



Role of Health Education in the Awareness of Mosquito Breeding Sites in Public Secondary Schools in Imo State, Southeast, Nigeria

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Abstract

A cross-sectional study on the prevalence of malaria infection among secondary school students in Imo State was carried out between May and August 2022 in secondary schools in Imo State. This study adopted a survey research design that used the inferential method. A total of 399 students were involved in the study. The sample was drawn using purposive and cluster random sampling techniques. Data were collected using pre-tested questionnaires. The reliability of the instrument was assured using the Cronbach alpha statistic. The result obtained yielded a reliability index of 0.82, indicating the high internal consistency reliability of the research instrument. Mean and standard deviation statistics were used to answer the research questions. Hypotheses were tested with One Sample t-test statistic at a 0.05 level of significance. The findings of the study were that the extent of malaria prevalence among public secondary school students in Imo State is moderate and not significantly rated above average; the extent to which Exposure to health education help students to be aware of mosquito breeding indicators among public secondary school students in Imo State is moderate and significantly rated above average; the extent to which Exposure to health education help students to be aware of their contribution to mosquito breeding in public secondary school in Imo State is moderate and not significantly rated above average. Based on the findings, it was recommended among others that government should provide refuse receptacles in large quantities and place them at an interval of not more than 200 m apart in both residential and commercial areas. The findings of this study also emphasize the need for health education in schools, churches, and communities to control malaria in the area.

Keywords: Malaria, Awareness, Health Education, Knowledge, Public schools, Imo State

1 Introduction

Malaria is the most prevalent parasitic endemic disease in Africa, which is preventable, treatable, and curable[1]. Today malaria is found throughout the tropical and sub-tropical regions of the world and causes more than 300 to 500 million acute illnesses and at least one million deaths annually. Approximately, 40% of the world's population, mostly those living in the poorest countries, is at risk of malaria. It affects five times as many people as Acquired Immune Deficiency Syndrome (AIDS), leprosy, measles, and tuberculosis combined. [2] carried out a related study titled "School Health Program (SHP) in Nigeria: A Review of Its Implementation for Policy Improvement". The purpose of this study was to synthesize available information on the implementation of the program across Nigeria for policy review and program improvement [3]. A comprehensive review of relevant literature was done to identify the implementation of the SHP across the country. Relevant implementation drivers were also reviewed. The implementation of SHP across the country was sub-optimal [4]. The study revealed that SHP in Nigeria has largely remained at the policy level with minimal implementation. Hence, a need to re-establish or strengthen the program in the country was suggested among other recommendations. Also, the need to review and redefine

stakeholders' participation for effective coordination was emphasized. Although, this study reviews school health education under the umbrella of a school health program, however, it did not correlate its variables with mosquito breeding or any vector-borne disease in the environment. [5] conducted a related study on "Factors Affecting Health Instruction in Secondary Schools in Edo State, Nigeria" was also conducted. The primary objective of this paper was to determine the factor that affects health instruction in secondary schools in Edo State, Nigeria. The descriptive survey research method was used for the study and data were analyzed descriptively using frequency count and percentages. The population of the study consisted of all public secondary schools in Edo State where health education is being offered. The results of the study reveal that school principals' negative administrative styles and the inadequacy of duration/time allotted to health instruction in the schools were critical factors that affect health instruction in Edo State secondary schools. The study equally shows that the lack of health education teachers, and the lack of relevant health education textbooks, pamphlets, and posters were factors central to the poor state of health instruction in Edo State secondary schools. Based on the findings, the authors made several recommendations including the need for school authorities in Edo State to provide relevant

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and modern textbooks, pamphlets, posters, computers, and other related instructional materials. It was also recommended that the State's Ministry of Education should help in enhancing the tenets of health education by posting at least one experienced health education staff in the school. The Ministry should endeavor to visit the schools regularly to ensure that the schools, students, and teachers are adequately implementing the health education curriculum. Although this study focused comprehensively on delivering health education to students, it failed to relate it to vector-borne diseases or any other environmental disease. Hence, the current study will intend to close this gap by investigating students' exposure to mosquito breeding indicators.

