

Age Related Pattern of Awareness and Basic Knowledge on Zika Virus Disease among Women Visiting Children Immunization Unit in Enugu State University Teaching Hospital, Southeast Nigeria

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Authors' contributions

This work was carried out in collaboration among all authors. Author EON designed the study, wrote the first draft of the manuscript and finalized writing the final version that was sent to the journal for publication. Author IIO did the literature search and assisted in designing the questionnaire and directing data collection. Author SUA performed the statistical analysis of the study and presented the results in figure and tables. All authors read and approved the final manuscript.

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ABSTRACT

Background: Zika virus is an infective agent of significant Public Health importance, which re-emerged in 2015. It is transmitted through mosquito bite, and associated with microcephaly and some other neurological malformations in some babies of infected mothers.

Objectives: The objective of this study was to assess the age-related pattern of the awareness and basic knowledge of Zika virus infection among women who bring children for immunization, in a teaching hospital, southeast Nigeria.

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Materials and Methods: The study was conducted in the Immunization unit of a Teaching Hospital, Southeast Nigeria, between November 2016 and February 2017. It was a quantitative, observational, descriptive, cross-sectional study, involving randomly selected 256 women who brought children for immunization. Pre-tested, interviewer-administered, structured questionnaire was used; and data was analyzed using SPSS version 20.0 for windows.

Results: Highest number of respondents [112 (43.8%)] were from 30 to 39 age group, followed by those aged 20 to 29 years [108(42.2%)]. Up to 38.3% of respondents had never heard about Zika virus, though this was not statistically significant when compared to the 61.7% that were aware of Zika Virus Disease ($P = 0.92$). Highest number heard it through television [57(36.1%)]. Overall, respondents that were 20 to 29 years of age recorded mean percentage basic knowledge score of 54.6%, while those in the 30 to 39 years age range recorded 49.8%.

Conclusions: Many respondents either had never heard about Zika virus, and also many exhibited poor basic knowledge on Zika virus disease. It is therefore important to develop good strategies aimed at addressing these awareness and knowledge gaps among women of child-bearing age, who are mostly affected by Zika virus disease.

Keywords: Age; awareness; knowledge; Zika virus; women.

ABBREVIATIONS

Abbreviations	Meaning
ICT	Information and Communication Technology
PCR	Polymerase Chain Reaction
PHEIC	Public Health Emergency of International Concern
RNA	Ribonucleic Acid
TV	Television
WHO	World Health Organization
ZVD	Zika Virus Disease

1. INTRODUCTION

Zika virus is a flavivirus that re-emerged in 2015 as an infective agent of significant Public Health importance. The virus was first found in monkeys in Uganda, in the year 1947, but later found in humans, in the same Uganda and the United Republic of Tanzania, in 1952 [1]. Mild infections with this virus were recorded in Americas, Asia, Africa, and the Pacific region in the past; but it was in 2015 that it re-emerged in Brazil as a disease of real Public Health importance. It became associated with significant cases of microcephaly in the newborn, Guillian-Barre syndrome in older children and adults, and some other neurological problems in Brazil. Prior to the outbreak in Brazil, the first large outbreak was reported from the Island of Yap (Federated States of Micronesia) in 2007 [1]. As at August 2016, seventy countries reported Zika virus transmission through mosquito bite, out of which twenty of these countries reported association of the infection with microcephaly and other central nervous system malformations [2]. By January 2017, the number of countries reporting mosquito-borne Zika virus transmission had risen to seventy five, with twenty nine reporting

association with microcephaly and other neurological problems [3]. In Nigeria, the first reported case of Zika virus infection in man was in Afikpo division, Eastern Nigeria, during the investigation of an epidemic of jaundice in 1952, and reported in 1954. Zika virus was shown to have occurred in three patients, one by isolation of the virus and two by a rise in serum antibodies [4]. Though no confirmed diagnosis of Zika virus disease (ZVD) has been made in Nigeria since then, it is possible that some cases of microcephaly in newborn babies in Nigeria, could have been caused by ZVD [5].

