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Effect Of Health Education Intervention On Knowledge And Attitude Towards Infectious Diseases Prevention Among Secondary School Students In Rivers State

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ABSTRACT
This study investigated the effect of health education on knowledge and attitude infectious diseases prevention among secondary school students in Rivers State. The study was a quasi-experimental study and data for the study was obtained from a sample size of 180 students drawn from the population of 36,100 public secondary schools in Ogba/Egbema/Ndoni L.G.A, Rivers State using multistage sampling procedure. A validated self-structured questionnaire titled "Knowledge and Attitude towards Infectious Diseases Questionnaire (KAIDQ)" with a reliability index of 0.85 was used for data collection. The data collected was analyzed using the Statistical Package for Social Sciences version 21 employing both descriptive and inferential statistics of percentage, mean, Standard Deviation, Chi-squared and ANCOVA. The study found that health education had a significant effect on knowledge and attitude of students in Rivers State towards infectious diseases prevention ($P<0.05$). It was also found that health education had a significant effect on knowledge and attitude of the students based on age, gender and class level ($P>0.05$). Based on the findings of the study, it was concluded that health education significantly enhances knowledge and attitudes towards infectious diseases prevention among secondary schools students in Ogba/Egbema/Ndoni LGA, Rivers State, with the intervention proving effective across different age groups, gender, and class levels, Finally the study recommended among others that schools should integrate structured and comprehensive health education programs into their curricula to enhance students' knowledge and attitudes towards infectious diseases.
Keywords: Health Education, Knowledge, Attitude, Infectious Diseases, Prevention

INTRODUCTION

Infectious diseases remain a formidable challenge to global public health and economic stability, with profound impacts on societies worldwide. For centuries, they have been among the leading causes of death and disability, continuously posing growing challenges to health security and human progress (Nii-Trebi, 2017). Despite advances in medical science and technology, infectious diseases continue to be a leading cause of morbidity and mortality, particularly in low- and middle-income countries. The burden they impose is immense, not only due to the high number of deaths and disabilities but also because of the substantial economic costs associated with their prevention, treatment, and control.

The World Health Organization (WHO) has consistently highlighted that infectious diseases, including tuberculosis (TB), malaria, and HIV/AIDS, account for a significant proportion of the global disease burden (WHO, 2020). Emerging infectious diseases, such as COVID-19, Ebola, and Zika virus, further exacerbate the situation by causing widespread fear, disrupting healthcare systems,

and necessitating substantial financial resources for effective management and containment (McArthur, 2019).

Infectious diseases (IDs) occupy a prominent position in world history due to the substantial burden they impose on human survival and development. They constitute a significant proportion of all known human diseases, with at least 25% of the approximately 60 million deaths that occur worldwide each year attributed to infectious diseases (Nii-Trebi, 2017). Neglected infectious diseases claim the lives of over half a million people annually and have left at least one billion people chronically infected (Bhutta et al., 2014). The threat posed by infectious diseases is further deepened by the continuous emergence of new, unrecognized pathogens and the resurgence of old infectious disease epidemics with global impact. Over the past three and a half decades, at least 30 new infectious agents affecting humans have emerged, many of which are zoonotic, originating from animal reservoirs and significantly influenced by socioeconomic, environmental, and ecological factors (Bhutta et al., 2014). This trend underscores the dynamic nature of infectious diseases and the critical need for robust preventive measures.

According to Drexler (2014), infectious diseases are typically caused by including viruses, bacteria, fungi, and parasites. These pathogens gain entry into the host through various routes, such as the mouth, eyes, genital openings, nose, and skin, and cause damage to organs and systems, leading to significant health complications (Raji et al., 2022). While efforts to combat infectious diseases have led to a decline in mortality rates, these diseases remain a significant threat globally. The fight against both ancient pathogens, like the plague, and newer ones, such as HIV, continues to challenge healthcare systems worldwide. Endemic diseases, such as TB and malaria, impose steady but substantial burdens, while others, like influenza, fluctuate in intensity, causing widespread disruptions during outbreaks, epidemics, or pandemics (Bloom & Cadarette, 2019; Wang et al., 2018).

In this context, secondary school students represent a critical demographic in the fight against infectious diseases. They are mostly adolescents and are at a unique developmental stage characterized by increased social interactions, a sense of invulnerability, and experimentation with behaviors that may increase their risk of exposure to infectious agents. Educating this group on the prevention of infectious diseases is vital, as they are not only at risk themselves but also play significant roles in their families and communities. By empowering students with knowledge and fostering positive attitudes towards disease prevention, they can become advocates for health within their social circles and contribute to broader public health efforts (Mbonye et al., 2016).