[6] conducted research on School health program practices among private secondary school administrators in an urban local government area in Lagos state, Nigeria. A descriptive cross-sectional study design using a semi-structured self-administered questionnaire to obtain information on demographic data of the schools, socio-demographic data of the respondents, and knowledge, and practice of school health programs by the respondents and their schools respectively. This study was conducted among the 56 respondents in all the 32 registered private secondary schools in Ikeja between July and August 2010. The result revealed that only 7.2% had good knowledge of SHP while 58.9% and 19.33.9% had fair and poor knowledge respectively. About 60% of the respondents' schools had a school health policy and practiced compulsory pre-admission medical examination. Although, the majority of the schools (94.6%) had functional first aid boxes, only 28.6% had a staff in each of their building trained to use the first aid box. There's a statistically significant association between respondents' schools that had a School Health Policy and those that had a school clinic or health post ($X^2=7.2641$, $p=0.009$). The study recommended that more awareness be created as well as more training conducted among school administrators for the National School Health Policy to succeed.

A related study was carried out by [7] titled "Simple Intervention to Reduce Mosquito Breeding in Waste Stabilization". Ponds collected larvae were preserved in vials containing 70% isopropyl or alcohol for later identification. The third and fourth instar larvae were identified, whilst early instars and damaged larvae were only counted, noted, and discarded. Pupae were not counted or recorded. For further information on the identification of mosquitoes, [8]. Samples were classified as positive or negative for each of the mosquito species. A total of 936 samples (28 080 dips) were taken from intervention and control ponds combined. The overall abundance both of *Culex* and *Anopheles* mosquitoes was greatest in the anaerobic ponds, followed by the facultative ponds, and least in the maturation ponds. However, for *A. culicifacies* and *A. Stephensi*, the trend appeared to be different. Overall, seven different mosquito species were found (four *Culex* and three *Anopheles* species), with *C. quinquefasciatus* being the most abundant. In the intervention ponds, the percentage of samples positive was reduced to zero for *Anopheles* and almost zero for *Culex*, whereas, in the control ponds, 19.2% of samples were positive for *Anopheles* and 34.0% for *Culex*. In the control ponds, the sampling gave a very heterogeneous result, with 65% of the samples being negative; all positive samples were found in habitats with vegetation. Owing to the magnitude of the observed differences between intervention and control ponds, no statistical analyses were performed.

[9] researched community participation in mosquito breeding site control: an interdisciplinary mixed methods study in Curaçao. A cross-sectional mixed methods study applying a survey questionnaire (response rate of 82.5%; $n = 339$), in-

depth interviews ($n = 20$) and focus group discussions ($n = 7$; 50 participants) was performed in Curaçao. The study was designed based on an integrated theoretical framework of the Health Belief Model and the Theory of Planned Behaviour. A related study was conducted by [10] to assess learners' exposure to health education and promotion at schools in the Limpopo Province of South Africa. This study aimed to assess the exposure of rural secondary school learners to health education in South Africa. This study was carried out at 10 secondary schools in Vhumbedzi educational circuit. The study adopted a cross-sectional quantitative approach. Data were collected from 338 randomly selected learners from 10 secondary schools that make up a rural Vhumbedzi circuit in the Limpopo province. A self-administered questionnaire was used to collect data. The findings showed that 102 (66.07%) male and 121 (67.60%) female learners reported that they were taught about physical changes that occur during adolescence. In the same vein, most of the participants ($n = 128$, 84.39%) and ($n = 152$, 85.39%) males and females respectively claimed to have been taught about sexually transmitted diseases. The study also revealed that secondary schools in the Limpopo Province of South Africa are making efforts to uphold and expose their learners to health education and promotion at school.

[11] examined the identification of Primary School Teachers' Health Literacy. A 5 open-ended item questionnaire was used to collect data that were further processed using the quantitative content analysis. The results indicated that knowledge about healthy lifestyles, practical behavior, and healthy lifestyle promotion were the essential components of the teachers' health literacy. Though, their parameters of main health literacy were understandable and quite well evaluated; nevertheless, they lacked knowledge and practical abilities. This research recommends those only teachers' competencies of health literacy and personal healthy lifestyle experience can contribute to students' healthy living habits.

