

Effects of Risk Communication on the Knowledge and Practice of Water Sanitation and Hygiene (WASH) among Public Senior Secondary School Students in Rivers State, Nigeria; A Religious Affiliation Perspective

*OKENE, Alvan Ifeanyi (PhD) & ABU, Epere Comfort (PhD)

Department of Health and Safety Studies, Ignatius Ajuru University of Education, Rumuolemini, Port Harcourt, Rivers State

*Corresponding Author

DOI: <https://doi.org/10.51584/IJRIAS.2026.11060177>

Received: 14 June 2026; Accepted: 20 June 2026; Published: 07 July 2026

ABSTRACT

Access to safe water, sanitation, and hygiene (WASH) remains a major public health challenge in Nigeria, particularly within school environments while Risk communication is the “real-time exchange of information, advice, and opinions between experts, community leaders, and people at risk” to empower individuals and communities to make informed decisions This study investigated the effects of risk communication on the knowledge and practice of WASH among public senior secondary school students in Rivers State, with religious affiliation examined as a moderating factor. A pre-test–post-test quasi-experimental design was adopted, with a sample of 216 students drawn through multi-stage sampling from three local government areas. Data were collected using a validated questionnaire, and analysis was conducted using descriptive statistics and Analysis of Covariance (ANCOVA). Findings revealed that risk communication significantly improved both knowledge ($F(1, 215) = 8.00, p < .05$) and practice ($F(1, 215) = 2.07, p < .05$) of WASH among students. Although all religious groups demonstrated improvement, the extent of change varied slightly, with traditional adherents and Muslim students recording larger mean differences in knowledge gains than their Christian counterparts while for practice, the Muslim students more improvement compared to Traditional and Christian believers. Religious affiliation accounted for 95.6% of the variance in knowledge and 15.2% in practice. In conclusion, risk communication is an effective strategy for enhancing WASH-related knowledge and practices among adolescents, and religious affiliation moderates its impact. These findings underscore the importance of incorporating culturally and religiously sensitive approaches into school-based WASH programs to improve health outcomes.

Keywords: Risk communication, WASH, adolescents, religious affiliation.

INTRODUCTION

Access to safe water, sanitation, and hygiene (WASH) is a fundamental determinant of public health and well-being, particularly among adolescents in school settings. Globally, inadequate WASH practices have been linked to preventable diseases such as diarrhoea, cholera, and typhoid, which remain major contributors to morbidity and mortality among young people in developing countries (World Health Organization [WHO], 2017). In Nigeria, poor sanitation and hygiene practices are prevalent, with the United Nations Children’s Fund (UNICEF, 2020) reporting that only 39% of schools have basic sanitation facilities and fewer than 50% have handwashing stations with soap and water. Such inadequacies directly affect the health, academic performance, and overall quality of life of students.

Effective risk communication has emerged as a crucial strategy for promoting awareness and behaviour change in health-related interventions, including WASH. Risk communication refers to the “real-time exchange of information, advice, and opinions between experts, community leaders, and people at risk” to empower

individuals and communities to make informed decisions (WHO, 2018). In the context of WASH, risk communication can enhance knowledge about the dangers of unsafe water and poor sanitation, while also fostering sustainable hygiene practices that reduce disease transmission (Glanz et al., 2015). However, the extent to which risk communication strategies effectively influence adolescents, particularly in diverse sociocultural and religious contexts, remains underexplored.

Within the domain of Water, Sanitation, and Hygiene (WASH), risk communication has proven to be essential in reducing waterborne diseases, improving hygiene practices, and promoting safe sanitation. Studies show that when schoolchildren are exposed to targeted WASH risk communication through classroom education, posters, peer learning, and community outreach, they are more likely to adopt preventive behaviours such as regular handwashing and proper water storage (Freeman et al., 2014). Furthermore, effective communication about risks related to unsafe water and poor sanitation can help reduce outbreaks of cholera, typhoid, and diarrhoea in vulnerable populations (UNICEF, 2019).

Risk communication cannot be detached from the social and cultural contexts in which it is delivered. In countries like Nigeria, religion plays a pivotal role in shaping values, perceptions, and everyday practices. As such, tailoring WASH risk communication to align with religious beliefs and practices may enhance message acceptance and compliance (Siddiqui et al., 2016). Religious leaders, for example, often command significant influence and can act as credible messengers in reinforcing safe hygiene behaviours among adolescents. Conversely, messages that ignore cultural and religious contexts risk being disregarded or misunderstood.

