

AWARENESS, KNOWLEDGE AND PERCEPTION OF DENGUE FEVER AMONG UNDERGRADUATES OF A NIGERIAN FEDERAL UNIVERSITY

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Abstract

Background: Dengue fever is neglected, under-recognized and under-reported in Nigeria due to a lack of awareness by healthcare providers and a lack of prioritization by the public health authorities.

Objectives: This study assessed the awareness, knowledge and perception of some undergraduate students at the University of Nigeria Nsukka.

Methods: A cross-sectional study was conducted among undergraduate students of the University of Nigeria Nsukka, using a convenient sampling method with the aid of a questionnaire which had four (4) sections. Section A obtained socio-demographic information of respondents. Section B assessed respondents' awareness of dengue fever. Section C assessed the respondents' knowledge of dengue fever. Section D assessed the respondents' perception of dengue fever.

Results: Out of eight hundred (800) students that were sampled, only 536 questionnaires were properly filled giving a response rate of 67%. Most 337(62.9%) of the students were aware of dengue fever, 140(26.1%) of the students heard about dengue from lectures and 354(66.0%) wanted increased awareness through public enlightenment. More than half 273(50.9%) of the students had good knowledge of dengue fever while 370(69.0%) had a good perception of dengue fever.

Conclusion: The undergraduate students were aware of dengue fever, and they had good knowledge and perception of dengue fever.

Keywords: Dengue fever, knowledge, awareness, perception, undergraduate student

Introduction

Over the past years, Nigeria has experienced intermittent outbreaks of dengue fever, with varying degrees of severity and geographic distribution ^[1]. Dengue fever is the most rapidly spreading mosquito-borne viral disease with an estimated annual incidence of 390 million cases ^[2]. Recent reports suggest that dengue viruses are a major cause of acute fever in Nigeria ^[3]. It is estimated that every year, between 2.5-3.6 billion people in over 125 endemic countries are at risk, including 120 million travelers to these regions ^[4]. About 2 million cases evolve into dengue hemorrhagic fever and about 20,000 may culminate in death ^[5]. It has now become a major public health dilemma, annually affecting approximately 50–100 million people worldwide ^[4]. Two and a half billion people reside in dengue-endemic regions ^[6] and roughly 400 million infections occur per year, with a mortality rate surpassing 20% in some areas ^[7]. There is a possibility that many outbreaks of dengue fever may have been neglected, under-recognized or under-reported due to a lack of awareness of health staff and the unavailability of diagnostic tools in health institutions ^[8,9]. Factors such as urbanization, climate change, and inadequate healthcare infrastructure have contributed to the resurgence and spread of the disease in the country ^[1]. Dengue fever is a viral disease transmitted to humans by the bite of infected females of the main vector *Aedes aegypti* and to a lesser extent *Aedes albopictus* mosquitoes. These mosquitoes bite both indoors and outdoors during the daytime (from dawn to dusk). This virus is an RNA virus that belongs to the genus *Flavivirus* of the family *Flaviviridae*.

Dengue fever is an acute febrile illness with a sudden onset of fever, followed by the development of generalized symptoms and sometimes a macular skin rash. It is known as *breakbone fever* because

of severe muscle, joint and bone pains. Pain behind the eyes (retro-orbital pain) may be present. It affects individuals of all age groups^[10]. The syndromes produced by the dengue virus are influenced by age and immunological status. With primary infection, the symptoms are very mild in most children and range from sub-clinical infection or mild undifferentiated febrile syndromes. Secondary infection is associated with a dramatic alteration in the pathophysiology resulting in a greater propensity to develop severe dengue^[11].