Zika virus disease is mainly transmitted by infected mosquito bite, usually *Aedes aegypti*, and to a lesser extent *Aedes albopictus* [6]. *Aedes aegypti* also transmits yellow fever, dengue fever, and chikungunya disease [1]. Current evidence show that ZVD could also be transmitted through sexual intercourse, from mother to child, blood transfusion, and laboratory exposure [7]. The disease usually presents with mild symptoms such as low grade fever, conjunctivitis, muscle and joint pain, skin rash, headache or malaise; lasting 2 to 7 days [1]. Definitive diagnosis of Zika virus infection is

made through Polymerase Chain Reaction (PCR), and virus isolation from the blood [8]. There is currently no specific drug used for the treatment of ZVD. Treatment usually comprises sufficient rest and managing the symptoms. There is also no vaccine currently available for prevention of the infection [8]. As a result of the disease outbreak in Brazil 2015, which resulted in a cluster of microcephaly cases and other neurological disorders, following a similar cluster in French Polynesia in 2014; WHO on February 1, 2016 declared Zika virus infection a "Public Health Emergency of International Concern (PHEIC)" [9]. This was aimed at emphasizing the urgent need aimed at creating more awareness about the disease, and mobilizing international support needed for the control of the infection.

This viral infection can be controlled through environmental activities aimed at controlling mosquito population, and protecting humans, especially pregnant women from mosquito bite. Safer sex practices for six months, especially for men and women returning from areas of active transmission is also a recommended ZVD prevention method [1]. It has been documented that Zika virus RNA was detected in semen up to 188 days following onset of symptoms, and infectious virus was found in the semen 69 days after the onset of symptoms [10]. It is important therefore, that men who suffered from ZVD abstain from sex, or practice safer sex for this duration of time.

Though WHO declared an end to its global health emergency (PHEIC) on Zika virus in November, 2016; she still maintained that the infection is a dangerous mosquito-borne disease like malaria or yellow fever, and as such should be viewed as an ongoing threat. WHO emphasized that the crisis was not yet over [11]. Most mothers visiting children immunization unit in any hospital are usually those that bring their children for immunization against vaccine preventable diseases. Children who have microcephaly, or any other form of congenital malformation are usually identifiable at this stage. It is therefore important that the awareness and knowledge of Zika virus infection among this group is assessed; with the aim of identifying gaps, and developing interventions to address the identified gaps. It is possible that age of the woman that is the caregiver of the child might be a factor that affects the level of knowledge exhibited by the female caregivers. The primary objective of this study was to assess the age-related pattern of the awareness and basic knowledge of Zika virus infection among

women who bring children for immunization, in a teaching hospital, Southeast Nigeria.

2. MATERIALS AND METHODS

2.1 Study Area

Nigeria is the most populous country in Africa, and administratively is divided into thirty six states and the federal capital territory, which are further split into a total of seven hundred and seventy four local government areas [12]. Enugu state is one of the five states in the Southeast geo-political zone of the country, and it has seventeen local government areas [13]. The state has four public tertiary health facilities, with two being designated teaching hospitals; one owned by the federal government, while our study site is owned by the state government. Hospital records revealed that this state teaching hospital usually conducts immunization activity three times in a week; Mondays, Wednesdays, and Fridays. On the average, 263 children are immunized weekly.

2.2 Study Design

The study was quantitative study; and was of observational, descriptive, cross-sectional design.

2.3 Study Population

The study was conducted among women who brought children for immunization in the Enugu State University Teaching Hospital. All female care givers that brought children to the immunization unit within the study period were included in the study, while very few male care givers that brought children for immunization were excluded from the study. Other care givers and health workers who brought children to the hospital for purposes outside immunization were also excluded from the study.

2.4 Sampling Instrument

Pre-tested questionnaire that was divided into sections on socio-demographic variables, awareness of Zika virus disease, and basic knowledge of Zika virus infection; was used for data collection.

2.5 Sample Selection and Data Collection

The respondents were recruited into the study through random sampling of women who brought

their children for immunization on each of the stated immunization days. Ten of these women were interviewed on each immunization day by a trained junior resident doctor in the department of Community Medicine, of the study teaching hospital, giving a total of thirty interviewed in one week. This process was conducted for nine weeks between November 2016, and February 2017, with only sixteen interviewed on the ninth week. A total of two hundred and fifty six (256) respondents were interviewed. Data were also simultaneously collected from the same respondents for other ZVD studies.

2.6 Data Analysis

The information gathered were analyzed using SPSS version 20.0 for windows. The outcome measures were expressed in terms of frequency and percentage of respondents who were aware of ZVD, and those who had correct basic knowledge of the virus. The results were presented in tables and figure.