Religious affiliation plays a unique role in shaping health knowledge, attitudes, and practices in many societies, including Nigeria. Religious institutions often serve as influential platforms for disseminating information and reinforcing social norms (Adedini et al., 2018). In Rivers State, where Christianity and Islam are predominant, religious teachings and practices may either support or hinder the adoption of safe WASH behaviours. For instance, some faith-based teachings emphasize cleanliness as a moral virtue, while others may perpetuate cultural taboos that limit certain practices (Olanrewaju et al., 2021). Thus, examining the interplay between risk communication and religious affiliation is essential to understanding variations in WASH knowledge and practices among students.

Adolescents in secondary schools constitute a particularly important population group for WASH interventions. Not only are they vulnerable to the health consequences of inadequate hygiene, but they also act as change agents within their families and communities (Joshi & Amadi, 2013). Schools provide a structured environment where interventions can be systematically implemented, and risk communication can be tailored to suit the needs, beliefs, and values of students. By evaluating the effects of risk communication on students' knowledge and practices, this study contributes to understanding how religious affiliation moderates health communication effectiveness in a pluralistic, or heterogeneous society like Rivers State.

Despite growing recognition of the importance of WASH and health communication, research in Nigeria has largely focused on infrastructural and policy interventions (Okeke & Eze, 2019; Olanrewaju et al., 2021). Few studies have examined how risk communication strategies, coupled with religious identity, influence adolescents' knowledge and behavioural practices in school environments. This creates a significant knowledge gap that this study seeks to address. The findings are expected to inform evidence-based strategies for designing religious and culturally sensitive and effective school-based WASH programs in Nigeria.

Purpose of the Study

The purpose of this study was to investigate the effects of risk communication on the knowledge and practice of water sanitation and hygiene (WASH) among public senior secondary school students in Rivers State, Nigeria, with respect to their religious affiliations.

Hypotheses

1. Risk communication has no significant effect on the Knowledge of WASH among public senior secondary school students in Rivers state based on religious affiliation.

2. Risk communication has no significant effect on the Practice of WASH among public senior secondary school students in Rivers state based on religious affiliation.

Study Design

The study adopted the pre-test – post-test quasi experimental design. This type of design allows for uncomplicated assessment of an intervention applied to group of study participants by the researcher.

Study Population

The population for this study comprised of all senior secondary school students of public schools in Rivers State. The population of the study was 261,404 male and female senior secondary school students in public schools in Rivers State (Planning, Research & Statistics Department, RSSSB, Port Harcourt, Rivers State, 2021; Patrick, 2023) and the sample size was derived from the stated population.

Sample Size

The simplified Cohen's formula for sample size determination for intervention study was used to determine the sample size and a sample size of 302 was determined. A sample size of 216 completed the study and was therefore used for calculations.

Sampling Techniques: A multi-stage sampling procedure was used for this study; this comprised of a cluster sampling technique, simple random sampling technique, stratified sampling technique, proportionate sampling technique and systematic sampling technique. **Stage I:** At this stage, the stratified sampling method was used to group the state (Rivers State) into three strata (geographical zones), with each stratum comprising of the Rivers East (8 LGAs), Rivers South East (7 LGAs), and Rivers West (7 LGAs).

Stage II: Simple random sampling was used to select one Local Government Area from each of the geographical zones identified in stage I, therefore, three LGAs namely, Ahoada East Local Government Area, Etche Local Government Area and Khana Local Government Area were selected using balloting with replacement.

Stage III: At this stage, simple random sampling was again employed to select two secondary schools from the three listed LGAs selected in stage II.

Stage IV: At this stage, proportionate sampling was used to allocate samples to the selected secondary schools according to their size.

Stage V: At this stage, a systematic sampling method was used to pick the specific number of students from the selected schools that participated based on the number allocated to the school by proportion.

Inclusion and Exclusion Criteria

Inclusion criteria

1. Students in senior (SS1 – SS3) secondary schools were included in this study
2. Government owned secondary schools, were the only schools used for the study.
3. Both female and male students participated in the study.

