Effects of Disease Education on Knowledge and Attitudes of Hepatitis B among In-School Adolescents with Hearing Impairment in Oyo State, Nigeria

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DOI: https://dx.doi.org/10.47772/IJRISS.2026.100500143

Received: 30 April 2026; Accepted: 05 May 2026; Published: 25 May 2026

ABSTRACT

Background: Knowledge and attitude play essential roles in controlling hepatitis B among all populations, including in-school adolescents with hearing impairment who regularly face barriers to health information. Hepatitis B continues to remain a significant public health challenge in Nigeria, especially for adolescents with hearing loss. Studies report low levels of knowledge and unfavourable attitudes toward hepatitis B in Nigeria, including Oyo State. Previous work has mainly examined causative factors, offering limited focus on approaches such as Disease Education (DE). This study assessed the effect of disease education on knowledge and attitude toward hepatitis B among in-school adolescents in Oyo State, Nigeria.

Method: A pretest–posttest control group quasi-experimental design was used. The 123 participants were assigned to experimental (n = 78) and control (n = 45) groups. The experimental group received an 8-week intervention guided by the intervention manual, while the control group receive no intervention. Data were collected using validated tools: the Knowledge of Hepatitis B Test (r = 0.79) and the Attitude toward Hepatitis B scale (r = 0.71). Data were analyzed using descriptive statistics and analysis of covariance at the 0.05 significance level.

Result: Among 123 participants, 65.9% were female, with a mean age of 18.23± 1.34 years. There was a statistically significant main effect of the intervention on Hepatitis B knowledge ($F(1,115) = 1205.23$, partial $\eta^2 = 0.91$). DE participants ($\bar{x} = 31.74$) outperformed the control group ($\bar{x} = 20.40$). The intervention also had a significant effect on attitude ($F(1,115) = 2856.05$, partial $\eta^2 = 0.96$). DE participants ($\bar{x} = 40.57$) showed more positive attitudes than controls ($\bar{x} = 28.90$).

Conclusion: Disease education intervention significantly improved knowledge and attitudes towards hepatitis B. Inclusive health education interventions are effective for in-school adolescents with hearing impairment.

Keywords: Hepatitis B, Knowledge, Attitude, Disease Education

INTRODUCTION

The well-being of populations in developing countries, including individuals with hearing impairments, is significantly threatened by preventable diseases. Health educators play a critical role in mitigating this risk by enhancing knowledge, influencing attitudes, and promoting healthy behaviours. Hepatitis B exemplifies this threat, as it can cause severe hepatic damage and is highly transmissible. In Nigeria, hepatitis B is hyperendemic and is primarily transmitted through horizontal routes, particularly among adolescents who participate in behaviours such as unsterilized piercings, sharing sharp objects, and engaging in unprotected sexual activities. These factors increase their susceptibility to infection. Adolescents with hearing impairment in educational settings face additional challenges, including communication barriers due to reliance on sign language and restricted access to health information, as most health education is delivered through auditory means. These obstacles hinder informed decision-making and the adoption of protective behaviours against hepatitis B infection.

Hepatitis B is a significant global public health problem, evident in its prevalence, infectivity, morbidity, and mortality. Its causative agent, a DNA virus from the Hepadnaviridae family, primarily targets liver cells. Hepatitis B transmission routes resemble those of HIV, but the virus is markedly more robust. It is roughly fifty to one hundred times more infectious than HIV and can remain viable up to seven days outside a human host (WHO, 2022). Principal infection sources include exposure to infected blood or body fluids, unprotected sex, contaminated needles or syringes, blood transfusion, and perinatal transmission (Papastergiou et al., 2015). Mother-to-child transmission is a critical health issue; 70–80% of HBsAg-positive women transmit the virus, though timely measures can greatly reduce risk (Karaca & Karaca, 2018). Other vectors include unsafe injections, skin puncturing, tattooing, and sharing razors (WHO, 2023). This underscores the importance of targeted education for in-school adolescents with hearing impairment, whose risky behaviours, such as early sex, tobacco, and alcohol use, or reusing unsterilized needles, can amplify disease burden (Bahy, 2015). Hepatitis B causes liver inflammation, which may resolve or progress to chronic complications like cirrhosis, fibrosis, or hepatocellular carcinoma.