2.7 Ethical Consideration

Ethical clearance for the study was obtained from the Ethical Research Committee of the Enugu State University College of Medicine, and informed consent was obtained from each respondent, prior to commencement of the interview.

2.8 Limitation

There were marked differences in the number of respondents in some of the age groups that were assessed. Most of the respondents were between 20 to 39 years of age (86.0%); with 42.2% being 20 to 29 years of age, and 43.8% being 30 to 39 years. Thus, findings among the other age groups that were 40 years and above, or 19 years and below could not be reliably compared with those that were 20 to 39 years of age. A study with equal or close number of respondents in each age group, could reveal more reliable findings on the age-related pattern of awareness and basic knowledge on Zika virus disease among the study population.

3. RESULTS

3.1 Socio-Demographic Characteristics

Most of the respondents were within the age range of 20 - 39 years (86.0%), with highest number [112 (43.8%)] being 30 to 39 years of age, and then those aged 20 to 29 years [108(42.2%)]; while 8.2% were between the age range of 40 - 49 years, 3.5% below 19 years, and 2.3% was 50 years and above. Most were Igbo by tribe (92.2%), married (89.5%), mostly Christians (94.9%), and graduates of a tertiary education institution (50.4%). Almost half of the respondents were civil servants (48.4%), followed by Petty traders (15.2%).

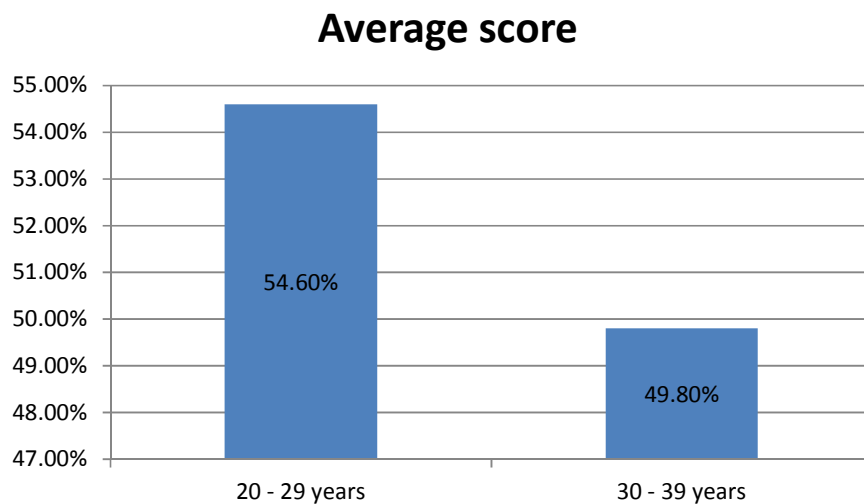


Fig. 1. Mean percentage basic knowledge score of respondents aged 20 to 29, and those aged 30 to 39 years

Table 1. Socio-demographic characteristics

Socio-Demographic Variable	N	%
	(256)	(100)
Age Range (yrs)		
19 and below	9	3.5
20 – 29	108	42.2
30 – 39	112	43.8
40 – 49	21	8.2
50 and above	6	2.3
Tribe		
Igbo	236	92.2
Efik	1	0.4
Yoruba	6	2.3
Hausa	8	3.1
Igala	1	0.4
Cross Rivers	1	0.4
Benue	2	0.8
West Country	1	0.4
Marital Status		
Married	229	89.5
Single	26	10.2
Divorced/Separated	1	0.4
Religion		
Christian	243	94.9
Muslim	8	3.1
Traditional Religion	5	2.0
Educational Level		
No Formal Education	3	1.2
Primary Level	5	2.0
Secondary Level	65	25.4
Tertiary Level	129	50.4
Postgraduate Level	54	21.1
Occupation		
Applicant	5	2.0
Farmer	6	2.3
Teacher	21	8.2
Petty Trader	39	15.2
Civil Servant	124	48.4
Public Servant	7	2.7
Student	29	11.3
National Youth Service Corps	2	0.8
Business	7	2.7
Hair Dressing	1	0.4
Engineer	2	0.8
Tailoring/Fashion Designer	3	1.2
Banking	1	0.4
Optometrist	1	0.4
Private Organization	7	2.7
Nursing	1	0.4

3.2 Awareness of Zika Virus

Between the age range of 20 - 49 years, respondents within all the age intervals documented recorded awareness score above

60%. Those that were 30 - 39 years had the highest percentage awareness score of 63.4%. Those within 20 - 29 years and 40 - 49 years had almost the same score (61.1% and 61.9% respectively). Respondents less than 19 years of

age were only 9 (3.5% of the total number of respondents in the study), out of which 5 (55.6%) were aware of Zika virus. Respondents that were 50 years of age and above were even fewer (6 [2.3%]), out of which 3 (50%) were aware of Zika virus. Overall, 61.7% of respondents are aware of ZVD, while 38.3% were not aware.

