EFFECT OF HEALTH EDUCATION INTERVENTION ON STUDENTS' ATTITUDE TOWARDS WATER-BORNE DISEASE PREVENTION IN HEALTH TERTIARY INSTITUTIONS IN KATSINA STATE

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Abstract
This study investigated the impact of a structured health education intervention on the attitudes of students toward water-borne disease prevention in health tertiary institutions in Katsina State, Nigeria. Despite high levels of health awareness, recurring outbreaks of typhoid and cholera suggest a persistent "attitudinal lag" among pre-service health professionals. A quasi-experimental research design, utilizing a pre-test, post-test non-equivalent control group model, was adopted. The sample comprised 206 students in the experimental group, primarily young adults (68.0%) with a female majority (60.2%). Data were collected using the "Water-Borne Disease Attitude Scale (WBD-AS)," which demonstrated high content validity (CVI = 0.92) and internal consistency (r = 0.88). Descriptive statistics and inferential tools, including paired t-tests, ANCOVA, and quantile regression, were used to analyze the data at a 0.05 level of significance. Findings revealed a significant positive shift in attitudinal mean scores within the experimental group ($t = 33.414$, $p < .05$). The intervention group also achieved significantly higher post-test scores compared to the control group ($F = 842.579$, $p < .001$). Demographic analysis indicated that age was a significant driver of attitude ($p = .000$), while gender and level of study were not. The study concluded that structured health education is essential for bridging the gap between knowledge and practice by fostering a proactive psychological mindset. It was recommended that health curricula transition toward interactive, case-study-based learning to effectively reshape the attitudes of future healthcare providers.

Keywords: Health Education, Attitude, Water-borne Diseases, Katsina State, Tertiary Institutions.

Introduction

Water-borne diseases remain a formidable threat to global public health, particularly in developing nations where access to potable water and advanced sanitation infrastructure is often inconsistent. According to the World Health Organization (WHO, 2023), illnesses such as cholera, typhoid fever, and dysentery account for a significant portion of the global disease burden, claiming millions of lives annually. While the engineering of safe water systems is a primary solution, the role of human behavior, specifically the underlying attitudes toward hygiene, is increasingly recognized as the pivot upon which successful disease prevention turns (Abodunrin, Oladele, & Adekunle, 2022). In Nigeria, the prevalence of these diseases persists despite various public health efforts, suggesting a critical gap between health knowledge and the psychological predisposition to act upon that knowledge (Adeniran, Alabi, & Olayinka, 2020).

Attitude, in the context of health education, is defined as a learned predisposition to respond consistently favorably or unfavorably toward a given health practice (Fishbein & Ajzen, 2023). It comprises cognitive beliefs, emotional responses, and behavioral intentions.

For students in health tertiary institutions, who are being trained as the next generation of healthcare providers and community advocates, having a positive attitude toward water safety is paramount. These students serve as the primary link between medical theory and community practice; therefore, their internal perception of risk and their belief in the efficacy of preventive measures are essential for the sustainability of any sanitation intervention (Okonkwo & Adebayo, 2024).

In Katsina State, the environmental landscape presents unique challenges, including seasonal water scarcity and varying levels of sanitation infrastructure within educational campuses (Umar & Adekunle, 2018). Research indicates that students may possess high levels of knowledge regarding the microbiology of water contamination yet maintain an ambivalent or negative attitude toward consistent practices like chlorination or hand hygiene due to perceived barriers or low self-efficacy (Salisu & Tanko, 2022). This "attitudinal lag" represents a significant vulnerability in the public health strategy of tertiary institutions, where the dense population of boarding students can turn a single contamination event into a widespread outbreak (Olamide, Smith, & Jones, 2022).

The current study is anchored in the Health Belief Model (HBM) and the Theory of Planned Behavior (TPB), both of which posit that a person's attitude toward a behavior is a primary determinant of their intention to perform that behavior (Champion & Skinner, 2022; Glanz et al., 2023). By implementing a structured health education intervention, this research seeks to shift the evaluative orientations of students from passive awareness to active engagement. The focus is specifically on altering students' perceived susceptibility to water-borne diseases and reinforcing their perceived behavioral control (Becker, 1984). Understanding the dynamics of these attitudinal shifts is essential for designing effective health curricula that do more than just informthey must transform the student's psychological approach to sanitation.