The World Health Organization identifies Nigeria as a significant source of severe infectious hepatitis outbreaks. (WHO, 2018). The limited effectiveness of comprehensive hepatitis prevention and management programmes has contributed to rising infection rates in Sub-Saharan Africa. A major barrier is that many people remain asymptomatic for up to 30 years, often only being diagnosed when chronic liver disease is advanced (Eni et al., 2019).

Although effective hepatitis B vaccines have been available since 1982, the prevalence of infection continues to rise among both hearing and hearing-impaired populations. The persistently high rates of chronic hepatitis B in Nigeria are attributed to inadequate vaccination coverage and significant disparities in knowledge, particularly among individuals with hearing impairments who frequently lack access to information communicated orally. Oyasope et al. (2024) observed that, despite the inclusion of the hepatitis B vaccine in the National Programme on Immunisation (NPI), immunisation remains insufficient, especially for sign language users who encounter additional barriers to medical awareness. Given the propensity of adolescents for experimentation and risk-taking behaviours, targeted hepatitis B education is essential to provide them with the knowledge, attitudes, and behaviours necessary to reduce their vulnerability to infection.

Research consistently indicates that adolescents, including those with hearing impairments, possess inadequate health knowledge, which fuels high-risk behaviours. Pache et al. (2015) found hepatitis B awareness among Brazil's deaf community to be minimal. Xue et al. (2017) linked elevated risk-taking among deaf and hard-of-hearing individuals in the US to insufficient knowledge. Gaps in information compromise students' ability to avoid risky activities or adopt preventive actions, such as vaccination.

Limited awareness about hepatitis B transmission influences sexual and other risky behaviours in hearing-impaired adolescents (Isaiah and Ola 2016). Olaleye et. al. (2007) observed that many deaf adolescents engage in sex, sometimes for financial reasons. Their findings showed 35% of participants were sexually active for various reasons, 17% had sought abortion due to sexual partners, and 28% had experienced rape, with STI

prevalence at 9% and 16%. These figures underscore the heightened hepatitis B risk in this demographic. Okonkwo et al. (2019) suggested that increasing hepatitis B awareness and improving attitudes should foster healthier behaviours and potentially reduce infection rates among in-school hearing-impaired adolescents.

Changing attitudes is crucial in shaping health-promoting behaviours and preventing infections, especially since hepatitis B knowledge among hearing-impaired adolescents plays a pivotal role. Recognizing key attitudes enables supportive interventions for positive behaviour change and improved health outcomes, as negative beliefs can fuel unhealthy choices (Fava et al, 2022). Knowledge-driven attitudes are instrumental in slowing hepatitis B's spread; thus, disease control strategies must target attitude change. Additionally, people with hearing impairment may experience heightened stigma and discrimination regarding hepatitis B, intensifying isolation and deterring treatment (Iezzoni, 2022). Misconceptions about transmission and treatment further hinder preventive actions and candid health disclosures (Ferguson, 2018).

Adolescents with hearing impairments in schools are often excluded from mainstream health education due to reliance on auditory communication, such as spoken instruction, radio messages, and oral campaigns. These methods limit their understanding of hepatitis B transmission, prevention, and vaccination. A shortage of qualified sign language interpreters with medical knowledge worsens misinformation, restricts health literacy, and lessens uptake of preventive services.

Oyo State data highlight major deficiencies in adolescents' hepatitis B awareness and preventive behaviours. A study in Ibadan found that only 13.7% of youths had sufficient knowledge. In Ogbomosho, while some adolescents recognised transmission routes, vaccination awareness was notably low (Oyasope et al., 2024). While hepatitis B immunisation efforts have expanded, infection remains a pressing public health issue in Nigeria and Oyo State. Seroprevalence studies in Oyo State show persistent HBsAg positivity among clinic visitors (Olayiwola & Lanlehin, 2021) and fully vaccinated children (Akomolafe et al., 2024). Nationally, about 5.4% of the population is affected (Olakunde et al., 2025). These results demonstrate ongoing prevention and awareness gaps which is likely to be more pronounced among hearing-impaired adolescents.