3.3 Source of Zika Virus Information

More respondents accessed information on Zika virus through the Television (36.1%). This was followed by 23.4% for Radio, 13.9% for Newspaper, 7% respectively through friend or hospital, 5.1% through school, 4.4% through internet, 1.3% respectively through relation and church, and 0.6% through market.

3.4 Basic Knowledge on Zika Virus Infection

Overall correct knowledge of respondents that Zika virus disease symptoms could be similar to those for malaria was 61.3%. Respondents within 20 - 29 age range recorded percentage knowledge of 66.7% among respondents in their groups. They were followed by respondents within the age range of 30 -39 (59.8%). Out of the 9 respondents that were 19 years of age and below, 5(55.6%) had the correct knowledge. Most of the respondents (75.4%) knew that Zika virus is micro-organism that you cannot see with the naked eyes. Among the two groups that constituted 86.0% of respondents, the highest percentage knowledge on this was demonstrated by respondents between the age range of 20 - 29 years (75.9%), while those between 30 -39 years scored 74.1%. Six (66.7%), out of the nine respondents that were 19 years of age and below had this knowledge. The knowledge that Zika virus could infect monkeys was very poor among respondents. The overall score was 39.1%, while respondents in age range of 20 - 29 years scored 40.7%, and those between 30 and 39 years scored 40.2%. The knowledge of Zika

virus being transmitted through mosquito bite was reasonably high among respondents between the ages of 20 to 29 years (74.1%), but not so high among those between the ages of 30 to 39 years (59.8%). Those between the ages of 40 to 49 years recorded 52.4%, three respondents (50.0%) out of the six that were 50 years and above had the correct knowledge on this. The overall knowledge level on Zika virus being transmitted through mosquito bite was 65.6%

Respondent between 30 to 39 years of age demonstrated slightly higher knowledge level (46.4%) than respondents between the ages of 20 to 29 who recorded 44.4%, on Zika virus being transmitted through sexual intercourse. Those between 40 to 49 years scored 28.6%, while those 19 years or below scored 22.2%. Two persons (33.3%) out of six that were 50 years and above had the correct knowledge. Overall knowledge level on this was 43.0%. The knowledge level among respondents between 30 to 39 years that Zika virus could be transmitted through blood transfusion was 51.8%, between 20 to 29 years was 50.0%, and between 40 to 49 years was 23.8%. Only two (22.2%) out of nine respondents 19 years and below had the correct knowledge, Three (50.0%) out of the six that were 50 years and above had the correct knowledge. The overall knowledge level on Zika virus being transmitted through blood transfusion was 47.7%.

About half of the respondents between the ages 20 to 29 years (50.9%) knew that Zika virus cannot be transmitted through rat bit. Between the ages of 30 to 39 years, and 40 to 49 years age range, 44.5%, and 42.9% respectively had the correct knowledge. Three (33.3%) out of the nine respondents that were below the age of 19 had the correct knowledge, while 2 (33.3%) of those 50 years and above had the knowledge that Zika virus is not transmitted through rat bite. Good percentage of respondents between 20 to

Table 2. Respondents that ever heard about Zika virus

Age	Yes	No	Total
Less than 19	5 (55.6%)	4 (44.4%)	9 (100.0%)
20 - 29	66 (61.1%)	42 (38.9%)	108 (100.0%)
30 - 39	71 (63.4%)	41 (36.6%)	112 (100.0%)
40 - 49	13 (61.9%)	8 (38.1%)	21 (100.0%)
50 and above	3 (50.0%)	3 (50.0%)	6 (100.0%)
Total	158 (61.7%)	98 (38.3%)	256 (100.0%)
P-value	0.915		

