EFFECT OF HEALTH-EDUCATION INTERVENTION ON KNOWLEDGE AND ADHERENCE TO COVID-19 PROTOCOLS AMONG KWARA STATE SECONDARY SCHOOL STUDENTS

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Abstract

This research examined whether or not secondary school pupils in Kwara State understood and followed COVID-19 recommendations after receiving a health education intervention. A quasi-experimental approach was taken for this study. Participants' entering behaviours or prior knowledge were assessed, and participants' knowledge gains following the intervention were measured using a non-randomized pre- and post-test control group design. All high school senior students in Ilorin, Kwara State, were included in the study, but only 116 students from the Ilorin East and South LGAs were surveyed for the study. Students in senior secondary school from two distinct local governments were randomly selected using a multistage selection procedure. The results showed, for example, that students who were exposed to the COVID-19 protocol (treatment intervention) scored higher on the post-test regarding their knowledge of COVID-19 compared to those who were exposed to the personal hygiene protocol (placebo), who scored higher on the post-test regarding their knowledge of COVID-19 but scored lower on their adherence to the COVID-19 protocol. The study revealed that the health education intervention significantly improved students' knowledge of and compliance with COVID-19 protocols in Kwara State's secondary schools. Consequently, it has been proposed that professional associations spanning several fields collaborate to provide health education interventions aimed at fostering compliance with COVID-19 standards, with a particular focus on the male demographic

Keywords: *Health Education, COVID-19 Protocols, Secondary School Students, Intervention*

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Introduction

There have been reported incidences of COVID-19 and post COVID-19 pandemic globally. The two reported pandemic incidences happened in strides which confirmed the deadly nature of the disease. SARS-CoV-2 creates COVID-19, a highly contagious virus. COVID-19 has killed almost 6 million individuals worldwide (Cascella et al., 2023). It's the worst global health issue since 1918's influenza pandemic. The COVID-19 pandemic may have ended, but immunization is vital to prevent serious illness (Lewandowsky et al., 2023). As the virus undergoes genetic alterations, a key pandemic challenge, treatment guidelines are updated to include the most effective drugs. Since the December 2019 epidemic, the SARS-CoV-2 genome has changed significantly. Many of these mutations were connected to increased transmissibility, death, or hospitalization and were classified as variants of concern (Rashedi et al., 2022). Current global COVID-19 outbreaks have raised concerns about the Delta variety, also known as B.1.617.2. The variant of concern is prominent due to its greater transmissibility, 60% higher hospitalisation rates than the wild type, elevated viral loads, and decreased vaccination efficiency (Rashedi et al., 2022).

The pattern and rate at which the new Delta variant COVID disease spreads and infects human population call for urgent action. The current record and statistics show drastic increase in cases of COVID-19 which was taught to have been reduced globally. Community transmission replaced imported cases and an elitist pattern as the incidence of COVID-19 in Nigeria increased consistently and the case's fatality rate was 2.8% (Amzat et al., 2020). A brief relaxation of the closure resulted in a 52% increase in the number of cases of COVID-19 transmitted throughout the country (Amzat et al., 2020). However, at the time of conducting this study, the researcher hoped to investigate the effect of a health education intervention on the knowledge and adherence of secondary school students in Kwara State to COVID-19 and its guidelines. The reason for initiating this study was attributed to a deficiency in understanding COVID-19 protocols.

Theoretical Framework

The theoretical framework that undergirds and provides a justification for this study is composed of two health promotion theories: the health belief model (HBM) and social cognitive theory (SCT). During programme planning, the implementation of theories and techniques can be employed to guarantee the incorporation of health promotion and disease prevention approaches, thereby enhancing population health. The models can function as frameworks for structuring health promotion and disease prevention activities, which was one of the rationales behind the investigation in this study.

The Health Belief Model (HBM) is a highly utilised theory in the field of health behaviour. It suggests that six factors can predict health behaviour: risk susceptibility, risk severity, advantages to taking action, barriers to taking action, self-efficacy, and cues to action (Jones et al., 2015). The Health Belief Model (HBM) was initially developed to simulate the adoption of preventive health behaviours in the United States. However, it has been effectively modified to suit many cultural and topical situations (Scarinci et al., 2011). The Health Belief Model (HBM) suggests that individuals are more likely to take preventive measures against an illness if they perceive themselves as being susceptible to the condition (perceived susceptibility), believe that the illness would have significant consequences (perceived severity), have confidence that a specific action can reduce their susceptibility or severity and result in positive outcomes (perceived benefits), and perceive minimal obstacles or negative aspects associated with the health action (perceived barriers). Furthermore, proponents of the Health Belief Model (HBM) subsequently proposed the inclusion of self-efficacy, which refers to the idea that one can effectively carry out a specific behaviour despite potential obstacles (Rosenstock et al., 1988).