Rivers State, located in the Niger Delta region of Nigeria, is particularly vulnerable to infectious diseases due to its dense population, tropical climate, and socioeconomic factors. The state has experienced outbreaks of various infectious diseases, including cholera, malaria, and more recently, COVID-19. These outbreaks have underscored the urgent need for effective health education interventions to enhance the knowledge and attitudes of its residents, particularly the youth, towards disease prevention (Federal Ministry of Health, 2022).

The knowledge and attitudes of students in Rivers State towards infectious diseases and their prevention are crucial determinants of their health behaviors. Studies have shown that there is often a gap in students' understanding of how infectious diseases are transmitted and prevented. Misconceptions and lack of awareness can lead to risky behaviors that increase the spread of diseases. Therefore, health education interventions are essential to bridge this knowledge gap and promote healthier attitudes and behaviors among students (Bisallah et al., 2018).

Health education plays a pivotal role in promoting the knowledge and attitudes of students towards infectious diseases and their prevention. Educational interventions that are well-structured and effectively delivered can significantly improve students' understanding of disease transmission, symptoms, and preventive measures. Such interventions also have the potential to change attitudes, making students more likely to engage in protective behaviors and adhere to public health recommendations (Solhi et al., 2017). The effectiveness of health education has been demonstrated in various contexts, with studies showing improvements in knowledge and practices related to infectious disease prevention following educational programs (Usman et al., 2018).

The Health Belief Model (HBM) is a theoretical framework that supports this study. The HBM suggests that individuals' beliefs about health problems, perceived benefits of action, and barriers to action can predict health-related behaviors. According to this model, students' knowledge and attitudes towards infectious diseases can influence their perceived susceptibility to these diseases, the

severity of the diseases, the benefits of preventive actions, and the barriers to taking those actions. Health education interventions that address these components can effectively enhance students' preventive behaviors (Rosenstock, 1974).

Demographic factors such as age, gender, and class level can significantly influence students' knowledge and attitudes towards infectious diseases and their prevention. Younger students may have different levels of understanding and risk perception compared to older students. Gender differences can also play a role, as males and females may have varying levels of exposure and attitudes towards health information. Additionally, students in different class levels may have different educational needs and responses to health education interventions (Ojulong et al., 2013). Understanding these demographic factors is crucial for designing tailored interventions that address the specific needs of diverse student populations.

Despite the wealth of research on health education and infectious disease prevention, there is still a gap in the literature regarding the specific impact of such interventions on secondary school students in Rivers State. This study aims to fill this gap by evaluating the effect of a health education intervention on the knowledge and attitudes of secondary school students in Ogba/Egbema/Ndoni Local Government Area, Rivers State. By focusing on this demographic, the study seeks to provide insights into effective strategies for enhancing disease prevention efforts among young people in a context that is highly relevant to public health priorities.

Research Questions

The following research questions were raised and answered to guide the study:

1. What is the effect of health education on the level of knowledge towards infectious diseases prevention among secondary schools in Ogba/Egbema/Ndoni Local Government Area, Rivers State?
2. What is the effect of health education on the attitude towards infectious diseases prevention among secondary schools Ogba/Egbema/Ndoni Local Government Area, Rivers State?
3. What is the effect of health education on knowledge towards infectious diseases prevention among secondary school students in Ogba/Egbema/Ndoni Local Government Area, Rivers State based on age gender and class-level?
4. What is the effect of health education on attitude towards infectious diseases prevention among secondary school students in Ogba/Egbema/Ndoni Local Government Area, Rivers State based on age, gender, and class- level?

Hypotheses

The following hypotheses were postulate and tested at .05 level of significance

1. Health education has no significant effect on the level of knowledge towards infectious diseases prevention among secondary school students in Ogba/Egbema/Ndoni Local Government Area, Rivers State.
2. Health education has no significant effect on the attitude towards infectious diseases prevention among secondary school students in Ogba/Egbema/Ndoni Local Government Area, Rivers State.
3. Health education has no significant effect on the knowledge towards infectious diseases prevention among secondary school students in Ogba/Egbema/Ndoni Local Government Area, Rivers State based on age, gender and class level.
4. Health education has no significant effect on the attitude towards infectious diseases prevention among the secondary school students in Ogba/Egbema/Ndoni Local Government Area, Rivers State based on age, gender and class level.

