

Assessment Of Awareness And Knowledge Of Pentavalent Vaccine Among Pregnant Women Attending Antenatal Care In A Tertiary Hospital In Jos North Local Government, Plateau State, Nigeria

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Abstract—Background: Immunization prevents debilitating illness and disability and saves millions of lives every year. It is one of the most powerful and cost effective of all public health interventions. Pentavalent vaccine is a combination of five vaccines-in-one that prevents diphtheria, tetanus, whooping cough, hepatitis B and Haemophilus influenza type b all through a single dose. It was introduced into the Nigerian immunization schedule in 2012.

Awareness and knowledge of childhood immunization and vaccines play a major role in determining immunization coverage in Nigeria. Studies have shown geographical disparities in knowledge of childhood vaccines. Other factors include vaccine availability, acceptance, perceived side effects, level of education, religious beliefs, poor cold chain, lack of trust for the system and others.

Objective: This study aims to assess the awareness and knowledge of pentavalent vaccine in pregnant women attending antenatal care in a Tertiary Hospital in Jos North Local Government Area.

Methods: This was a descriptive cross-sectional study conducted done over a period of three (3) months from August 2018 to October, 2018. The study involved 397 pregnant women attending antenatal care at Plateau Specialist Jos North LGA, Plateau State.

A Simple Random Sampling method was used to select pregnant women for the study. This was done by balloting. Data was collected using an interviewer-administered, pre-tested, structured questionnaire. The data was collected, entered and analyzed using IBM Statistical package for social sciences (SPSS) version 20.0.

Results: The result shows the socio-demographics of the respondents in the study. A total of 379 participants were interviewed. The Mean age was 28.4 years while the Median age was 28.0 years. Lowest age was 15 years while the oldest was 43years.

Majority 378 (95.2%) of the respondents were aware of routine immunisation (RI) generally, 265

(66.8%) of the respondents were aware of pentavalent vaccine Most 276 (73.0%) of the respondents got information about routine immunization from health workers, relatives and friends 54 (14.3%), 23 (6.14%) school, Television 14 (3.7%), radio 8 (2.1%), Internet 3 (0.8%). Majority of the respondents 224 (84.5%) had incorrect knowledge of the composition of pentavalent vaccine, 141 (53.2%) did not know the correct route of administration, 171 (64.5%) knew the correct number of doses required for every child, 6 (2.3%) had no idea of the health benefits.

Only 32 (8.1%) had good knowledge of Pentavalent vaccine, 57 (14.4%) had fair knowledge while 308 (77.6%) had poor knowledge of Pentavalent vaccines. There was a statistically significant association between knowledge of pentavalent vaccine and age of pregnant women ($p = 0.042$), level of education ($p = 0.011$), occupation of pregnant women. ($p = 0.0002$)

Conclusion and recommendations:

Ninety five percent of pregnant women were aware of routine immunisation (RI) generally, while two thirds were aware of pentavalent vaccine. Over three fourths of pregnant women had poor knowledge of pentavalent vaccines, 1 in 7 had fair knowledge, while only 8.0% (1 in 12) had good knowledge . Age of pregnant women, educational level and occupation of pregnant women had statistically significant association with knowledge of pentavalent vaccines.

The government should support health education activities targeted at routine immunization and pentavalent vaccines. Health facilities and workers are should continue to enlighten the mothers on need for pentavalent vaccine use. Expectant mothers should be more interested in immunizations that will be given to their children, the components and side effects of such vaccines.

Keywords—Knowledge, Pentavent vaccine, Pregnant women

INTRODUCTION

Immunization is one of the most powerful and cost effective of all public health interventions.^{1, 2} It prevents debilitating illness and disability and saves millions of lives every year. National Program on Immunization is responsible for the managing immunization programs in Nigeria with the support of international and local partners.³ Initially the schedule consisted of Bacillus Calmette-Guerin (BCG), diphtheria-tetanus-pertussis (DTP), oral polio, yellow fever, hepatitis and measles.⁴ However with increased knowledge of the immunologic factors of disease, newer vaccines were developed and added to the EPI's list of recommended vaccines^{5, 3} one of which is the Pentavalent vaccine.