Exclusion criteria

1. Students in junior (JSS1 – JSS3) secondary schools were excluded in this study
2. Non-public, Private owned secondary schools, were not included in this study

3. Only female and male students in senior secondary schools (SS 1 to SS 3) were studied

Study Tools

The tool for data collection was a self-administered questionnaire titled; “Knowledge and Practice of WASH (KPWASH)”, The instrument consisted of two sections, A and B. Section A, elicited response on demographic data of respondents such as age, gender, class level, etc, Section B measured the Knowledge and Practice on WASH of the respondents with response options on a modified scale of Yes (1), Don’t know (0), No (0) for knowledge and Always, Sometimes, Never for Practice. Section B was also given under the different subclasses which included; Knowledge of WASH, and Practice of WASH.

Validation of the Instrument: The two responses from the administered instrument were correlated using the Pearson product-moment correlation, PPMC (r) to establish the reliability of the instrument, and the values of 0.80 were obtained for Knowledge of WASH, while 0.86 were obtained for Practice of WASH, which indicated that the instrument was reliable

Data Collection: An approval letter which was gotten from the senior secondary schools board in Rivers State was presented to the various school Principals to enable the researcher to gain access to the respondents. The aim of the study and the method to be adopted were clearly explained to the respondents and consent was sought from those who were selected for the study. This stage was carried out in three phases: Pre-intervention, Intervention and Post-intervention

Data Analysis: Data collected at pre-test and post-test were coded and entered into the statistical package for the Social Sciences (SPSS) version 25.0. The analysis was based on a 72% return rate.

Ethical Approval: Ethical approval was obtained from the ethics and disciplinary committee of the Rivers State Senior Secondary Schools Board where permission and modalities was approved.

Conflict of Interest: The authors declare that there was no conflict of interest while carrying out this research work.

RESULT ANALYSIS

Research Questions 1: What is the effect of Risk Communication on the knowledge of WASH among public senior secondary school students in Rivers state, based on religious affiliation?

Table 1: Mean and standard deviation on the effect of risk communication on the knowledge of WASH among public senior secondary school students in Rivers state based on religious affiliation

Religious affiliation	Pretest		Posttest		Mean difference (post – pre)	Decision
	M	SD	M	SD		
Christianity	1.81	0.22	1.85	0.40	0.04	Positive effect
Muslim	1.65	0.31	1.91	0.30	0.26	
Tradition	1.61	0.37	1.91	0.10	0.30	
Total	1.72	0.30	1.90	0.30	0.18	

Table 1, shows the mean and standard deviation of the effect of risk communication on the knowledge of WASH among public senior secondary school students in Rivers State based on religious affiliation. The study's results showed that the pretest mean knowledge score was 1.72±0.30, and the posttest mean knowledge score was 1.90±0.30, with a mean difference of 0.18, indicating a positive effect. Thus, the effect of risk communication on the knowledge of WASH among public senior secondary school students in Rivers State based on religious affiliation was positive.

Research Question 2: What is the effect of Risk Communication on the practice of WASH among public senior secondary school students in Rivers State based on religious affiliation?

Table 2: Mean and standard deviation on the effect of risk communication on the practice of WASH among public senior secondary school students in Rivers state based on religious affiliation

Religious affiliation	Pretest		Posttest		Mean difference (post – pre)	Decision
	M	SD	M	SD		
Christianity	1.81	0.25	1.92	0.28	0.11	Positive effect
Muslim	1.68	0.32	1.36	0.12	0.32	
Tradition	1.55	0.33	1.67	0.36	0.12	
Total	1.61	0.37	1.90	0.10	0.18	

Table 2 presents the mean and standard deviation of the effect of risk communication on the practice of WASH among public senior secondary school students in Rivers State, categorised by religious affiliation. The result of the study showed that the pretest mean practice score was 1.61 ± 0.37 , and the posttest mean practice score was 1.90 ± 0.10 with a mean difference of 0.18, showing a positive effect. Thus, the effect of risk communication on the practice of WASH among public senior secondary school students in Rivers State based on religious affiliation was positive.