Clinically, the patient typically defervesces after 4-5 days of fever with an accompanying generalized maculopapular rash, which signals recovery. Leucopenia may be found at this stage with normal platelet count and transaminase values. Sometimes, symptoms are mild and can be mistaken for those of the flu or another viral infection. Once you are infected with the same Dengue virus serotype you become immune to future infections. However, if you are infected subsequently with a different serotype, immunity wanes over time which increases the risk of developing Dengue Hemorrhagic Fever (DHF). Healthcare professionals who are frontiers are usually at risk of getting infected by the virus especially if they are not aware of the symptoms and practices to prevent getting infected or to control its spread. Healthcare professionals and community health workers must be aware and knowledgeable about dengue fever; its clinical manifestation and management so that they can help the public to prevent and treat the disease. Studies have revealed that students are susceptible to dengue viral infection^[12].

Hence, the need for students especially those in medical and health-related courses to be well equipped with adequate knowledge and skill required for diagnosis, management, and treatment of dengue fever, since they are the future healthcare professionals. To the best of our knowledge, no study has been conducted to assess undergraduate students' awareness and knowledge of dengue fever in Nigeria.

This study assessed the awareness, knowledge and perception of dengue fever among undergraduates in the medical and health sciences faculties of the University of Nigeria, Nsukka.

Methods

Study Design

A cross-sectional study was conducted among undergraduate students of the University of Nigeria, Nsukka.

Study Setting

This study was conducted in the faculties of pharmacy, microbiology, nursing and medical sciences at the University of Nigeria Nsukka. The University of Nigeria Nsukka (UNN) is a federal university in Enugu State, Nigeria. It was founded by Nnamdi Azikiwe in 1955 and formally opened in 1960. UNN operates 102 academic departments across 15 faculties and offers 82 undergraduate programs and 211 postgraduate programs with a student population of about 36,000 (Times Higher Education). It has four campuses; Enugu campus (UNEC); University of Nigeria Teaching Hospital (UNTH), in Ituku-Ozalla, the University of Nigeria Aba campus (UNAC) and the main campus (Nsukka).

Study Instrument

A structured validated 36-item questionnaire which was developed after an extensive literature review was used for this study. Two experts each in Public Health Pharmacy and Clinical Pharmacy assessed the questionnaire and conducted face validity. Content validity of the questionnaire was conducted with the aid of Cronbach's alpha. The questionnaire consists of four sections; A, B, C and D. Section A obtained socio-demographic information from respondents.

Section B which consists of a nine-item statement assessed respondents' awareness of dengue fever. The respondents are to answer 'Yes' or 'No' to each of the questions. Each correct response is scored '1' and '0' for any incorrect response. The scores were expressed as percentages and the mean was obtained. The student's awareness of dengue fever was categorized into "Poor Awareness" and "Good Awareness" using the mean as a cut-off point. Students who obtained scores that are below the mean are categorised as having "Poor Awareness" while the students who obtained scores that are equal to and above the mean are categorised as having 'Good awareness' for scores above the mean.

Section C assessed the respondents' knowledge of dengue fever. It consists of 18 item questions. In this section, the respondents are to answer 'Yes' or 'No' to each of the questions. Each correct response is scored '1' and each incorrect response is scored '0'. The scores were expressed as percentages and the mean was obtained. Using the mean as the cut-off point, the respondents with scores less than the mean are categorized as having "Poor Knowledge" and those who obtained scores equal to and above the mean are categorised as having "Good Knowledge".

Section D assessed the students' perception of dengue fever. It consists of 10-item questions. The questions in this section were anchored on a 4-point Likert scale as Strongly disagree (1-point), Disagree (2-points), Strongly agree (3-points) and Agree (4-points). The student's perception of dengue fever was categorized into "Poor Perception" and "Good Perception." using the mean as a cut-off point. The students who obtained scores below the mean were categorised as having "Poor Perception" while the students with scores equal to and above the mean were categorised as having "Good Perception" and were classified into

The questionnaire was pre-tested on 20 respondents who were not part of the study and was found to be usable as the questions were easily understood and the desired data was obtained.