Table 3. Source of Zika virus information

Age	Radio	TV	Newspaper	Relations	Friends	Church	School	Market	Internet	Hospital
19 and below	0 (0.0%)	2 (40.0%)	2 (40.0%)	0 (0.0%)	1 (20.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
20 - 29	17 (25.8%)	19 (28.8%)	9 (13.6%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	8 (12.1%)	0 (0.0%)	6 (9.1%)	7 (10.6%)
30 - 39	14 (19.2%)	32 (46.6%)	9 (12.3%)	2 (2.7%)	8 (11.0%)	2 (2.7%)	0 (0.0%)	1 (1.3%)	1 (1.3%)	2 (2.7%)
40 - 49	4 (30.8%)	3 (23.1%)	2 (15.4%)	0 (0.0%)	2 (15.4%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (15.4%)
50 and above	2 (33.3%)	1 (16.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Total	37 (23.4%)	57 (36.1%)	22 (13.9%)	2 (1.3%)	11 (7.0%)	2 (1.3%)	8 (5.1%)	1 (0.6%)	7 (4.4%)	11 (7.0%)

Table 4. Basic knowledge on Zika virus infection

Question	Age range (Years)	Correct Response
Zika virus Disease symptoms can be similar to those for malaria?	19 and less	5 (55.6%)
	20 - 29	72 (66.7%)
	30 - 39	67 (59.8%)
	40 - 49	10 (47.6%)
	50 and above	3 (50.0%)
	Total	157 (61.3%)
Zika virus is micro-organism that you cannot see with the naked eyes?	19 and less	6 (66.7%)
	20 - 29	82 (75.9%)
	30 - 39	83 (74.1%)
	40 - 49	18 (85.7%)
	50 and above	4 (66.7%)
	Total	193 (75.4%)
Zika virus can infect monkeys?	19 and less	3 (33.3%)
	20 - 29	44 (40.7%)
	30 - 39	45 (40.2%)
	40 - 49	7 (33.3%)
	50 and above	1 (16.7%)
	Total	100 (39.1%)
Zika virus can be transmitted through mosquito bite?	19 and less	7 (77.8%)
	20 - 29	80 (74.1%)
	30 - 39	67 (59.8%)
	40 - 49	11 (52.4%)
	50 and above	3 (50.0%)
	Total	168 (65.6%)
Zika virus can be transmitted through sexual intercourse?	19 and less	2 (22.2%)
	20 - 29	48 (44.4%)
	30 - 39	52 (46.4%)
	40 - 49	6 (28.6%)
	50 and above	2 (33.3%)
	Total	110 (43.0%)
Zika virus can be transmitted through blood transfusion?	19 and less	2 (22.2%)
	20 - 29	54 (50.0%)
	30 - 39	58 (51.8%)
	40 - 49	5 (23.8%)
	50 and above	3 (50.0%)
	Total	122 (47.7%)
Zika virus can be transmitted through rat bite?	19 and less	3 (33.3%)
	20 - 29	55 (50.9%)
	30 - 39	50 (44.6%)
	40 - 49	9 (42.9%)
	50 and above	2 (33.3%)
	Total	119 (46.5%)
Zika virus can be transmitted through shaking hands with infected persons?	19 and less	4 (44.4%)
	20 - 29	67 (62.0%)
	30 - 39	57 (50.9%)
	40 - 49	10 (47.6%)
	50 and above	3 (50.0%)
	Total	141 (55.1%)
Zika virus can be transmitted through sharing meal with an infected person?	19 and less	3 (33.3%)
	20 - 29	72 (66.7%)
	30 - 39	58 (51.8%)
	40 - 49	10 (47.6%)

	50 and above	2 (33.3%)
	Total	145 (56.6%)
Zika virus can infect a pregnant woman leading to the delivery of a baby with malformed brain?	19 and less	7 (77.8%)
	20 - 29	71 (65.7%)
	30 - 39	63 (56.3%)
	40 - 49	11 (52.4%)
	50 and above	1 (16.7%)
	Total	153 (59.8%)
Zika virus can infect a pregnant woman leading to the delivery of a very big baby?	19 and less	3 (33.3%)
	20 - 29	62 (57.4%)
	30 - 39	51 (45.5%)
	40 - 49	8 (38.1%)
	50 and above	3 (50.0%)
	Total	127 (49.6%)
Zika virus can infect a pregnant woman leading to the delivery of a baby with small head (Microcephaly)?	19 and less	3 (33.3%)
	20 - 29	49 (45.4%)
	30 - 39	53 (47.3%)
	40 - 49	10 (47.6%)
	50 and above	0 (0.0%)
	Total	115 (44.9%)
Zika virus can infect a grown-up person, leading to paralysis?	19 and less	3 (33.3%)
	20 - 29	42 (38.9%)
	30 - 39	42 (37.5%)
	40 - 49	7 (33.3%)
	50 and above	0 (0.0%)
	Total	94 (36.7%)
Zika virus can infect a grown-up person, leading to shrinking of the head?	19 and less	1 (11.1%)
	20 - 29	42 (38.9%)
	30 - 39	45 (40.2%)
	40 - 49	8 (38.1%)
	50 and above	1 (16.7%)
	Total	97 (37.9%)
Zika virus has a vaccine for the prevention of infection	19 and less	1 (11.1%)
	20 - 29	45 (41.7%)
	30 - 39	46 (41.1%)
	40 - 49	4 (19.0%)
	50 and above	0 (0.0%)
	Total	96 (37.5%)