Pentavalent vaccine is a combination of five vaccines-in-one that prevents diphtheria, tetanus, whooping cough, hepatitis B and Haemophilus influenza type b all through a single dose.⁵ It was introduced into the Nigerian immunization schedule in 2012.⁵ The Global Alliance for Vaccines and Immunizations (GAVI) and the World Health Organization (WHO) recommended its use in developing countries to replace the DPT vaccine.^{6, 7} The underlying reason was to increase the uptake of the hepatitis B (HB) and Haemophilus influenza type b (Hib) vaccines in these countries by piggybacking these on the DPT vaccine⁸ The national guideline for immunization stipulates that a child should receive four doses of OPV (Oral polio vaccine), three doses of pentavalent vaccines (at 6, 10 and 14 weeks) and one dose each of BCG (Bacilli Calmette- Guerin), HEPB 0, MCV (Measles Containing Vaccine) and Yellow Fever.^{9, 10}

Despite the advantages the pentavalent vaccine has to offer in the attainment of MDG 4, inadequate immunization is still a significant problem in resource-poor countries like Nigeria. Awareness and knowledge of childhood immunization and vaccines play a major role in determining immunization coverage in Nigeria. Studies have shown geographical disparities in knowledge of childhood vaccines. Typically, the knowledge of childhood immunization among mothers in Northern Nigeria (Nassarawa) is much lower than in Southern Nigeria (Enugu).¹¹ Other factors include vaccine availability, acceptance, perceived side effects, level of education, religious beliefs, poor cold chain, lack of trust for the system and others.

Every year more than 10 million children in low- and middle-income countries die before they reach their fifth birthdays. Most die because they do not access effective interventions that would combat common and preventable childhood illnesses.¹² Vaccine preventable diseases remain the most common cause of childhood mortality with an estimated 3 million deaths each year.¹³ About 23.1 % of caregivers had a poor knowledge on the pentavalent vaccine, this presents a huge challenge in their willingness to seek for vaccination.¹⁴

Immunization is very vital to the survival of the under-five population. Studies have revealed that under-five mortality is inversely related with their immunization coverage rates, but however it varies between developed and developing countries.¹⁵ Thus, knowledge of Pentavalent vaccine is important in helping women take decisions and seek out the relevant vaccines. This study also seeks to assess the awareness and knowledge of pregnant women to pentavalent vaccine in Northern Nigeria, Jos Plateau state and possibly address any misconceptions about the vaccine with aim at promoting awareness of pentavalent vaccine among these women thereby facilitating immunization coverage in Northern Nigeria. This paper seeks to contribute to the available literature concerning pentavalent vaccine in Plateau state, Northern Nigeria.

This study aims to assess the awareness and knowledge of pentavalent vaccine in pregnant women attending antenatal care in Plateau Specialist Hospital, Jos North, Jos, Plateau State.

MATERIALS AND METHODS

This study was conducted in Jos North Local Government Area of Plateau State. Jos North is one of the seventeen LGA in Plateau State.¹⁶ The LGA has its headquarter in the city center of Jos which is located at 9°55'N 8°54'E. It has an area of 291 km² and a population of 429,300 at the 2006 census.¹⁷ with 266,660 (62%) being urban dwellers and 163,134 (38%) rural dwellers. In 2009, the National population commission estimated population of Jos North LGA as 439,217 comprising of 220,856 males and 216,361 females. It was estimated that 3000 pregnancies occurred per annum.^{16, 18} Jos North has 1 district and about 71 health care centers of which twenty nine (29) are primary health care (PHC) centers and over 40 private institutions. Prominent hospitals in the Local Government include Jos University Teaching Hospital, Plateau Specialist Hospital, Bingham University Teaching Hospital, Our lady of Apostle Hospital and Faith Alive Foundation.¹⁶

The study involved pregnant women attending ANC in Plateau Specialist Hospital Jos North LGA, who were willing to participate in the study and are able to understand Hausa, Yoruba, Igbo or English. Study was done over a period of three (3) months using a descriptive Cross-sectional study design from August 2018 to October, 2019