[12] investigated the Influence of Health Education and Healthy Lifestyle on Students' Academic Achievement in Biology in Nigeria. The positive effects of health education and healthy lifestyle on adolescent academic achievement could not be over-emphasized as learning experiences were evaluated to help students accurately assess the level of risk-taking behavior among their peers, and emphasis on the value of good health that reinforces health-enhancing attitudes and beliefs is paramount. Little effort had been made by researchers to examine the influence of health education and a healthy lifestyle on students' academic achievement. This study examined the influence of health education and healthy lifestyle on students' academic achievement in Biology. Seven hundred and twenty (720) students of both sexes participated in the study. Three instruments used in the study are Health Education Efficiency Questionnaire ($\alpha=0.89$), Adolescent Healthy Lifestyle Questionnaire ($\alpha=0.94$), and Biology Achievement Test ($r=0.88$). Data were analyzed using descriptive and inferential statistics of Multiple Regression at p . Another related study was conducted by [13] on evaluating the impact of health education on health knowledge: a study of secondary school students in Cross River State, Nigeria. The study adopted the Survey Research design with a structured questionnaire as an instrument for data collection. A total of 500 students participated in the study and data were analyzed using the Pearson Product Moment Correlation Coefficient (r). Findings revealed that there is a significant relationship between health knowledge and health education amongst senior secondary school students in Cross River State. This implies that the introduction and implementation of health education programs in secondary schools have contributed

immensely to the students' increased knowledge about health-related issues, which is a vehicle for proper healthy living needed for societal development.

2 Materials and methods

2.1 Area of the Study

The study was carried out in Imo State, Imo state is one of the 36 states in Nigeria and was created on 3rd Feb. 1976. Imo State has a land mass of 5,100sqkm with a population of about 3,934,899 persons (NPC, 2006). Imo State is located in South East region of Nigeria and its capital is Owerri which is the largest town in the state. The state derives its name from the Imo River which takes its course from Okigwe Upland. It lies within latitude 4° 45'N and 7° 15'N, and longitude 5° 50'E and 7° 25'E. The state has boundaries with Anambra and Delta States in the West, Anambra, and Abia states in the North, Abia State in the East, and Rivers State in the South. Imo state is made up of six educational zones namely Okigwe zones I & II, and Owerri zones I & II. Okigwe Zone I is made up of 3 local government areas – Isiala Mbano, Okigwe, and Onuimo L.G.A.; Okigwe Zone II is made up of Ehime Mbano, Ihitte/Uboma, and Obowo Local Government area, Orlu zone I is made up of Ideato North, Ideato south, Isu, Njaba, Nkwerre, Nwagele, Orlu, and Orsu L.G.A.s; Orlu Zone II comprises of Oguta, Ohaji/Egbema, Oru East and Oru West L.G.A.s; Owerri zone 1 comprises of Ikeduru, Mbaitoli, Owerri Municipal, Owerri North and Owerri West L.G.A.s while Owerri Zone II is made up of Aboh Mbaise, Ahiazu Mbaise, Ngor Okpala, and Ezinihitte Mbaise L.G.As. Besides Owerri the capital, Imo State's major towns are Okigwe and Orlu.

2.2 Population of the Study

The population of this consists of 177,918 students from 301 public secondary schools in Imo State.

2.3 Sample and Sampling Technique

The sample for this study is 399 students. The sample was drawn using purposive and cluster random sampling techniques. To determine the sample size of the study, the Taro Yamen formula was used. Purposively, the researcher chose the secondary school students 2 class to rate the extent of exposure to health education, indicators of mosquito breeding, and malaria prevalence. This stream of students was chosen because it is the next mature class after the SS3 students that were busy with their external examinations. Cluster random sampling was used to draw representatives from each of the zones which constituted the cluster for the study. Random sampling techniques were also used to determine the selected students in the various secondary schools in each zone. This implies that all the members of the given population have an equal chance of being chosen for the sample group.