29 years of age (62.0%) knew that Zika virus is not transmitted through shaking of hands with an infected person, while 50.9% of those between 30 to 39 years of age, and 47.6% of those between 40 to 49 years had the correct knowledge. Three (50.0%) of respondents that are 50 years and above did not know that Zika virus cannot be transmitted through shaking of hands with infected person. Again respondents between the ages of 20 - 29 years had the highest knowledge score (66.7%) on Zika virus not being transmitted through sharing of meals with infected person. They were followed by those between 30 to 39 years (51.8%), and 40 - 49 (47.6%). Few of those that were 19 years and below (33.3%), two (33.3%) respondents aged 50 years and above did not have this knowledge. Overall, 56.6% of respondents knew that Zika

virus infection could not be transmitted through sharing of meals with an infected person.

Seven, out of the nine respondents that were 19 years and less (77.8%) knew that Zika virus infection in a pregnant woman could lead to delivery of baby with malformed brain, while 65.7% of those between 20 to 29 years of age, 56.3% of those between 30 to 39 years, and 52.4% of those between 40 to 49 years had the same knowledge. Only one (16.7%) person aged 50 years and above knew that Zika virus infection could lead to delivery of baby with malformed brain. Overall, 59.8% of respondents had the correct knowledge that Zika virus infection in a pregnant woman could lead to delivery of a baby with malformed brain. On Zika virus infection not resulting in the delivery of a

very big baby, 57.4% of respondents that were 20 to 29 years of age, 45.5% of those 30 to 39 years and 38.1% of those that were 40 to 49 years had the knowledge. Three (33.3%) of the nine persons that were 19 years and less, while only three (50.0%) out of the six aged 50 and above knew that Zika virus infection in a pregnant woman does not result in the delivery of very big baby. A total of 127 (49.6%) of respondent knew that Zika virus infection did not result in the delivery of very big baby. None of the respondents aged 50 and above knew that Zika virus infection could result in the delivery of baby with small head, while 45.4%, 47.3% and 47.6% of respondents aged 20 to 29, 30 to 39, and 40 to 49 years respectively had the correct knowledge. Three (33.3%) out of the nine respondents aged 19 years and less also had the correct knowledge. The Overall correct knowledge on Zika virus infection in pregnant women causing delivery of babies with small head was 44.9%. Again, none of the respondents aged 50 years and above knew that Zika virus infection in adult human could lead to paralysis, while 38.9%, 37.5%, and 33.3% of respondents 20 - 29 years, 30 -39 years, and 40 - 49 years respectively had the correct knowledge on the issue. Three (33.3%), out of the nine respondents aged 19 years and below, that participated had the correct knowledge. The overall correct knowledge on this was 36.7%. On the question of Zika virus infection in an adult not resulting in the shrinking of the head, respondents that are 30 to 39 years of age scored 40.2%, followed by those 20 to 29 years (38.9%), and 40 to 49 years (38.1%). Only one (16.7%) out of the six aged 50 years and above had the correct knowledge, while only one (16.7%) person out of the nine that were 19 years and below (11.1%) gave the correct response. Overall, 37.9% of the respondents knew that Zika virus infection does not lead to shrinking of the head in the infected adult. Less than half of respondents 20 - 29 years of age (41.7%), and 30 - 39 years (41.1%) knew that there is no vaccine for Zika virus infection. Only one person among the nine that were 19 years and below (11.1%), and four (19.0%) out of the twenty one that were 40 - 49 years of age had the correct knowledge. None of the six respondents that were 50 years and above knew that Zika virus infection does not have any preventive vaccine. Overall score of the respondents on this knowledge score was 37.5%.