The minimum sample size was determined using the fisher's formula¹⁹ for sample size determination; $n = z^2 Pq/d^2$ where 'n' is desired minimum sample size. 'z' is standard deviation which has a value of 1.96 at 95% confidence interval. 'P' is the percentage of women of reproductive age reporting knowledge of pentavalent vaccine in Nigeria, which was 36.7%²⁰ 'q' is the complementary probability 'P' (1-P). 'd' is the magnitude of errors that can be acquired and is 0.05%.

$$n = z^2 Pq/d^2$$

$$n = \frac{1.96^2 * 0.367 * (1 - 0.367)}{(0.05^2)}$$

$$n = \frac{3.8416 * 0.367 * 0.633}{0.0025}$$

$$n = 357.65$$

To compensate the non-response rate, 10% of the determined sample would be added:

$$N = \frac{n}{1 - NRR}$$

$$N = \frac{357.65}{1 - 0.1}$$

$$N = \frac{357.65}{0.9}$$

$$N = 397$$

Using the list registered women attending ANC at the hospital as the sampling frame, a Simple Random Sampling Method was used to select pregnant women for the study. This was done by balloting. Data was collected using an interviewer-administered, pre-tested, structured questionnaire, which included questions on socio-demographic data, knowledge of pentavalent vaccine which has questions on awareness of pentavalent vaccine, component of vaccines, number of times it is given, ages at which it is given and the route of administration, function of pentavalent vaccine.^{14, 20}

The data was collected, entered and analyzed using IBM Statistical package for social sciences (SPSS) version 20.0. A total of 11 questions were used to assess knowledge under 7 domains (awareness of the vaccine, composition of pentavalent vaccine, route of administration, number of times the vaccine is given, age at which vaccine is administered and health benefits). A score of 1 was awarded for a correct answer and 0 for a wrong answer. Minimum and maximum scores for each domain was calculated and scores were converted to percentages and graded as; Poor (Scores 49.9% and below), Fair (50.0 to 69.9%) and Good knowledge (70.0% and above).

Test of associations were carried out using Chi squared tests for associations between socio-demographic variables such as age, sex, religion, occupation, level of education and number of children and independent variables such as knowledge of pentavalent vaccine. The level of significance of all statistical associations was set at $p < 0.05$.

Ethical approval to conduct this study was obtained from the research ethics committee of Bingham University Teaching Hospital (BHUTH) Jos. Permission to conduct this study was obtained from the Health facility that were used in this study. Written informed consent was obtained from each respondent before the conduct of interviews after adequate information must have been given to the respondents

by the interviewers. Confidentiality and privacy was respected during the course of interview. Participants were treated with dignity and respect. To ensure confidentiality, respondent's serial numbers rather than name were used to identify each respondent. Respondents were informed that there will be no penalties or loss of benefit for refusal to participate in the study or withdrawal from it. There was no risk of harm or injury to the participants during or after the study is conducted.

The responses from respondents were based on self-report. They depended on the truthfulness of the respondents. Recall bias could have occurred especially among the patients that had pentavalent vaccine. This research was a descriptive study in which actual

choice behaviour is not observed.

RESULTS

A. Socio-demographic Characteristics of Pregnant Women

The result shows the socio-demographics of the respondents in the study. A total of 379 participants were interviewed. The Mean age was 28.4 years while the Median age was 28.0 years. Lowest age was 15 years while the oldest was 43 years. Table 1 shows that 218 (54.9%) respondents were within the age range of 15-24 years, 108 (27.2%) of the respondents were within the age range of 25-34 years. Only (17.9 %) were aged 35-44 years. This implies that about 82.1 % of the respondents were within their active reproductive age.

On level of education, 9 (2.3%) do not have any education, 45 (11.3%) completed primary education, 201 (50.6%) completed secondary school education, 142 (35.8%) completed tertiary education.

Majority 373 (94%) were married, while 24 (6.0%) were single. Most women were business women 213 (53.7%), 51 (12.8%) were students, 48 (12.1%) were civil servants, 85 (21.4%) were unemployed.

