine. There was however another hike in turn up (up to 50%) observed for yellow fever and measles. A smaller percentage (less than 20%) was generally observed to turn up late for the vaccines while less than 10% were either not vaccinated or had incomplete doses. Considering those that were immunized at the stipulated time and those who were immunized late, it will be observed that only about 60% of children were recorded within these groups. This result shows that though there is a seemingly good knowledge about immunization among mothers, but their being available for these vaccines does not reflect this knowledge. The survey of the records at the epidemiologic unit showed that less than 25% of children who had their first immunization at the unit had returned to complete their full course of vaccination. Dropouts were observed at various levels of schedule. Many reasons could be postulated for this high rate of dropout such as moving to another area, changing the place used for immunization, death of the child or ignorance on the part of the mother. Health education is greatly required in this regard. In addition, it must also be stated that just as the EPI coverage survey of WHO (2009) noted that immunization coverage estimates based on health centre records may be misleading or inaccurate, despite the fact that routine reports from health centers provide important information about immunization coverage. It was observed while going through the records that omissions were sometimes inevitable probably as a result of high turnout of women for immunization of their children leading to work pressure on the staff. These findings are similar to that of Sadoh & Eregie (2009) in Benin, Nigeria who reported that the uptake of vaccines was the highest for BCG, OPV0, and Hepatitis at birth having a percentage rate of 89.5%, 96.7%, and 93.8% respectively having studied the records of a clinic. They however noticed that uptake was the lowest for measles and yellow fever vaccines having percentage rates of 57.6% and 57.2% respectively. Though over 30% of women claimed to have immunized their children, no concrete evidence was presented as to how promptly this was done or the completeness of the schedule for such children. Inappropriate immunization of children generally leads to the spread of vaccine preventable diseases which would result in increased morbidity and mortality where they could have been prevented. Sadoh and Eregie (2009) commented in this regard stating that to achieve maximal protection against vaccine-preventable diseases, a child should receive all immunizations within recommended intervals. One of the health indicators of achieving reduction in child mortality is to increase the proportion of one-year old that have been immunized against measles. From this study, only 50% of the children were immunized promptly against measles and 9.5% were yet to be immunized even after one year of age.

Conclusion

This study has established that there is a high knowledge of immunization among respondent mothers. Knowledge of mothers amongst respondents was also found to be significantly affected by education, marital status, religion, geopolitical zone and the immunization of the children as a child. However, the high knowledge among the respondents doesn't translate to good practice as some respondent mothers couldn't complete the immunization schedule for their children. In general, only a few women respondent had negative attitudes towards immunization.

Recommendations

- Create more jingles in local dialect to promote knowledge on the immunization schedule and the various vaccines that should be taken.

- Traditional birth attendants should be taught on immunization as a disease prevention and health protection tool. Health protection in the area of preventing sepsis during child birth through tetanus toxoid vaccines can be taught also.
- Health workers in public health and community should educate the women through health promotion focused on public health activities.
- Information, communication and education (ICE) materials such as fliers and billboards on immunization should be produced and widely distributed.
- The Government should make health policy on child immunization compulsory for children of immunizable age.
- Efforts should be made to immunize children in hard to reach area to improve immunization coverage.

Acknowledgment

The author extends his appreciation to all the respondents who participated in the study.

References

1. Angelillo IF, et al. "Mothers and vaccination: knowledge, attitudes, and behaviour in Italy". *Bulletin of the World Health Organization* 77.3 (1999): 224-229.
2. Antai D. "Inequitable childhood immunization uptake in Nigeria: a multilevel analysis of individual and contextual determinants". *BMC Infectious Diseases* 9 (2009): 181.
3. Awosika D. "Access to immunization and other public health interventions through the pharmacists". *West African Journal of Pharmacy* 23.1 (2012): 3-11.
4. Centers for Disease Control and Prevention (CDC). "Measles--United States, January 1 - April 25, 2008". *Morbidity Mortality Weekly Report (MMWR)* 57.18 (2008): 494-8.
5. Gherardi E. *The Concept of Immunity. History and Applications*. Immunology course Medical School, University of Pavia (2013).
6. *Global Immunization Vision and Strategy (GIVS). Facts and figures April 2005*. Geneva: WHO (2005).
7. *Global immunization vision and strategy 2006-2015*. Geneva: WHO (2005).
8. Kapoor R and Vyas S. "Awareness and knowledge of mothers of under five children regarding immunization in Ahmedabad, Healthline 1.1 (2010): 12-15.
9. Lee JW. "Child survival: a global health challenge". *Lancet* 362 (2003): 262.
10. Odusanya OO., et al. "Determinants of vaccination coverage in rural Nigeria". *BMC Public Health* 8 (2008): 381.
11. Orenstein WA, Papania MJ and Wharton ME. "Measles elimination in the United States". *Journal of infectious Diseases* 189.Suppl 1 (2004): S1-3.
12. Sadoh AE and Eregie CO. "Timeliness and Completion Rate of Immunization among Nigerian Children Attending a Clinic-based Immunization Service". *J Health Popul Nutr* 27.3 (2009): 391-395.
13. Siddiqi N., et al. Mothers' knowledge about EPI and its relation with age-appropriate vaccination of infants in peri-urban Karachi". *Journal of Pakistan Medical Association* 60 (2010): 940-4.
14. World Health Organization. *The Expanded Programme on Immunization (EPI) Survey (1991)*.
15. World Health Organization (WHO). *Immunization (2013)*.