Ethical Consideration

Verbal consent to participate in the study was obtained from each student. Ethical approval for this study was obtained from the Health Research and Ethics Committee of the Department of Clinical Pharmacy and Pharmacy Management, Faculty of Pharmaceutical Sciences University of Nigeria Nsukka with reference number CPPM/HREC/23/UG/0009. Confidentiality of the respondents was ensured throughout the study.

Sample Size and Sampling

All the students in the penultimate and final year classes of the Department of Pharmacy, microbiology, nursing and medical laboratory were sampled to obtain a holistic view of the students in these classes. Thus 800 questionnaires were given out to the students to fill to create room for questionnaires that may not be appropriately filled and for non-responses.

Data Collection

The questionnaire was self-administered to the students who gave consent to participate in the study during their practical classes and/or during their clinical clerkship meetings. They were each given about 10 minutes to read through the questions and to respond after which the questionnaires were retrieved from them and kept in an envelop.

Inclusion Criteria

Students in their penultimate and final year in the Department of Pharmacy, Microbiology, Nursing and Medical Laboratory who agreed to participate in the study were included.

Data Analysis

The data collected was entered into a Microsoft Excel spreadsheet 2016 for data cleaning. The frequencies, percentages, mean and standard deviation were also obtained. The data was then exported into the software IBM SPSS Statistics for Windows Version 21.0 (IBM Corp, Version 21.0, Armonk, NY, USA) and the inferential analysis was done. Chi-square was used to determine the association between the respondents' demographics variable and the categorised data.

Results

Out of 800 questionnaires that were given out, only 536 questionnaires were properly filled giving a response rate of 67%. The reliability score of the questionnaire for this study was 0.75. Most of the students (284; 53.0%) in the study were females, aged between 19 to 23 years (378; 70.5%) and in their

4th year of study (237; 44.2%). The socio-demographic characteristics of the respondents are presented in Table 1.

Results obtained for awareness of dengue fever show that 337 (62.9%) of the students were aware of dengue fever, 140 (26.1%) of the students heard about dengue from lectures, 84 (17.5%) while 88(16.4%) of the students heard about it from news broadcasts. However, a majority of the students (427; 79.7%) believed that there is a need for increased awareness of dengue fever. Most students 354 (86%) want public enlightenment, 190 (36.6%) while 299 (55.0%) of the students suggested that common health workers should engage more in public enlightenment.

Table 2 shows the students' knowledge of dengue fever. The mean knowledge was 31.64 ± 22.98. More than half 273(50.9%) of the students had good knowledge of dengue fever while 263 (49.1%) had poor knowledge.

Findings showed that the students' mean perception of dengue fever was 89.85 ± 12.71. Most students 370 (69.0%) had a good perception of dengue fever while 166 (31.0%) students had a poor perception of dengue fever. Details are as shown in Table 3.

Findings revealed that the course of study was associated with the student's knowledge and perception of dengue fever. The pharmacy students had significantly better knowledge and perception of dengue fever (p=0.001 & 0.002 respectively) when compared to their counterparts. Details in Table 4.

Table 1 shows the demographic characteristics of respondents.

Variable	Frequency (n)	Percentage (%)
Age(yrs.)		
>18	3	0.5
19-24	378	70.5
25-29	145	27.1
≥30	10	1.9
Gender		
Female	284	53.0
Male	252	47.0
Course of Study		
Nursing	133	24.8
Medical laboratory	125	23.3
Pharmacy	158	29.5
Microbiology	120	22.4
Year of Study		
3 rd	107	20.0
4 th	237	44.2
5 th	192	35.8

Table 2: shows respondents' knowledge of dengue fever

Questions	Frequency (%)	
	No	yes
Dengue fever is a viral infection	325(60.6)	211(39.4)
The chief mode of transmission of Dengue is through mosquito bites	233(43.5)	303(56.5)
Do all the species of mosquito cause Dengue fever	468(87.3)	68(12.7)
The main vector of Dengue infection is the female <i>Aedes aegypti</i> mosquito	270(50.4)	266(49.6)
<i>Aedes albopictus</i> is a secondary vector for Dengue virus transmission	406(75.7)	130(24.3)
Like other mosquitoes, <i>Aedes</i> species survives better in hot weather	368(68.7)	168(31.3)