B. Awareness of Routine immunization among pregnant women

Table 2 shows, that Majority 378 (95.2%) of the respondents were aware of routine immunisation (RI) generally, while 19 (4.8%) of the respondents were not aware of routine immunisation.

Majority 276 (73.0%) of the respondents got information about routine immunization from health workers, others got information from relatives and friends 54 (14.3%), a few 23 (6.14%) respondents got information from school, Television 14 (3.7%), radio 8 (2.1%), Internet 3 (0.8%)

C. Awareness of Pentavalent vaccines among pregnant women

Table 3 shows, that 265 (66.8%) of the respondents were aware of pentavalent vaccine, while 132 (33.2%) of the respondents were not aware of

pentavalent vaccine. Majority 201 (78.5%) of the respondents got information about from vaccine from health workers, others got information from relatives and friends 46 (17.4%), some 9 (3.4%) respondents got information from school, 5 (1.9%) got information from television, 3 (1.1%) from radio, 2 (0.8%) from internet.

C. Knowledge of Pentavalent Vaccine among respondents

Table 3 shows that majority of the respondents 224 (84.5%) had incorrect knowledge of the composition of the vaccine, 41 (15.5%) had a correct knowledge of the composition.

Majority of the respondents 141 (53.2%) did not know the correct route of administration of pentavalent vaccine while only 124 (46.8%) know the correct route of administration.

A good number of respondents 171 (64.5%) knew the correct number of doses required for every child, 94 (35.5%) had incorrect knowledge.

Six (2.3%) had no idea of the health benefits of pentavalent vaccines, 244 (92.1%) knew it protects children against disease, 15 (5.7%) knew it promotes growth of children.

Only 32 (8.1%) had good knowledge of Pentavalent vaccine, 57 (14.4%) had fair knowledge while 308 (77.6%) had poor knowledge of Pentavalent vaccines.

D. Association between Knowledge of pentavalent vaccine and socio-demographic characteristics of respondents

Table 4 shows the association between knowledge of pentavalent vaccine and Socio-demographic characteristics of respondents. There was a statistically significant association between knowledge of pentavalent vaccine and age of pregnant women as more 9 (12.7%) women of age group 35 – 44 years had good knowledge of pentavalent vaccine than those in age group 15 – 24 years with 7 (6.5%). More women aged 15 – 24 years 93 (86.1%) had poor knowledge of pentavalent vaccine than women aged 35 – 44 years. ($p = 0.042$)

There was also a statistically significant association between knowledge of pentavalent vaccine among pregnant women and level of education. A hundred percent (100%) of women with no form of education had poor knowledge of pentavalent vaccine while 97 (68.3%) of women with tertiary education had poor knowledge of pentavalent vaccines. Also, 19 (13.4%) of women with tertiary education had good knowledge of pentavalent vaccine, while no woman with primary or no level of education had good knowledge of pentavalent vaccines. This finding was statistically significant. ($p = 0.011$)

There was also a statistically significant association between knowledge of pentavalent

vaccine among pregnant women and occupation of pregnant women. More Students 10 (19.6%) and civil Servants 5 (10.4%) had good knowledge of pentavalent vaccines than Business women 12 (5.6%) and unemployed women 5 (5.9%). This finding was statistically significant. ($p = 0.002$)

More Christians 26 (9.2%) than Muslims 6 (5.3%) had good knowledge of pentavalent vaccines. While more Muslims 96 (84.2%) than Christians 212 (74.9%) had poor knowledge of pentavalent vaccines. This finding was not statistically significant. ($p = 0.129$)

A higher proportion of singles 3 (12.5%) than married 29 (7.8%) had good knowledge of pentavalent vaccines. This finding was not statistically significant. ($p = 0.702$)

A higher proportion of women with 2 – 3 children 15 (10.8%) have a good knowledge of pentavalent vaccine than those with no children 4 (3.6%). This finding was not statistically significant. ($p = 0.066$)

DISCUSSION

It is widely accepted that immunization is of great importance in the prevention of childhood diseases; hence vaccination uptake is an indirect way to assess child health. 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.^{5,6}