3.5 Mean Percentage Basic Knowledge Score of Respondents in 20 - 29, and 30 - 39 Age Groups

Respondents that fell within the age range of 20 to 29 years recorded higher scores in eleven, out of the fifteen Zika virus knowledge questions that respondents were required to provide answers to, while those that are 30 to 39 years of age, scored highest in four out of the fifteen basic knowledge questions posed. Overall, respondents 20 to 29 years of age, recorded mean percentage basic knowledge score of 54.6%, while those in the 30 to 39 years age range recorded 49.8%.

4. DISCUSSION

Simply comparing the age related pattern of awareness and basic knowledge on Zika virus disease among respondents in this study, as recorded in the nine age groups presented in the result section could be misleading. Very clear majority of respondents in this study were aged 20 to 39 years (86.0%), with almost equal number falling into the age range of 20 to 29 years (42.2%), and 30 to 39 years (43.8%). The closest number to 20 - 29 and 30 - 39 years groups of respondents in any age group that participated in this study were those aged 40 to 49 years (8.2%), while the group with the next number of respondents fell into those that were 19 years and below (3.5%). Only six (2.4%) of the respondents were 50 years and above [Table 1]. Hence, it is obvious that reliable comparison of the findings in the various age groups could only be made among those that were 20 to 29 years, and 30 to 39 years. This as previously stated is a limitation in this study. The study population comprising of women who brought their children for immunization implies that most would be within the reproductive age range of 15 to 49 years.

Among the different age groups of ten years each, respondents belonging to age groups 20 - 29 years, 30 - 39 years, and 40 - 49 years; recorded very close awareness percentage scores of 61.1%, 63.4%, and 61.9% respectively. These scores also are not remarkably different from the overall awareness score of 61.7%, since 94.1% of all the respondents fell into those aged 20 to 49 years [Table 2]. The highest percentage of respondents that heard about Zika virus got the information through the television (36.1%), with most of those aged 39 years and above

accessing the information through the television, while most of those that were 40 years and above got the information through the radio [Table 3]. This could be seen as strengthening the thinking that radio, possibly might not be the current most effective means of disseminating health information among the younger generation in urban areas; rather television could achieve better results in health information dissemination among this group. It was also found in a Zika virus knowledge and perception study in an education city in Qatar that Television (42.8%) was a reasonably more popular source of Zika virus information when compared to Radio (10.8%) [14]. Most of the respondents in the Qatar study were 39 years and below (77.6%), which could be compared to the 89.5% of respondents in this study that were aged 39 years and below. Television being the most popular source of health information probably would not apply in the rural areas where ownership of Television sets and availability of electricity are still problematic. However, it was found in the Outpatient department of an urban tertiary hospital, Northeast Nigeria, that Radio was a reasonably better source of Zika virus information among reproductive-age women (47.7%), than Television (11.2%) [15]. It is said that most of the patients who access health from the Outpatient department of that hospital in the Northeastern part of Nigeria, came from the hinterlands; hence radio was still commonly used by majority of the respondents in that study. Further comparing the source of Zika virus information in this study with the earlier stated Qatar study, revealed that whereas Internet was the leading source of Zika virus information among the Qatar respondents (60.8%), it was the third to the least source (4.4%) among ten options in our study; performing only better than Market and Church as sources of Zika virus information. This very poor score of Internet as a source of Zika virus information in this study, could be a pointer to low computer literacy and Information/Communication Technology (ICT) use among our respondents. Low Internet Zika virus information source (6.9%) was also documented in the Northeast Nigeria study [15].

Respondents aged 20 to 29 years of age demonstrated better basic knowledge on Zika virus, in eleven out of the fifteen questions that were posed to respondents; when compared to those aged 30 to 39 years of age that were better in only four questions [Table 4]. These younger respondents were eventually able to demonstrate fairly good mean basic knowledge on Zika virus

(54.6%), while those aged 30 to 39 years recorded slightly less than average score (49.8%) [Fig. 1]. This finding could be said to compare well with the finding in another Zika virus knowledge study among women of reproductive age in Northern Nigeria, where women aged less than 27 years demonstrated superior Zika virus knowledge than those aged 27 years and above [15]. Certain factors could have contributed to the younger respondents having better knowledge than the older ones. These factors could have been said to include the likelihood of these younger ones having more interest in watching Television since TV was recorded to be the most common source of Zika virus information in this study. On Television being the source of ZVD information, the younger ones however scored less than those aged 30 - 39 years. Another plausible reason could be that the younger respondents were still probably students, thus could be more exposed to health information in school, than the older respondents. These lines of thought however require further scientific research.