Furthermore, the dual stigma associated with hearing impairment and hepatitis B infection significantly impedes access to healthcare services and participation in preventive programmes. Despite considerable efforts to address hepatitis B in Nigeria, there is limited empirical evidence focusing on adolescents with hearing impairment, representing a substantial gap in the literature. In response to these challenges, it is necessary to develop inclusive and targeted disease-education interventions aimed at enhancing knowledge, fostering positive attitudes, and reducing risk-related behaviours regarding hepatitis B among adolescents with hearing impairments. This study evaluated the effects of a disease-education on the knowledge and attitudes towards hepatitis B among hearing-impaired adolescents in Oyo State, Nigeria.

Hypotheses

1. There will be no significant main effect of the disease education intervention on Hepatitis B knowledge among adolescents with hearing impairment in Oyo State.

2. There will be no significant main effect of the disease education intervention on attitudes toward Hepatitis B among adolescents with hearing impairment in Oyo State.

METHODOLOGY

This study used a pretest-posttest control-group quasi-experimental design. This approach was deemed appropriate because it allowed the experimental group to receive the intervention while measuring the dependent variables' knowledge and attitude towards Hepatitis B, both before and after the intervention. The population of the study comprised all in-school adolescents with hearing impairment in Oyo State. 123 adolescents with hearing impairments who were enrolled in school made up the study sample. This study utilized three primary instruments: a self-developed training manual on disease education, a self-developed questionnaire and an

audiometric screening machine. The training manual served as the intervention guide for the experimental group, outlining the procedures for the educational programme.

To assess the effect of the intervention on participants' knowledge and attitudes towards Hepatitis B, the researchers designed and administered a self-developed questionnaire with three major sections (A–C), each addressing specific dimensions of the study variables. Section A: Demographic Information of the participants. Section B: Knowledge of Hepatitis B Scale (KHBS) to assess participants' factual knowledge of Hepatitis B. Section C: Attitude towards Hepatitis B Scale (AHBS) aimed at evaluating participants' attitudes toward Hepatitis B and related preventive practices. A pilot study was conducted with 20 in-school adolescents with hearing impairments from the Secondary School for Persons with Special Needs to assess the reliability and internal consistency of the research instrument. Cronbach's Alpha (α) was calculated to determine the internal consistency of the two Hepatitis B-related scales: Knowledge of Hepatitis B Scale (KHBS): $\alpha = 0.79$, and Attitude towards Hepatitis B Scale (ATHBS): $\alpha = 0.71$. The hypotheses were tested by using inferential statistics, specifically Analysis of Covariance (ANCOVA), at a 0.05 level of significance.

Results

Ho1: There will be no significant main effect of treatment on knowledge of Hepatitis B among in-school adolescents with hearing impairment in Oyo state, Nigeria

Summary of results demonstrating the pretest-posttest effects of treatment, gender, and onset of impairment on knowledge and attitude toward Hepatitis B among in-school adolescents with hearing impairment in Oyo state, Nigeria.

Table 1.1

Source	Dependent Variable	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	Knowledge	3798.351a	2	1899.1755	704.44196	.000	.925
	Attitudes	3954.398b	2	1977.199	469.294	.000	.966
Intercept	Knowledge	68608.797	1	68608.797	25450.737	.000	.996
	Attitude	121834.471	1	121834.471	101212.291	.000	.999
Treatment	Knowledge	3248.993	1	3248.993	1205.228	.000	.913
	Attitude	3437.977	1	3437.977	2856.052	.000	.961
Error	Knowledge	310.011	120	2.696			
	Attitude	138.431	120	1.204			
Total	Knowledge	96835.840	123				
	Attitude	164366.000	123				

Corrected Total	Knowledge	4108.362	122				
	Attitude	4092.829	122				

Table 1.1 above shows that treatment has a statistically significant main effect on the knowledge level of Hepatitis B among in-school adolescents with hearing impairment in Oyo State, Nigeria, F(1,115) = 1205.228, p <.05, 913. Therefore, the null hypothesis (Ho1) was discarded. The result of this indicates that the treatment had a significant difference in scores of knowledge among the participants. This effect size (η 2 =.913) indicates that it is estimated that 91.3 of the variance in Hepatitis B knowledge can be due to the treatment status, indicating a very large practical effect. The results align with the study carried out by Usita et al. (2021), who found that health education intervention played an important role in helping to improve the knowledge and awareness of the secondary school students with regard to sickle cell anaemia. Also, a quasi-experimental study by Abiola et al. (2012) revealed high efficacy of a knowledge-based health education intervention on the knowledge of rural secondary school students in the Sokoto State on the perceptions and individual hygiene practices.