From this study carried out, the majority of the respondent were between the ages of 15 to 24 this correspond to that of Nigeria demographic survey of 2013 which shows that about 64.6% of women at this age range have given birth.^{17, 18} Most of the women were found to have attained secondary school which is found to be in consonance with the findings in Nigeria demographical survey¹⁸ which shows that 41.9% of women in plateau state have either completed secondary school or have dropped out.¹⁷ Education among women of child bearing age have a way of promoting health seeking behaviour in them and also giving them chances of having knowledge and promote health like immunization and also how to access it for herself and her family. From this study, it was found that most of the respondents were Christians and also married. Majority of the respondent were found to be Berom and about half of the respondents were business women.

Over 95% of the respondents were aware of Routine Immunisation while more two third of the respondents were found to be aware of pentavalent vaccine specifically and their source of information was majorly from the health workers. This was in line with the study carried out in Kwara state,²⁰ which stated that more than two third of the respondents were also aware of the vaccine with their information gotten from the health workers.²⁰ Another study carried out in Italy²¹ showed that 57.8% of the respondents were aware of the vaccine.²¹ Also a

study carried out in Benin¹⁴ showed that three-quarter of the respondent had good knowledge about the vaccine. This is of public health importance because the women will be able to use their knowledge to increase usage of the vaccine and seeking preventive and promotive strategies thereby reducing the burden of vaccine preventable diseases. It is also important to enlighten friends and family members as this study showed that some women got information from relatives and friends.

The findings in this study showed that four in five pregnant women did not know composition of pentavalent vaccine as Diphtheria, Pertusis, Tetanus, Hepatitis, Haemophilus Influenza and the diseases it prevents. This can be due to lack of proper health education by the health workers since most of the respondents got their information from the health workers. Thus, adequate inclusion of composition of Pentavalent vaccines as part of the health education campaign will be useful. This was not in consonance with the study carried out in Benin¹⁴ which showed that most of the respondents had good knowledge of the composition. This disparity may have to do with the difference in literacy level in the study population. Just above half of the pregnant women did not know the correct route of administration of the vaccine and over two thirds did not know the correct number of doses of the vaccine. These details maybe not be necessary for the women, but knowing such detail demonstrates excellent knowledge of pentavalent vaccine among the study group.

Less than 10% of women had good knowledge of Pentavalent vaccine, one in seven had fair knowledge while three quarters had poor knowledge of Pentavalent vaccines. The overall knowledge of pentavalent vaccine in this study was found to be poor in the study population. This is consonance with the study carried out in India (**India.**) which stated that majority of the women had poor knowledge on the vaccine but different from the findings in a study conducted in Benin (**Benin.**) which showed that majority of the women had good knowledge with about 77% of the respondent having good knowledge. This is discouraging considering that Plateau State was among the first states that pentavalent vaccine were introduced to and this implies improper health education to women attending antenatal care by health workers since they get most of their information from the health workers. Some studies^{22, 23} showed majority of respondents had good knowledge of immunization generally. This usually translates to good knowledge of pentavalent vaccine.

Of the total number of pregnant women involved in the study, most respondents had secondary and tertiary levels of education; this is in agreement with a study carried in North Central Nigeria²⁰ This similarity may be due to the fact that both were carried out in state capitals where majority of the people have some form of western education.

Some demographic factors were observed to have significant effects on the knowledge of mothers. One of such factors was level of education, it was seen that those with tertiary education had a significantly higher knowledge of pentavalent vaccine ($p=0.011$) than those with other forms of level of education. In fact, no woman with primary or no level of education had good knowledge of pentavalent vaccines in this study. This is similar to the work done in Jos²² where the level of education was found to significantly affect their level of knowledge. The level of education may enhance knowledge in the sense that those with tertiary education are more exposed and have more access to information than those with other forms of education. The effect of education seems to be felt once more as more students and civil Servants had good knowledge of pentavalent vaccines than Business women and unemployed women. This finding was statistically significant. This further lays credence to the effect of education in health services acceptance and implementation.