Statement of the Problem

Despite the integration of health education into the curriculum of tertiary institutions in Northern Nigeria, there remains a persistent and troubling incidence of water-borne infections among students (Nigeria Centre for Disease Control, 2021). While previous interventions have successfully increased students' knowledge levels, empirical evidence suggests that knowledge alone has failed to curb the recurring outbreaks of typhoid and cholera in school hostels (Bello, Nasir, & Adamu, 2023). This disconnects points to a fundamental problem: the failure of traditional health education to address the deep-seated attitudes and psychological barriers that prevent students from translating their health knowledge into consistent preventive action.

Furthermore, the lack of targeted interventions that specifically address attitudinal shifts—such as risk perception and self-efficacyhas left students vulnerable to socio-cultural myths and environmental complacency (Ibrahim & Musa, 2021). If the attitudes of pre-service health professionals are not intentionally reshaped through structured pedagogical strategies, they will likely enter the workforce with the same ambivalent hygiene practices they maintained during their studies. Therefore, there is a critical need to evaluate how a multi-strategy health education intervention can specifically modify the attitudes of health

students in Katsina State to ensure a sustainable reduction in the transmission of water-borne diseases.

Objectives of the Study

The main objective of this study is to determine the effect of a health education intervention on the attitudes of students toward the prevention of water-borne diseases in health tertiary institutions in Katsina State. Specifically, the study seeks to:

1. To determine the pre-intervention and post-intervention mean attitude scores of students in the experimental group.
2. To compare the post-intervention mean attitude scores between the experimental and control groups.

Research Questions

The following research questions are formulated to guide the investigation:

1. What is the difference between the pre-intervention and post-intervention mean attitude scores of students in the experimental group?
2. What is the difference in the post-intervention mean attitude scores between the experimental and control groups?

Research Hypotheses

The following null hypotheses (H0) will be tested at a 0.05 level of significance:

HO_1: There is no significant difference between the pre-test and post-test mean attitude scores of students regarding the prevention of water-borne diseases.

HO_2: There is no significant difference in the mean attitude scores toward water safety between students in the experimental group and the control group following the intervention.

Methodology

Research Design

The study adopts a Quasi-experimental research design, specifically the Pre-test, Post-test Non-equivalent Control Group design. This design is utilized because it allows for the investigation of attitudinal changes within established educational settings where the random assignment of individual students into groups is neither practical nor ethical. By employing intact classes, the researcher can evaluate the causal impact of the health education intervention while maintaining the natural social dynamics of the tertiary institution environment.

Population and Sampling

The population for this study consists of all students currently enrolled in health tertiary institutions in Katsina State, Nigeria. A multi-stage sampling technique is employed to select the participants. In the first stage, institutions are purposively selected based on the availability of residential facilities to ensure that environmental factors related to water access are consistent among participants. In the second stage, two intact classes are randomly assigned to either the Experimental Group (receiving the multi-strategy health education intervention) or the Control Group (receiving conventional instruction).

Research Instrument

The primary tool for data collection is the "Water-Borne Disease Attitude Scale (WBD-AS)." This researcher-developed instrument is designed to measure the affective and evaluative domains of students regarding water safety. The scale utilizes a 4-point Likert Scale (Strongly Agree, Agree, Disagree, Strongly Disagree)

Procedure for Data Collection

The study is conducted in three distinct phases over an 8-week period. In the Pre-intervention Phase, the WBD-AS is administered to both groups to establish baseline attitudinal scores. This is followed by the Intervention Phase, during which the experimental group is exposed to a multi-strategy health education program involving interactive sessions, peer-modeling, and video-based case studies focused on the consequences of water-borne diseases. The control group receives traditional health lectures without the multi-strategy components. Finally, in the Post-intervention Phase, the same scale is re-administered to evaluate the magnitude of attitudinal shift.

Method of Data Analysis

Data were analyzed using IBM SPSS Version 26.0. Descriptive statistics (Mean and Standard Deviation) were used to summarize the pre-test and post-test scores. Inferential statistics, including Paired Samples t-test and ANCOVA, were employed to test the null hypotheses at a 0.05 level of significance. Additionally, Quantile Regression was utilized to determine the influence of demographic factors such as age and gender on the post-test results.

Result

Research Question One: What is the difference between the pre-intervention and post-intervention mean attitude scores of students in the experimental group?