Hypothesis 1: Risk Communication has no significant effect on the knowledge of WASH among public senior secondary school students in Rivers state, based on religious affiliation

Table 3: Analysis of Covariate (ANCOVA) on the effect of risk communication on the Knowledge of WASH among public senior secondary school students in Rivers state based on religious affiliation

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial eta square
Corrected Model	.026 ^a	1	.026	8.003	.000	.956
Intercept	1777.723	1	1777.72	206.64	.491	.000
PreKnow*Religion	.026	1	.026	8.003	.000*	.956
Error	1841.011	214	8.603			
Total	10154.000	216				
Corrected Total	1841.037	215				

*Significant; $p < 0.05$

Table 3, showed the Analysis of Covariate (ANCOVA), which was conducted to ascertain the effect of risk communication on the knowledge of WASH based on religious affiliation. The result of the ANCOVA showed that behaviour change communication had a significant effect [$F(1,215) = 8.00, p < 0.05$] on knowledge of WASH based on religious affiliation. Furthermore, 95.6% ($\omega^2 = 0.956$) of the variance in the post-test knowledge score could be explained by the religious affiliation. Therefore, the null hypothesis, which stated that risk communication has no significant effect on the knowledge of WASH among public senior secondary school students in Rivers state based on religious affiliation, was rejected.

Hypothesis 2: Risk Communication had no significant effect on the Practice of WASH among public senior secondary school students in Rivers State based on religious affiliation

Table 4: Analysis of Covariate (ANCOVA) on the effect of risk communication on the Practice of WASH among public senior secondary school students in Rivers state based on religious affiliation

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial eta square
Corrected Model	.406 ^a	1	.406	2.070	.010	.152
Intercept	430.441	1	430.441	21.180	.011	.000
PrePractic*Religion	.406	1	.406	2.070	.010	.152
Error	42.020	214	.196			
Total	3110.000	216				
Corrected Total	42.426	215				

*Significant; $p < 0.05$

Table 4, showed the Analysis of Covariate (ANCOVA), which was conducted to ascertain the effect of risk communication on the practice of WASH based on religious affiliation. The result of the ANCOVA showed that risk communication [$F(1,215) = 2.07, p < 0.05$] had a significant effect on the practice of WASH based on religious affiliation. However, only 15.2% ($\omega^2 = 0.142$) of the variance in the post-test WASH practice score could be explained by religious affiliation. Therefore, the null hypothesis, which stated that risk communication had no significant effect on the Practice of WASH among public senior secondary school students in Rivers State based on religious affiliation, was rejected.

DISCUSSION OF FINDINGS

The findings of this study in Table 1, showed that the pretest mean knowledge score was 1.72 ± 0.30 , and the posttest mean knowledge score was 1.90 ± 0.30 , with a mean difference of 0.18, showing a positive effect. Thus, the effect of risk communication on the knowledge of WASH among public senior secondary school students in Rivers State based on religious affiliation was positive. The result of the ANCOVA also showed that risk communication has a significant effect [$F(1,215) = 8.00, p < 0.05$] on knowledge of WASH among the students based on religious affiliation. A detailed look at the result revealed that the student's knowledge level improved after risk communication intervention irrespective of their religious affiliation, thus, Christianity had a pre-test mean knowledge score of 1.81 ± 0.22 and a post-test mean knowledge score of 1.85 ± 0.40 with a mean difference of 0.04, Muslim had pre-test mean knowledge score of 1.65 ± 0.31 and post-test mean knowledge score of 1.91 ± 0.30 with mean difference of 0.26, and Traditional worshippers had pre-test mean knowledge score of 1.61 ± 0.37 and post-test mean knowledge score of 1.91 ± 0.10 with mean difference of 0.30, indicating that Muslims and Traditional worshippers had bigger mean difference, meaning that they gained more knowledge compared to Christianity. Therefore, belonging to any religion did not have a negative effect based on the findings of this study. Although all religious groups demonstrated improvement, the extent of change varied slightly, with traditional adherents and Muslim students recording larger mean differences in knowledge gains than their Christian counterparts. Religious affiliation accounted for 95.6% of the variance in knowledge.