Sometimes women who are much older are more experienced about immunization services and child care generally. Much older women have had more reproductive years, they have also had more opportunities to bear children, nurse them and care for them. In this study, there was a statistically significant association between knowledge of pentavalent vaccine and age of pregnant women as more women of age group 35 – 44 years had good knowledge of pentavalent vaccine than those in age group 15 – 24 years. This finding is in consonance with number of children as a higher proportion of women with 2 – 3 children have a good knowledge of pentavalent vaccine than those with no children.

Beliefs systems and religion plays a vital role in the acceptance and rejection of health care services in developing countries like Nigeria. This study revealed that more Christians than Muslims had good knowledge of pentavalent vaccines, while more Muslims than Christians had poor knowledge of pentavalent vaccines. This finding was not statistically significant.

CONCLUSION

The study revealed that almost all pregnant women (95.0%) were aware of routine immunisation (RI) generally, while two thirds were aware of pentavalent vaccine. Majority of the respondents got information about routine immunization from health workers, relatives and friends. Over three fourths (77.6%) of pregnant women had poor knowledge of pentavalent vaccines, 1 in 7 had fair knowledge, while only 8.0% (1 in 12) had good knowledge of Pentavalent vaccines.

Age of pregnant women, educational level and occupation of pregnant women had statistically significant association with knowledge of pentavalent vaccines as more women with higher age group (35 – 44 years) had good knowledge, than younger women (15 -24 years). Also those with no form of education

had more poor knowledge. More students and civil servant had good knowledge than business women.

RECOMMENDATION

The government should support health education activities targeted at routine immunization and pentavalent vaccines. Health facilities and workers are the commonest source of information on routine immunization and pentavalent vaccination. Thus they should continue to enlighten the mothers on need for pentavalent vaccine use.

Expectant mothers should be more interested in immunizations that will be given to their children, the components and side effects of such vaccines. Religious leaders and community leaders should encourage their members about the benefits of immunization. Other researchers should conduct similar studies in various local governments, publish and the results for action.

Table 1 : Socio demographic parameters of Pregnant Women

	FREQUENCY	PERCENTAGE
Age of care giver		
15-24	218	54.9
25-34	108	27.2
35-44	71	17.9
TOTAL	397	100
Level of education		
None	9	2.3
Primary	45	11.3
Secondary	201	50.6
Tertiary	142	35.8
MARITAL STATUS		
Single	24	6.0
Married	373	94.0
Occupation		
Business	213	53.7
Student	51	12.8
Civil servant	48	12.1
None	85	21.4
Number of children		
0	111	28.0
1	104	26.2
2-3	139	35.0
>4	43	10.8

Table 2: Awareness of routine Immunization among Respondents

VARIABLES	FREQUENCY (n=397)	PERCENTAGE
Awareness of Routine Immunization		
Yes	378	95.2
No	19	4.8
Source of Information on Routine Immunization	(n=378)	
Health workers	276	73.0
Relatives/ friends	54	14.3
School	23	6.1
Television	14	3.7
Radio	8	2.1
Internet	3	0.8

Table 3: Knowledge on Pentavalent Vaccine among Respondents

VARIABLES	FREQUENCY (n=397)	PERCENTAGE
Awareness of pentavalent Vaccines		
Yes	265	66.8
No	132	33.2
Source of Information on pentavalent vaccine	(n=265)	
Health workers	208	78.5
Relatives/ friends	38	14.3
School	9	3.4
Television	5	1.9
Radio	3	1.1
Internet	2	0.8
Composition of pentavalent vaccine	(n=265)	
In correct	224	84.5
Correct	41	15.5
Route of administration	(n=265)	
Incorrect	141	53.2
Correct	124	46.8
Number of doses	(n=265)	
Incorrect	94	35.5
Correct	171	64.5
Health benefits	(n= 265)	
Protective against diseases	244	92.1
Promotes growth	15	5.7
No idea	6	2.3
KNOWLEDGE OF PENTAVALENT VACCINE	(n=397)	
Poor	308	77.6
Fair	57	14.4
Good	32	8.1

Table 4: Association between Knowledge of pentavalent vaccine and Socio-demographic characteristics of respondents