<i>Aedes aegypti</i> prefers small container that collects water for laying eggs	383(71.5)	153[28.5]
<i>Aedes</i> mosquito dwells in tropical and subtropical regions all over the world	311(58.0)	225(42.0)
Fever and pain behind the eyes are symptoms of Dengue fever	284(53.0)	252(47.0)
Headaches are symptoms of Dengue fever	309(57.6)	227(42.4)
Muscle and joint pain are symptoms of Dengue fever	351(65.5)	185(34.5)
The incubation period of the virus is between 3-15days	444(82.8)	92(17.2)
Dengue virus cannot be found in altitudes above 1000meters	474(88.4)	62(11.6)
The maturity period of the virus is 8-12days before it could be transmittable	440(82.1)	96(17.9)
An infected mosquito remains infected throughout the rest of its life	448(83.6)	88(16.4)
Do you think symptoms of Dengue fever are similar to symptoms of malaria	302(56.3)	234(43.7)
Yellow fever and Dengue fever are caused by the same vector	397(74.1)	139(25.9)
Dengue fever can be prevented by vaccination	382(71.3)	154(28.7)
Mean Knowledge=31.64 ± 22.975		
Poor Knowledge =263 (49.1%)		
Good Knowledge =273 (50.9%)		

Table 3: Respondents Perception of Dengue Fever

Item statements	Frequency (%)			
	Strongly Disagree	Disagree	Agree	Strongly Agree
Dengue Fever can cause mortality	30(5.6%)	21(3.9%)	152(28.4%)	333(62.1%)
Mosquito eradication is useful in dengue fever prevention and control	40(7.5%)	41(7.6%)	141(26.3%)	314(58.6%)
The major way to prevent dengue fever transmission is to reduce and control its vector	24(4.5%)	18(3.4%)	92(17.2%)	402(75.0%)
The use of mosquito nets and repellents reduces the risk	22(4.1%)	22(4.1%)	77(14.4%)	415(77.4%)
Dengue fever should be taught in schools just like malaria and typhoid	28(5.2%)	18(3.4%)	90(16.8%)	400(74.6%)
Dengue fever cases in Nigeria are poorly treated, hence the need to increase awareness	29(5.4%)	23(4.3%)	73(13.6%)	411(76.7%)
Medical students should have adequate knowledge of dengue fever so that they can help the public	20(3.7%)	13(2.4%)	103(19.2%)	400(74.6%)
Poor drainage system and improper water disposal contributes to the spread of dengue fever	23(4.3%)	13(2.4%)	61(11.4%)	439(81.9%)
The public should be educated about dengue fever and how to fight its vectors	18(3.4%)	19(3.5%)	146(27.2%)	353(65.9%)
Dengue fever patients should stay hydrated by taking lots of water	15(2.8%)	18(3.4%)	83(15.5%)	420(78.4%)
Mean Perception = 89.85 ± 12.707				
Poor Perception = 166 (31.0%)				
Good Perception = 370 (69.0%)				

Table 4: Association between respondents' demographic variables and knowledge and perception of Dengue Fever