2.4 Method of Data Collection

A Direct Administration Technique (DAT) method also called face to face method was employed for the administration of the instrument. The researcher engaged the services of two (2) trained research assistants who assisted in administering copies of the rating scale to the selected schools in the Imo

state. This face-to-face encounter enabled the researcher to guide the respondents on the filling of the rating scale. An on-the-spot collection was made to ensure a maximum return of 100%. In end, all the copies were administered and all of them were retrieved and these collected copies were used for the analysis.

2.5 Method of Data Analysis

The research questions were answered using mean scores and standard deviation. The hypotheses were tested using one sample t-test statistics (population t-test or t-test of significant difference between sample and population mean) at 0.05 level of significance.

Decision Rule: For item base decision rule, any item that records a mean of:

1.00-1.80 = Very Low Extent (VLE),

1.81-2.60 = Low Extent (LE),

2.61-3.40 = Moderate Extent (ME),

3.41-4.20 = High Extent (HE), and

4.21-5.00 = Very High Extent (VHE).

The level of rejection or acceptance of the null hypotheses was based on the t-calculated value and its t-table value. Since the test statistics is a one-tailed test. When the t-calculated value is greater than the t-table value of 1.645, the hypothesis was considered rejected, when the t-calculated value is less than the t-table value of 1.645, the hypothesis was not rejected.

3 Data analysis

Data collected were analyzed using descriptive statistics and variations were tested using chi-square. The significance level was fixed at $p < 0.05$.

3.1 Hypothesis 1

Ho₂: The mean rating score of public secondary school students rating their awareness/knowledge of mosquito breeding indicators is not significantly more than the criterion mean of 30.

Table 1 shows the result of the test for the hypothesis to establish the significance of the extent to which exposure to health education helps students to be aware of mosquito breeding indicators among public secondary schools in Imo State. The outcome indicates that the t-calculated value of 8.867 is greater than the t-tabulated value of 1.645. Hence, rejecting the null hypothesis, revealing that the mean rating score of public secondary school students' rating their awareness/knowledge of mosquito breeding indicators is more significant than the criterion mean of 30. This indicates that the extent to which exposure to health education helps students to be aware of mosquito breeding indicators among public secondary schools in Imo State is moderate and significantly rated above average.

3.2 Research Question 1

RQ₁: To what extent does exposure to health education help students to be aware of their contribution to aware to breeding in public secondary schools in Imo State?

Table 1: Summaries of inferential statistics used to infer the extent to which exposure to health education help students to be awareness of mosquito breeding indicators among public secondary schools in Imo State

<i>n</i>	$\bar{X}$	μ	S	S.E	df	<i>t</i> _{cal.}	<i>t</i> _{tab.}	Decision
399	32.68	30	6.041	.302	398	8.867	1.645	Reject Ho ₂

Sample Size (*n*), Mean ($\bar{X}$), Standard Deviation (S), Standard Error (SE), degree of freedom (df), one sample t-test statistics and Decision

Table 2: Summaries of descriptive statistics used to describe the extent to which health education help students to be aware of their contribution to mosquito breeding in public secondary school in Imo State.

S/N	Item Statement	<i>n</i>	$\sum X$	$\bar{X}$	S	Remarks
1	Allowing bushes and stagnant water gives room to mosquito breeding.	399	1269	3.18	1.525	ME
2	Poor sewage disposal contributes to a mosquito breeding environment.	399	1234	3.09	1.497	ME
3	Students' activities have nothing to do with mosquito breeding	399	943	2.36	1.323	LE
4	Leaving/having dirty gutters around you can contribute to the breeding environment.	399	1335	3.35	1.467	ME
5	I only know mosquitoes transmit malaria but I do not know how mosquitoes breed.	399	881	2.21	1.297	LE
6	mosquito breeding indicators can affect my academic performance in school	399	1303	3.27	1.463	ME
	Cluster/Pooled Mean			17.46		
	Mean of Item Means			2.91		ME

Sample Size (*n*), Summation ($\sum X$), Mean ($\bar{X}$), Standard Deviation (S), and Remarks

Table 2 shows the mean scores and standard deviations used in answering the research question to ascertain the extent to which exposure to health education helps students to be aware of their contribution to mosquito breeding in public secondary schools in Imo State. By emphasizing the item criterion decision mean, the result points out that item numbers 19 and 21 were rated as low extent while the remaining items were rated as moderate extent. The values of standard deviations are seen to be small and are far from the mean, indicating that the scores in the distribution are homogeneous. The mean of item mean of 2.91, reveals that the extent to which health education helps students to be aware of their contribution to mosquito breeding in public secondary schools in Imo State is moderate.