Variable	Good	Fair	Poor	Test statistics
Age group (years)				
15-24				
25-34	7(6.5%)	8(7.4%)	93(86.1%)	X ² =9.935 P=0.042*
35-44	16(7.3%)	40(18.3%)	162(74.3%)	
	9(12.7%)	9(12.7)	53(74.6%)	
Level of education				
None	0(0.0%)	0(0.0%)	9(100%)	X ² =16.555 P=0.011 *
Primary	0(0.0%)	5(11.1%)	40(88.9%)	
Secondary	13(6.5%)	26(12.9%)	162(80.6%)	
Tertiary	19(13.4%)	26(18.3%)	97(68.3%)	
Occupation				
Business	12(5.6%)	27(12.7%)	174(81.7%)	X ² =21.405 P=0.002*
Student	10(19.6%)	12(23.5%)	29(56.9%)	
Civil servant	5(10.4%)	10(20.8%)	33(68.8%)	
None	5(5.9%)	8(9.4%)	72(84.7%)	
Number of children				
0	4(3.6%)	11(9.9%)	96(86.5%)	X ² =11.845 P=0.066
1	11(10.6%)	19(18.3%)	74(71.2%)	
2-3	15(10.8%)	23(16.5%)	101(72.7%)	
>4	2(4.7%)	4(9.3%)	37(86.0%)	

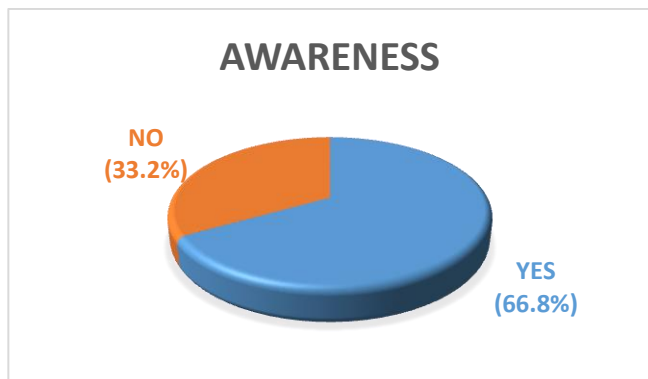


Figure 1: pie chart showing the awareness of respondents to pentavalent vaccine

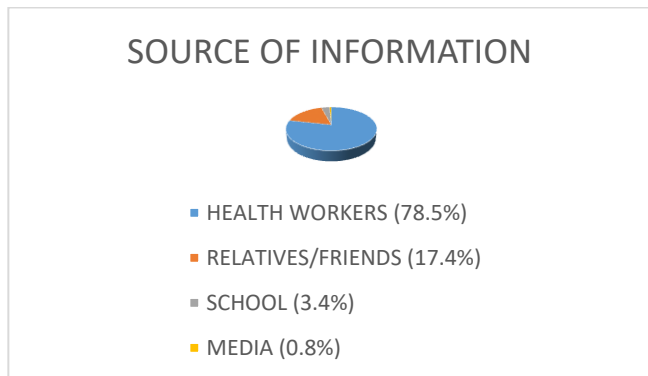


Figure 2: Pie chart showing the source of information regarding pentavalent vaccine

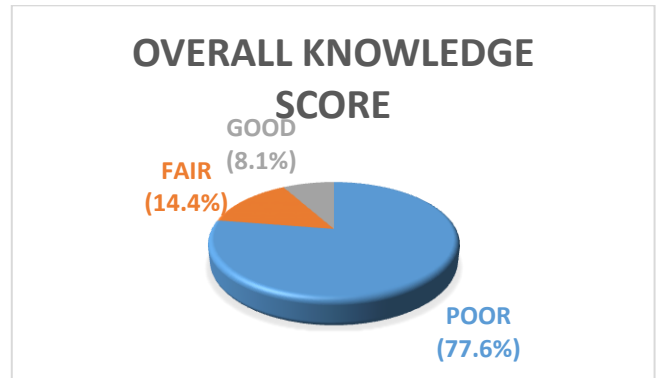


Figure 3: Pie chart showing the overall knowledge score of respondents on pentavalent vaccines

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