Adjusted Marginal Mean showing the direction of difference in knowledge of Hepatitis B between the treatment groups.

Table 1.2

Dependent Variable	**Treatment**	**Mean**	**Std. Error**	**95% Confidence Interval**	**95% Confidence Interval**
Dependent Variable	**Treatment**	**Mean**	**Std. Error**	**Lower Bound**	**Upper Bound**
Knowledge of Hepatitis B	Experimental group	31.741	.210	31.326	32.156
Knowledge of Hepatitis B	Control group	20.395	.251	19.899	20.892

The table 1.2 above demonstrates that participants assigned to the experimental group obtained a higher mean score. ($\bar{x}$ = 31.741) than their counterparts in the control group ($\bar{x}$ = 20.395). This difference in mean scores indicates that individuals exposed to the intervention possessed a greater level of knowledge regarding Hepatitis B than those who did not receive the treatment.

Ho 2: There is no significant main effect of treatment on attitude towards hepatitis B among in-school adolescents with hearing impairment in Oyo state, Nigeria.

From table 1.1 a statistically significant main effect of treatment on attitudes toward Hepatitis B among in-school adolescents with hearing impairment in Oyo State, Nigeria, F(1,115)=2856, *p*<...05, η^2=.961. Accordingly, the null hypothesis was rejected. This result indicates that the treatment produced a significant difference in participants' attitude scores. The reported effect size (η^2 = .961) suggests that approximately 96.1% of the variance in attitudes toward Hepatitis B is explained by the treatment condition, representing an exceptionally large magnitude of effect. The findings were corroborated by Sareetha et al. (2018), who found that the structured educational intervention led to a statistically significant increase in attitude scores towards hepatitis B vaccination and prevention. A study by Kamar et al. (2024 reported a 38% increase in the attitude of students in

India towards hepatitis B after the educational intervention, showing a clear positive shift in students' perception of the disease.

Adjusted Marginal Mean showing the direction of difference in attitude towards Hepatitis B between the treatment groups.

Table 1.3

Dependent Variable	**Treatment**	**Mean**	**Std. Error**	**95% Confidence Interval**	**95% Confidence Interval**
				Lower Bound	**Upper Bound**
Attitude towards Hepatitis B	Experimental group	40.574	.140	40.296	40.851
Attitude towards Hepatitis B	Control group	28.903	.168	28.571	29.235

The table 1.3 above demonstrates that participants assigned to the experimental group attained a higher mean attitude score ($\bar{x}$ = 40.574) than their counterparts in the control group ($\bar{x}$ = 20.903). This difference indicates that exposure to the treatment was associated with more favourable attitudes toward Hepatitis B among adolescents in the experimental condition relative to those who did not receive the intervention.

CONCLUSION AND RECOMMENDATIONS

This study demonstrates that well-designed and accessible disease education initiatives can significantly improve knowledge, attitudes, and preventive practices related to hepatitis B among in-school adolescents with hearing impairment in Oyo State, Nigeria. The intervention effectively addressed critical gaps in health education for this vulnerable population by promoting understanding and inclusion through the use of culturally relevant strategies, visual aids, and sign language.

The following recommendations are based on the findings of the study.

1. Incorporating hepatitis B education into the health curriculum of schools with hearing impairment is essential. This education should be formally integrated by the Ministry of Education and school administrators, as it has demonstrated improvements in knowledge, attitudes, and reductions in at-risk behaviours.

2. Health education resources that are accessible to sign language users should be developed, as adolescents with hearing impairment have shown substantial benefit from structured disease education. Government agencies and non-governmental organizations should produce visual, sign-language-based, and culturally appropriate hepatitis B instructional materials to ensure sustained learning and comprehension.

3. School health programs should be enhanced through the implementation of routine screening and vaccination initiatives. Schools should also provide regular health counseling sessions, given the positive outcomes observed from the intervention. These services must address the communication needs of learners with hearing impairments.

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