METHODOLOGY

Quasi-experimental non-randomized pre-test, post-test control group design was adopted for this study. Hence, the study involved two groups, one experimental group and one control group. The sample for this study was one hundred and eighty (180) students drawn from the population of thirty-six thousand and one hundred students (36,100)) public secondary schools in Ogba/Egbema/Ndoni local government area (River State Ministry of Education -2023) whose demographics fall within the researcher's specifications were eligible for the study. The sample size was selected using multi-stage

sampling procedures which included stratified random sampling techniques and simple random sampling techniques.

The instrument for data collection was a validated self-structured questionnaire titled "Knowledge and Attitude towards Infectious Diseases Questionnaire (KAIDQ)" with a reliability index of 0.85 structured in a "True or False" and 4point likert formats. The questionnaire had two sections A and B. The section A was dedicated to gathering demographic information while section B gathered data on the students' knowledge and attitude towards infectious diseases. The researcher obtained permission from the chairmen of Rivers State Schools Management Boards(Universal Basic Education and Senior Secondary schools), through an official letter signed by the Head of Department of Health Promotion, Environmental and Safety Education. The letter was to officially introduce the researcher and to solicit for permission to carry out the research and the co-operation from the principals, teachers and the (students) respondents of the selected schools. The photocopies of the official letter was distributed by the two research assistants to the various principals of the selected secondary schools where the intervention was carried out. Copies of the questionnaire were distributed on two batches for the pre and post-tests. The first copies was administered for Pre-Test to the respondents (both the experimental and control groups) before the health education intervention on knowledge, attitudes and preventive practices towards infectious diseaases was given. And the answered questionnaires were retrieved on the spot upon completion to obtain the base-line data. It was followed by the administration of same instruments after the intervention was implemented on the experimental group for a period agreed by the school authority so as to prevent disruption of academic activities. Copies of administered questionnaire were retrieved on the spot upon completion, and the exercise lasted for two weeks at the selected schools **a**nd a return rate of 96.6% of the instrument was achieved.

The completed copies of the questionnaire were collated, coded and analyzed using the statistical package of social sciences (SPSS) version 21. Descriptive statistics of percentages, mean and standard deviation was adopted to answer the demographic data and research questions respectively. While inferential statistics of Chi-square, Analysis of Covariance (ANCOVA) was used to test the hypotheses at 0.05 alpha.

RESULTS

Table 1: Percentage score on effect of health education intervention on the level of knowledge towards infectious disease prevention

Group	N	Pre-test		Post test		Gain score
		True	False	True	False	
Control	90	54.4%	45.6%	64.4%	35.6%	10.0%
Experimental	90	57.3%	42.7%	87.8%	12.2%	30.5%

Results in Table 1 showed that the gain scores of students exposed to health education is 30.5% gain. The students in the control group obtained a gain score of 10.0% gain. The overall percentage was 64.4% and 87.8% knowledge gain for control and experiment respectively.

Table 2: Mean and standard deviation on effect of health education intervention on the attitude towards infectious disease prevention.

Group	N	Pre-test		Post test		Gain score
		Mean	SD	Mean	SD	
Control	90	2.05	0.71	2.21	0.85	0.16
Experimental	90	2.63	0.64	2.93	0.56	0.30

Results in Table 2 showed that the mean gain scores of students exposed to health education is 0.30 gain. The students in the control obtained a mean gain score of 0.16 gain. It could therefore be deduced that the students exposed to health education obtained higher mean gain achievement in their attitude than the students in the control group.

Table 3: Summary of chi-square on the effect of health education on the knowledge of infectious disease prevention among secondary schools students in Ogba/Egbema/Ndoni LGA, Rivers State

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	13.475[a]	1	.000		
Continuity Correction[b]	12.222	1	.000		
Likelihood Ratio	13.940	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	13.400	1	.000		
N of Valid Cases	180				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 21.50.

b. Computed only for a 2x2 table

Table 3 shows a difference in pretest and post test scores, it implies that there is increase in percentage in knowledge in the post test. The Chi-square test revealed that the x^2cal is 13.475 with df = 1 and p<0.05. The obtained p −value of 0.000 is less than the level of significance of 0.05. This indicates that health education has significant effect on the level of knowledge towards infectious disease prevention among secondary schools students in Ogba/Egbema/Ndoni in Rivers State.

Table 4: Summary of ANCOVA on the effect of health education on the attitude towards infectious disease prevention among secondary schools students i**n Ogba/Egbema/Ndoni, Rivers State**.