Variables	Poor Knowledge	Good Knowledge	χ^2 (df)	Poor Perception	Good Perception	χ^2 (df)
Age(yrs.)						
>18	2(66.7)	1(33.3)		2(66.7)	1(33.3)	
19-24	177(46.8)	201(53.2)	0.153(3)	112(29.6)	268(70.4)	0.268(3)
25-29	81(55.9)	64(44.1)		47(32.4)	98(67.6)	
≥ 30	3(30.0)	7(70.0)		5(50.0)	5(50.0)	
Gender						
Female	137(48.2)	147(51.8)	0.684(1)	84(29.6)	200(70.4)	0.459(1)
Male	126(50.0)	126(50.0)		82(32.5)	170(67.5)	
Course of Study						
Nursing	65(49.9)	68(51.1)		29(21.8)	104(78.2)	
Medical	57(45.6)	68(54.4)	0.001(3)	44(35.2)	81(64.8)	0.002(3)
laboratory						
Pharmacy	64(40.5)	94(59.5)		42(26.6)	116(73.4)	
Microbiology	77(64.2)	43(35.8)		51(42.5)	69(57.5)	
Year of Study						
3rd	55(51.4)	52(48.6)		39(36.4)	68(63.4)	
4th	123(51.9)	114(48.1)	0.251(2)	70(29.5)	167(70.5)	0.391(2)
5th	85(44.3)	107(55.7)		57(29.7)	135(70.3)	

Discussion

Findings from this study revealed that most of the students were aware of dengue fever and had good knowledge and perception of dengue fever. However, they stated that dengue fever is not known much in their environment and that they are not knowledgeable enough to manage dengue fever cases. The students in this study were mostly females, between the age range of 19 to 23 years and in their fourth study year. These findings align with a study conducted on undergraduate students in Pakistan where female students (53.5%) were higher than the males [13].

In this study, the students had good awareness and knowledge of the symptoms, mode of transmission and severity of dengue fever. This could be because they are aware of the high prevalence and susceptibility of dengue fever among students who are within the age group of 18 to 23 as revealed in a study conducted on undergraduate students in Ogun State which confirmed a high prevalence of dengue virus antibody with 43.8% of the students being susceptible to dengue virus infection [12]. The students in this study had a good perception of dengue fever which implied that they perceive dengue fever could lead to death and that controlling the vectors through proper drainage systems and the use of mosquito nets could be an effective means of preventing and controlling the spread of the virus. However, they established the need for increased awareness and education of the public on the dangers of dengue fever, its risk factors and how to prevent and control the vectors that transmit the dengue virus which agreed with a study conducted by Nayyar *et al.*, 2013 which revealed the need for public enlightenment using the internet [13,14].

In this study, the course of study was associated with the student's knowledge and perception of dengue fever. The pharmacy students had better knowledge and perception of dengue fever than the nursing and medical laboratory science students. The microbiology students had the least knowledge and perception of dengue fever. These findings could be attributed to the students' clinical training and information obtained from lectures and seminars. Similar studies corroborate the findings which stated that pharmacists, nurses and medical lab scientists had a high awareness of dengue of dengue fever [15]. However, contrary to the findings of this study, students in the Department of Information

and Technology & Business Administration scored the highest in knowledge of dengue fever in a study conducted in Pakistan ^[13]

Recommendation

Public enlightenment and community education and awareness programs organised by government agencies, healthcare providers, researchers, and international partners are crucial in addressing the growing threat of dengue fever and reducing its impact on public health in Nigeria.

Limitations of the study

This was a cross-sectional study which obtained results at a point in time. There is a possibility that different findings will be obtained if the study is conducted at a different time.

This study was only conducted on some undergraduate students of the university who may not represent the whole undergraduate students of the university, the result obtained may not be applicable to other students who are in a faculty different from the ones used for this study.

Conclusion

The undergraduate students of pharmacy, nursing, microbiology and medical science of the University of Nigeria Nsukka, Nigeria were aware of dengue fever and they had good knowledge and perception of dengue fever.

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Conflict of Interest

None declared.