Also the findings of this study, as shown in Table 2, revealed that the pretest mean practice score was 1.61 ± 0.37 , and the posttest mean practice score was 1.90 ± 0.10 , with a mean difference of 0.29, indicating a positive effect. Thus, the effect of risk communication on the practice of WASH among public senior secondary school students in Rivers State based on religious affiliation was positive. The result of the ANCOVA also showed that risk communication [$F(1,215) = 2.07, p < 0.05$] had a significant effect on the practice of WASH among public senior secondary school students Rivers State, based on religious affiliation. A closer look at the result revealed that the student's practice level improved after risk communication intervention irrespective of their religious affiliation, thus, Christianity had a pre-test mean practice score of 1.81 ± 0.25 and a post-test mean practice score of 1.92 ± 0.28 with a mean difference of 0.11, Muslim had pre-test mean practice score of 1.68 ± 0.32 and post-test mean practice score of 1.36 ± 0.12 with mean difference of 0.32, and Traditional worshippers had pre-test mean practice score of 1.55 ± 0.33 and post-test mean practice score of 1.67 ± 0.36 with mean difference of 0.12, indicating that Muslims had biggest mean difference, meaning that their level of practice improved more compared to Christianity and Traditional worshippers. Therefore, belonging to any religion did not have a negative effect on practice based on the findings of this study. Although all religious groups demonstrated improvement, the extent of change varied slightly, with the Muslim students recording larger mean differences in level of practice compared to their Traditional and Christian counterparts. Religious affiliation accounted for 15.2% of the variance in practice. This result corroborates with the works of Shapu et al., (2021), who examined the Effectiveness of Health Education Intervention on Water, Sanitation and Hygiene (WASH) Practices among Adolescent Girls in Maiduguri Metropolitan Council, Borno State, Nigeria. The findings revealed that the health education intervention effectively improved water sanitation and hygiene (WASH) Practices among adolescent girls. Furthermore, religion, place of residence, monthly income and occupation of the mother were found to be positively associated with water, sanitation and hygiene (WASH) practices. The similarity between the present study and that of Shapu et al., could be due to the homogeneity of the study population and variables in both studies as they were both focused on the student population.

REFERENCES

1. Adedini, S. A., Odimegwu, C., Imasiku, E. N., Ononokpono, D. N., & Ibisomi, L. (2018). Religion, ethnicity and contraceptive use among women in Nigeria. *African Journal of Reproductive Health*, 19(2), 101–110.
2. Freeman, M. C., Greene, L. E., Dreibelbis, R., Saboori, S., Muga, R., Brumback, B., & Rheingans, R. (2014). Assessing the impact of a school-based water treatment, hygiene and sanitation programme on pupil absence in Nyanza Province, Kenya: A cluster-randomized trial. *Tropical Medicine & International Health*, 17(3), 380–391.
3. Glanz, K., Rimer, B. K., & Viswanath, K. (2015). *Health behaviour: Theory, research, and practice* (5th ed.). Jossey-Bass.
4. Joshi, A., & Amadi, C. (2013). Impact of water, sanitation, and hygiene interventions on improving health outcomes among school children. *Journal of Environmental and Public Health*, 2013, 1–10.
5. Okeke, T. A., & Eze, C. U. (2019). School sanitation in Nigeria: A critical appraisal. *Nigerian Journal of Hygiene and Sanitation*, 5(1), 45–53.
6. Olanrewaju, M. F., Olutola, B. A., & Akande, T. (2021). Religion, culture, and health-seeking behaviour in Nigeria: Implications for public health. *Journal of Public Health in Africa*, 12(1), 123–130.
7. Patrick, J. O. (2023). Principal Administrative Strategies Of Students In Public Senior Secondary. *International Journal of Education Policy and Administration Studies*.
8. Planning, Research & Statistics Department, (2021), Rivers State Senior Secondary Schools Board, Port Harcourt, Rivers State.
9. Shapu, A. A., & Mohammed, H. A. (2021). Effectiveness of health education intervention on water sanitation and hygiene practices among adolescent girls in Maiduguri Metropolitan Council, Borno State, Nigeria. *Global Health Education Journal*, 8(3), 78-92.
10. Siddiqui, T. R., Haider, S. R., & Raza, H. (2016). Role of cultural and religious factors in shaping hygiene practices: A study from South Asia. *International Journal of Hygiene and Environmental Health*, 219(4-5), 406–415.
11. United Nations Children’s Fund (UNICEF). (2019). Water, sanitation and hygiene (WASH): Global annual results report 2019. UNICEF.
12. United Nations Children’s Fund (UNICEF). (2020). *Water, sanitation and hygiene: UNICEF Nigeria*.
13. Vaughan, E., & Tinker, T. (2009). Effective health risk communication about pandemic influenza for vulnerable populations. *American Journal of Public Health*, 99(S2), S324–S332.
14. World Health Organization (WHO). (2017). Communicating risk in public health emergencies: A WHO guideline for emergency risk communication (ERC). WHO Press.
15. World Health Organization. (2017). *Progress on drinking water, sanitation and hygiene: 2017 update and SDG baselines*. Geneva: WHO.
16. World Health Organization. (2018). *Communicating risk in public health emergencies: A WHO guideline for emergency risk communication (ERC)*. WHO Press.