Dependent Variable: Attitude Post

Source	**Type III Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**	**Partial Eta Squared**
Corrected Model	69.392[a]	2	34.696	124.453	.000	.584
Intercept	17.511	1	17.511	62.812	.000	.262
Attitudepretest	14.253	1	14.253	51.123	.000	.224
Group	13.014	1	13.014	46.679	.000	.209
Error	49.346	177	.279			
Total	1138.211	180				
Corrected Total	118.738	179				

a. R Squared = .584 (Adjusted R Squared = .580)

Table 4 showed that the calculated F-value for group is 46.679 at degrees of freedom of 1 and 177 at p<0.05. The calculated F-value was significant at p<0.05 which is less than 0.05 level of probability (F = 46.679, df = 1/177, p<0.05). Hypothesis two was therefore rejected. This showed health education intervention has a significant effect on the attitude towards infectious disease among the students in public secondary schools in Ogba/Egbema/Ndoni, Rivers State.

Table 5: Summary of ANCOVA on the effect of health education on the knowledge of infectious disease prevention among secondary schools students in Ogba/Egbema/Ndoni LGA in Rivers State based on age, gender and class level.

Dependent Variable: knowledge Posttest						
Source	**Type III Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**	**Partial Eta Squared**
Corrected Model	25.521[a]	4	6.380	154.943	.000	.780
Intercept	1.119	1	1.119	27.185	.000	.134
Knowledgepretest	22.811	1	22.811	553.953	.000	.760
Age	.236	3	3.079	12.911	.020	.032
Gender	.031	1	5.031	26.729	.024	.038
Classlevel	.178	1	.178	4.339	.039	.024
Error	7.206	175	.041			
Total	137.000	180				
Corrected Total	32.728	179				

a. R Squared = .780 (Adjusted R Squared = .775)

Table 5 revealed that the calculated F-value for age was significant at $p<0.05$ which is less than 0.05 level of probability ($F = 12.911$, $df = 3/175$, $p<0.05$). For gender the calculated F-value for group is 26.729 at degrees of freedom of 1 and 177 at $p<0.05$. For Class level the calculated F-value for group is 4.339 at degrees of freedom of 1 and 177 at $p<0.05$. The p-values were less than 0.05 level of probability ($F = 4.339$, $df = 1/177$, $p<0.05$) and the hypotheses were therefore rejected. This showed that intervention has a significant effect on the knowledge of infectious disease prevention among secondary schools students in Ogba/Egbema/Ndoni LGA, Rivers State based on age, gender and class level.

Table 6: Summary of ANCOVA on the effect of health education on the attitude towards infectious disease prevention among secondary schools students in Ogba/Egbema/Ndoni LGA in Rivers State based on age, gender and class level.

Dependent Variable: Attitude Post						
Source	**Type III Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**	**Partial Eta Squared**
Corrected Model	57.429[a]	4	14.357	40.982	.000	.484
Intercept	6.309	1	6.309	18.010	.000	.093
Attitude Pretest	56.973	1	56.973	162.625	.000	.482
Age	1.051	3	6.350	22.529	.014	.017
Gender	.382	1	4.382	10.091	.037	.066
Class level	.383	1	6.383	18.093	.027	.036
Error	61.309	175	.350			
Total	1138.211	180				
Corrected Total	118.738	179				

a. R Squared = .484 (Adjusted R Squared = .472)

Table 6 showed that the calculated F-value for age group is 22.529 at degrees of freedom of 3 and 175 at $p>0.05$, For gender, 10.091 at degrees of freedom of 1 and 177 at $p<0.05$ while for class level is 18.093 at degrees of freedom of 1 and 177 at $p<0.05$. The p-value was less than 0.05 level of probability and the hypotheses were therefore rejected. This showed that intervention has a significant effect on the attitude towards infectious prevention among secondary schools students in Ogba/Egbema/Ndoni LGA, Rivers State based on age, gender and class level.

DISCUSSION

The results of the study reveal a significant improvement in both knowledge and attitudes towards infectious diseases prevention among secondary schools students in Ogba/Egbema/Ndoni LGA, Rivers State, following a health education intervention. Specifically, Table 1 shows a 30.5% gain in

knowledge scores among students exposed to health education, compared to a 10.0% gain in the control group. Additionally, the overall percentage gain was 87.8% for the experimental group versus 64.4% for the control group. Table 2 indicates a mean attitude gain score of 0.30 for the experimental group compared to 0.16 for the control group, suggesting that students exposed to health education had higher mean attitude gain achievements. The Chi-square test in Table 3 shows a significant increase in knowledge post-intervention, with a calculated x2 of 13.475 ($p < 0.05$).