References

1. Adesola RO, Ajibade AF, Idris I, Scott YG , Agaie MI. Addressing the Dengue fever challenges in Nigeria: A narrative review and recommendations for control. *Le Infezioni in Medicina* 2024; 1(2) 157-167. doi: 10.53854/liim-3202-5
2. Bhatt S, Gething PW, Brady OJ, Messina JP, Farlow AW, Moyes CL, Drake JM, Brownstein JS, Hoen AG, Sankoh O, Myers MF, George DB, Jaenisch T, William WGR, Simmons CP, Scott TW, Farrar JJ, Hay SI. The global distribution and burden of dengue. *Nature* 2013; 496: 504-507. Available from: <https://doi.org/10.1038/nature12060>.
3. Adeleke MA. Mosquito vectors and their epidemiological implications in the vicinities of Osun State University Main Campus, Osogbo, Nigeria. *Munis Entomology & Zoology* 2019; 14(1): 287-293.
4. WHO. (2012b). WHO Dengue and severe dengue. WHO International Media Factsheet. Available from: <https://www.who.int/heslthtopics/>.

5. Gubler DJ. Dengue/Dengue Haemorrhagic Fever: History and Current Status. In New Treatment Strategies for Dengue and Other Flaviviral Diseases. Novartis Foundation Symposium 2006; 227. Available from: <https://doi.org/10.1002/0470058005.ch2>.
6. Guzman MG, Halstead SB, Artsob H, Buchy P, Farrar J, Gubler DJ, Hunsperger E, Kroeger A, Margolis HS, Martí-nez E, Nathan MB, Pelegrino JL, Simmons C, Yoksan S, Peeling RW. Dengue: A continuing global threat. *Nat. Rev Microbiol* 2010; 8(Suppl 12): S7-S16. Available from: <https://doi.org/10.1038/nrmicro2460>.
7. Linares EM, Pannuti CS, Kubota LT, Thalhammer S. Immunospot assay based on fluorescent nanoparticles for Dengue fever detection. *Biosens Bioelectron* 2013; 15(41):180. Available from: <https://doi.org/10.1016/j.bios.2012.08.005>.
8. Ayukekbong JA. Mini-Review Dengue Virus in Nigeria: Current Status and Future Perspective. *British Journal of Virology* 2014b; 1(3):106–111.
9. Baba M, Talle M. The effect of climate on dengue virus infections in Nigeria. *New York Science Journal* 2011; 4(1):28-33.
10. Thomas EA, John M, Bhatia A. Cutaneous manifestations of dengue viral infection in Punjab (north India). *Int J Dermatol* 2007; 46(19):715-882. Available from: <https://doi.org/10.1111/j.1365-4632.2007.03298.x>.
11. Fagbami AH, Onoja AB. Dengue haemorrhagic fever: An emerging disease in Nigeria, West Africa. *J Infect Pub Health* 2018; 11(6): 757-762. Available from: <https://doi.org/10.1016/j.jiph.2018.04.014>.
12. Sule WF, Fadamitan OT, Lawal OA, Adebimpe WA, Opaleye OO, Oluwayelu OD. Probable primary and secondary dengue viral infections and associated host factors among university undergraduates in Osun State, Nigeria. *Alexandria Journal Of Medicine* 2019; 55(1): 25–30. <https://doi.org/10.1080/20905068.2019.1592935>.
13. Nayyar U, Dar FU, Latif MZ, Mahmud TR, Nizami R. Knowledge, Awareness and Practices about Dengue Fever among University Students. *P. J. Med. Health Sci.* 2013; 7(4). <https://www.researchgate.net/publication/276268166>.
14. Ashraf I, Ashraf S, Riyaz B, Hassan A, Rana AAC, Nawaz D, Shahid E, Hafeez F. Knowledge, Awareness And Preventive Practices Of Dengue In Pakistan. *J. Popu. Ther. Clin. Pharmacol.* 2023; 30(17): 871-880.
15. Oche OM, Yahaya M, Oladigbolu RA, Ango JT, Okafoagu CN, Ezenwoko Z, *et al.* A cross-sectional survey of knowledge, attitude, and practices toward dengue fever among health workers in a tertiary health institution in Sokoto state, Nigeria. *J Family Med Prim Care* 2021;10:3575-83.