5. CONCLUSION

WHO declared Zika virus infection a "Public Health Emergency of International Concern" on February 1, 2016, but lifted the emergency declaration in November of the same year. She however cautioned that the potential of the virus posing future public health challenges was not over. It is therefore very wise to still work towards identifying awareness and knowledge gaps among key members of the society that are mostly affected by the Zika virus infection, with the aim of addressing these gaps and preventing the health hazards associated with the virus. Among respondents within the child bearing age group, only those within the age range of 20 to 29 recorded mean percentage basic knowledge score that was over 50.0% (54.6%). It is then of utmost importance that health managers in the study state articulate strategy that will be implemented, towards addressing the identified awareness and knowledge gaps in this study.

CONSENT

Informed consent was obtained from each respondent, prior to commencement of the interview.

ETHICAL CONSIDERATION

Ethical clearance for the study was obtained from the Ethical Research Committee of the Enugu State University College of Medicine.

COMPETING INTERESTS

The authors hereby declare that there was no conflict of interest during this research work, and preparation of this paper.

REFERENCES

1. World Health Organization Zika virus factsheet; 2016. Available:<http://www.who.int/mediacentre/factsheets/zika/en>. Accessed 30/08/17.
2. World Health Organization. Zika Situation Report; 2016. Available:<http://www.who.int/emergencies/zika-virus/situation-report/25-august-2016/en/> [Accessed 30/08/17]
3. World Health Organization. Zika Situation Report; 2017. Available:<http://www.who.int/emergencies/zika-virus/situation-report/05-january-2017/en/> (1954). [Accessed 30/08/17]
4. Mac Namara FN. Zika virus: A report on three cases of human infection during an epidemic of jaundice in Nigeria. *Trans Royal Soc Trop Med Hyg.* 1954;48(2):139 - 145.
5. Adebayo B. Doctors fear Zika might have occurred in Nigeria. *Punch Newspapers (Online)*; 2016. Available:<http://punchng.com/doctors-fear-zika-might-have-occurred-in-nigeria/>
6. Dick GWA. Zika virus (II): Pathogenicity and Physical properties. *Trans Royal Soc Trop Med Hyg.* 1952;46:521-534.
7. Centre for Disease Control. Zika Virus home. Available:<http://www.cdc.gov/zika/transmission/index.html>. [Accessed 11/09/17]
8. World Health Organization. Zika Virus Disease. Available:<http://www.who.int/csr/disease/zika/en/>. [Accessed 30/08/17]
9. World Health Organization. WHO Director-General summarizes the outcome of the Emergency Committee regarding clusters of microcephaly and Guillain-Barre Syndrome; 2016. Available:<http://www.who.int/mediacentre/news/statements/2016/emergency-committee-zika-microcephaly/en/>. [Accessed 11/09/17]
10. Moreira J, Peixoto TM, Machado de Siqueira A, Lamas CC. Sexually Acquired Zika virus: A Systematic Review. *Clin Microbiol Infect.* 2017;23(5):296-305.
11. McNeil Jr. DG. Zika is No Longer a Global Emergency, WHO Says; 2016. Available:<http://www.nytimes.com/2016/11/19/health/who-ends-zika-global-health-emergency.html?mcubz=o>. [Accessed 10/09/17]
12. Wikipedia. Nigeria. Available:<http://en.wikipedia.org/wiki/nigeria>. [Accessed 14/09/17]
13. Wikipedia. Enugu State. Available:<http://en.wikipedia.org/wiki/Enugu-state>. [Accessed 14/09/17]
14. Cheema S, Maisonneuve P, Weber I, Fernandez-Luque L, Abraham A, Alrouh H, et al. Knowledge and Perception about Zika virus in a Middle East Country. *BMC Infect Dis.* 2017;17:524.
15. Michael GC, Aliyu I, Grema BA, Ashimi AO. Knowledge of Zika Virus Disease among Reproductive-age women attending a General Outpatient clinic in Northern Nigeria. *South Afri Fam Prac.* 2017;59(4): 148-153.

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