The ANCOVA results in Tables 5 and 4.6 demonstrate that the health education intervention had a significant impact on students' knowledge and attitudes towards infectious diseases prevention, across different demographic variables such as age, gender, and class level. Specifically, the significant F-values for age ($F = 12.911$, $p < 0.05$), gender ($F = 26.729$, $p < 0.05$), and class level ($F = 4.339$, $p < 0.05$) in Table 5 indicate that the intervention effectively improved knowledge among students. Similarly, Table 4.6 shows significant F-values for age group ($F = 22.529$, $p < 0.05$), gender ($F = 10.091$, $p < 0.05$), and class level ($F = 18.093$, $p < 0.05$), demonstrating the intervention's positive effect on students' attitudes towards infectious diseases prevention.

These findings align with several other studies that have demonstrated the effectiveness of health education in improving knowledge and attitudes towards infectious diseases prevention. Raji et al. (2022) reported enhanced knowledge among primary school teachers in Nigeria following health education interventions, supporting the notion that such interventions can be effective across different age groups and educational levels. Similarly, Mbonye et al. (2016) also found that educational outreach significantly improved infectious disease management in Uganda, supporting the notion that targeted health education can lead to meaningful improvements in disease prevention and control. Wang et al. (2018) also reported significant improvements in knowledge and behaviors towards infectious diseases among students in Gansu Province, China, following health education interventions. This finding is in line with our study, highlighting the effectiveness of health education in different geographical and cultural contexts.

Moreover, Qiu et al. (2020) highlighted the positive impact of WeChat-based health education on residents' knowledge of major infectious diseases, suggesting that both traditional and digital health education methods can effectively enhance public health knowledge. This aligns with our findings, and underscores the potential for various educational platforms to enhance public health knowledge. Bisallah et al. (2018) also found that health education interventions significantly improved knowledge and attitudes regarding tuberculosis among HIV patients in Nigeria further supporting the effectiveness of such programs in diverse and vulnerable populations. This study, like ours, emphasizes the critical role of health education in managing infectious diseases in vulnerable populations.

However, some studies present findings that do not fully coincide with our results. Solhi et al. (2017) conducted a systematic review on the role of health education on emerging diseases and found mixed results, suggesting that the impact of health education may vary depending on the disease and context. Usman et al. (2018) reported limited improvements in knowledge regarding dengue fever among high school students in Jeddah, indicating that the effectiveness of health education may be influenced by local factors and the specific infectious disease targeted. Abdel-Aziz et al. (2016) found that an educational health program improved knowledge and attitudes, regarding nosocomial infections among healthcare workers in Egypt, but the extent of improvement varied, pointing to potential limitations in health education program design and implementation.

Discrepancies in these findings may be attributed to various factors such as differences in study design, population characteristics, and the nature of health education interventions. For instance, the intensity, duration, and content of the educational programs can significantly influence their outcomes. In this study, the structured and comprehensive nature of the health education intervention likely contributed to its effectiveness. In contrast, studies reporting less significant impacts may have employed less rigorous or less tailored educational strategies, or faced contextual challenges that limited the effectiveness of the interventions.

The results of this study were expected given health education has long been recognized as a critical tool in promoting public health and preventing the spread of infectious diseases. The significant improvements in knowledge and attitudes observed among the experimental group underscore the importance of well-designed health education programs in enhancing disease prevention and control efforts. The structured and comprehensive nature of the intervention, coupled with its implementation

across different demographic groups, likely contributed to the observed improvements in knowledge and attitudes. The alignment with several other studies further reinforces the validity of these findings, highlighting the critical role of education in promoting public health, particularly in the context of infectious diseases among school-aged children. This study adds to the growing body of evidence that supports the effectiveness of health education as a vital tool in the fight against infectious diseases.

CONCLUSION

Based on the findings of this study, it was concluded that health education significantly enhances knowledge and attitudes towards infectious diseases prevention among secondary schools students in Ogba/Egbema/Ndoni LGA, Rivers State. A substantial gains in knowledge and attitudes was shown for students exposed to health education compared to a control group, with the intervention proving effective across different age groups, genders, and class levels.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations are proposed:

1. Schools should integrate structured and comprehensive health education programs into their curricula to enhance students' knowledge and attitudes towards infectious diseases. These programs should be tailored to address the specific health challenges and needs of the students.
2. Given the success of both traditional and digital health education methods, it is recommended to utilize various platforms, including digital tools like mobile apps and social media, to reach a wider audience and reinforce health education messages.
3. School should endeavor to provide health education interventions tailored to address the specific needs of different demographic groups, particularly focusing on age, gender, and class level differences.
4. Schools and health authorities should provide ongoing training and professional development for teachers and school health educators to equip them with the latest knowledge and skills in health education. This training should include updates on emerging infectious diseases, effective communication strategies, and methods to foster positive attitudes and behaviors among students.

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