3.3 Hypothesis 2

Ho₂: The mean rating score of Imo State public secondary school students on their contributions toward mosquito breeding is not significantly more than the criterion mean of 18.

Table 6 shows the result of the test for the hypothesis to establish the significance of the extent to which exposure to health education helps students to be aware of their contribution to mosquito breeding in public secondary schools in Imo State. The outcome indicates that the t-calculated value of -3.014 is less than the t-tabulated value of 1.645. Hence, accepting the

null hypothesis, revealing that the mean rating score of Imo State public secondary school students on their contributions toward mosquito breeding is not significantly more than the criterion mean of 18. This indicates that the extent to which exposure to health education helps students to be aware of their contribution to mosquito breeding in public secondary schools in Imo State is moderate and not significantly rated above average.

3.4 Research Question 3

RQ₃: To what extent does exposure to health education helps students to be aware of the existence of mosquito breeding environments in the public secondary schools in Imo State? Table 4 shows the mean scores and standard deviations used in answering the research question to ascertain the extent to which exposure to health education helps students to be aware of the existence of mosquito breeding environments in public secondary schools in Imo State. By emphasizing the item criterion decision mean, the result points out that item number 26 was rated as low extent while the remaining items were rated as moderate extent., the values of standard deviations are seen to be small and are far from the mean, indicating that the scores in the distribution are homogeneous.

Table 3: Summaries of inferential statistics used to infer the extent to which exposure to health education helps students to be aware of their contribution to mosquito breeding in public secondary school in Imo State

<i>n</i>	$\bar{X}$	μ	S	S.E	df	t _{cal.}	t _{tab.}	Decision
399	17.46	18	3.604	.180	398	-3.014	1.645	Accept Ho ₃

Sample Size (*n*), Mean ($\bar{X}$), Standard Deviation (S), Standard Error (SE), degree of freedom (df), one sample t-test statistics and Decision

Table 4: Summaries of descriptive statistics used to describe the extent to which exposure to health education help students to be aware of the existence of mosquito breeding environment in public secondary school in Imo State

S/N	Item Statement	<i>n</i>	$\sum X$	$\bar{X}$	S	Remarks
	Exposure to health education helps me to know the following:					
1	Existence of mosquito breeding environment.	399	1307	3.28	1.400	ME
2	Stages of mosquitoes.	399	1294	3.24	1.423	ME
3	Importance of environmental sanitation.	399	1258	3.15	1.463	ME
4	Existence of yards debris that breeds mosquitoes.	399	991	2.48	1.538	LE
5	help me to be conscious of my environment.	399	1284	3.22	1.473	ME
6	the existence of plant axils.	399	1231	3.09	1.510	ME
	Cluster/Pooled Mean			18.46		
	Mean of Item Means			3.08		ME

Sample Size (*n*), Summation ($\sum X$), Mean ($\bar{X}$), Standard Deviation (S), and Remarks

The mean of item mean of 3.08, reveals that the extent to which exposure to health education helps students to be aware of the existence of mosquito breeding environments in public secondary schools in Imo State is moderate.

3.5 Hypothesis 4

RQ4: The mean rating score of the existence of mosquito breeding environment/conditions in the public secondary in Imo State is not significantly more than the criterion mean of 18.

4 Conclusion

This study highlights the Potential Role of Health Education in the Awareness of Mosquito Breeding Sites in Public Secondary Schools in Imo State, Southeast, Nigeria. We observed a significant increase in the knowledge of school children on causes, modes of transmission, clinical symptoms, severe complications, and prevention of malaria. The extent to which Exposure to health education helps students to be aware of their contribution to mosquito breeding in public secondary schools in Imo State is moderate and not significantly rated above average.

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