Table 2:

Mean and Standard deviation of the difference between the pre-intervention and post-intervention mean attitude scores

	Mean	N	Std. Deviation	Std. Error Mean	Mean Difference
Pre-test Atittude	26.93	206	2.395	.167	7.90
Post-test Attitude	34.83	206	2.738	.191	

Table 2 revealed that the pre-test mean (SD) was 26.93 (2.395), the post-test mean (SD) was 34.83 (2.738), and the Mean Difference was7.90.There is a notable positive shift in the attitudes of students following the intervention. The mean attitude score increased from 26.93 at pre-test to 34.83 at post-test, showing a mean difference of 7.90

Research Question Two: What is the difference in the post-intervention mean attitude scores between students in the experimental group and those in the control group?

Table 3:

Mean and Standard deviation of the difference in the post-intervention mean attitude scores between the experimental group and control group

	Group	N	Mean	Std. Deviation	Std. Error Mean	Mean Difference
Post-test Attitude	Experimental	206	34.83	2.738	.191	7.91
	Control	206	26.92	2.724	.190	

Table 3 revealed that thepost-test mean attitude score for the experimental group was 34.83 (SD = 2.738), whereas the control group recorded a mean score of 26.92 (SD = 2.724). The result shows a mean difference of 7.91, suggesting a more positive attitude in the experimental group.

$H0_1$: There is no significant difference in the post-intervention mean attitude scores between the experimental and control groups.

Table 4:
Paired t-test Analyseson the difference between the pre-intervention and post-intervention mean attitude scores

	Mean	Std. Deviation	t-value	df	P-value	Decision
Pre-test Atittude	26.93	2.395	33.414	205	.000	Significant
Post-test Attitude	34.83	2.738				

Table 4 revealed that the t-value was 33.414 and the p-value was0.000. The mean attitude score rose from 26.93 to 34.83. Since the p-value (0.000) is less than the significance level of 0.05, the null hypothesis was rejected. This implies that the health education intervention significantly improved the students' attitudes toward preventing water-borne diseases.

$H0_2$: There is no significant difference in the post-intervention mean knowledge scores between the experimental and control groups.

Table 5:
ANCOVA Analyseson the difference between the pre-intervention and post-intervention mean attitude scores

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	6468.729[a]	2	3234.364	435.550	.000
Intercept	2844.364	1	2844.364	383.032	.000

PretestAtittude	19.942	1	19.942	2.685	.102
Group	6256.928	1	6256.928	842.579	.000
Error	3037.203	409	7.426		
Total	402344.000	412			
Corrected Total	9505.932	411			

R Squared = .680 (Adjusted R Squared = .679)

Table 5 revealed that the F (1, 409) was 842.579 and p was 0.000.Even though pre-test attitudes vary slightly, the effect of the intervention ("group") is overwhelming (F = 842.579, p = .000). The intervention was the primary driver in shifting student mindsets regarding water-borne disease prevention. Since the p-value (0.000) is less than the significance level of 0.05, the null hypothesis was rejected. This implies that theintervention group developed significantly better attitudes than the control group.

Discussion of the Findings

The findings of this study revealed a significant positive shift in students' attitudes toward the prevention of water-borne diseases following the intervention ($t = 33.414$, $p < .05$). This result mirrors the findings of Cairncross (2015) in Sub-Saharan Africa, where health education regarding water and sanitation was identified as the primary driver for shifting cultural and personal perceptions of hygiene. While the current study recorded simultaneous significant shifts in both knowledge and attitude, this outcome departs from the observations of Schrader and Lawless (2014) as well as Cairncross (2016). Those researchers suggested that attitudes are often slower to change than knowledge because they are deeply rooted in long-standing socio-cultural beliefs. The success of this specific intervention in moving both variables suggests that the structured pedagogical approach was intensive enough to overcome typical attitudinal resistance. Improved attitude is considered critical in this context because it acts as the psychological bridge between "knowing" what to do and "actually doing" it.

Conclusion

Based on the comprehensive analysis of the data, the following conclusions are drawn: the intervention group developed a more robust and favorable outlook toward health safety than the control group. This implies that formal health education is necessary to build a strong psychological foundation for disease prevention.

Recommendations

Based on the findings that the health education intervention significantly improved attitudesregarding water-borne disease prevention:

1. Institutions should ensure the availability of safe drinking water and functional handwashing stations within school premises. Practice is only sustainable when the environment supports the be

2. The Ministry should partner with health institutions to create a student-led surveillance system for monitoring water quality and disease outbreaks in the surrounding communities.

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