Bandura's Social Cognitive Theory (SCT) is yet another theoretical framework that is particularly helpful for research that focuses on behaviour change in the field of health promotion. The constructs of this theory, namely observational learning, self-efficacy, behavioural competence, reinforcement, and self-control, demonstrate the dynamic interplay between an individual's behaviour, environmental variables, and personal

characteristics, and how these aspects can influence or modify each other (Bandura, 1998). According to this theory, individual learning is influenced by both personal experiences and observing the behaviour and positive outcomes of others. Therefore, this approach is considered an effective strategy for health promotion interventions (McAlister et al., 2008).

In light of these theoretical frameworks, the researcher felt the need to base this investigation on these two theories, as they emphasise the importance of personal experience, observational learning, perceived benefits, and perceived severity. The theoretical constructs of perceived benefits and perceived severity proposed by the health belief model inform the researcher of the need to initiate a health education intervention to investigate the effects of adherence to COVID-19 protocols. Also, the constructs of Albert Bandura's social cognitive theory of personal experience and observational learning are proposed and assumed by the researcher to manifest in both experimental and control groups in this investigation.

Thematic Literature Review

A few studies have observed and considered a plethora of factors that militate against the prevention of COVID-19, but the purpose of this study is to find out the effects of health education interventions on knowledge and adherence to COVID-19 among secondary school students. The arrival of COVID-19 attracted numerous misconceptions regarding its origin, cause, and prevention. This has been the case in the face of pandemics, but COVID-19 was distinct because it was a novel pandemic that initially had unclear epidemiological facts. For this study, four health education interventions were selected for review and assessment, which included social distancing, the use of nose masks, handwashing, and the use of hand sanitisers. Many studies have proven the efficacy of these health interventions in reducing the spread and infection of the COVID-19 disease.

Social distancing is the main tool used to control COVID-19 and involves reducing contacts that could potentially transmit infection with strategies like school closures, work-from-home policies, mask-wearing, or lockdowns. These measures have been applied around the world, but in situations where they have suppressed infections, the

effect has not been immediate or consistent (Nande, et al, 2021). Social distancing is an example of a COVID-19 protocol. It is a strategy to reduce physical contact between people, to slow down, and to reduce the spread of COVID-19 in a community. According to the Nigeria Centre for Disease Control (NCDC, 2020), this measure involves strict adherence to non-physical greetings (avoiding hand shaking or hugs), maintaining at least 2 metres (6 feet) of physical distance between yourself and individuals, and closing activities that will cause any form of gathering, including schools, places of worship, sporting events, and social events.

To prepare for future pandemics caused by different viruses, it is important to assess the effect of national social distance on the spread of infectious diseases in general, not just COVID-19. Particularly, the effects on the most frequent types of respiratory viral infections, which may be the source of the ongoing pandemic, need more research (Cho, et al., 2018). On March 22, 2020 (beginning in the 13th week of 2020), the nationwide social distance was formally implemented, and hundreds of cases were being reported daily after February 28, 2020, when over 500 cases were identified; hence, public worry and response to the COVID-19 outbreak had already begun before that date.

Multiple studies have demonstrated a decrease in the prevalence of the influenza epidemic as a result of the implementation of social distancing measures. Respiratory viruses of common occurrence are transmitted through a mode of transmission that bears a resemblance to that of SARS-CoV-2 and the influenza virus. Therefore, it is anticipated that the implementation of social distancing measures will exert a certain degree of influence in terms of mitigating the transmission of prevalent respiratory viruses. According to Moosa (2020), using widespread social distancing measures may prove to be a highly efficacious strategy for managing a pandemic involving comparable respiratory viruses but it has not proven to be yet hence, the reason for social distancing as a variable to be investigated in this study.

In addition, the use of face masks is advised both as a component of personal protective equipment and as a public health strategy to mitigate the transmission of coronavirus

illness 2019 (COVID-19) during the ongoing epidemic. The utilisation of these objects, nonetheless, exhibits a profound interdependence with social and cultural customs and has garnered a diverse range of personal and societal connotations (Martinelli, et al., 2021).

Different countries have implemented mandatory or optional face mask practices with contradicting indications concerning their efficacy. Even though wearing masks in Europe is rare and usually associated with Asian cultures, face masks have been accepted as one of the ways to minimise COVID-19 spread across Europe. Social norms and personal meanings of face mask use have received little consideration. Social and cultural practises, political, ethical, and health issues, and personal and social meanings all impact its use (Martinelli et al., 2021). Vaccination, handwashing, and physical distance can reduce the transmission of the infection, as can face masks. The CDC advises the public to wear cloth masks. Unvaccinated people should use face masks indoors and outdoors at high-risk COVID-19 events and gatherings. The CDC recommends N95 masks for healthcare workers. The WHO recommends medical masks for healthcare workers, COVID-19 patients, and carers (Inglis et al., 2021).

The COVID-19 epidemic has revealed notable deficiencies in education and a dearth of fundamental skills, highlighting the need for remediation. The state must ensure the provision of masks to all individuals and undertake educational initiatives to promote proper usage. Mass communication methods could be utilised for this objective. A potential strategy to effectively disseminate information regarding the proper application and removal of facial masks, as well as their disinfection, would involve incorporating a commercial broadcast preceding the daily news, ensuring a wide-reaching audience. Furthermore, apart from the domain of public legislation, commercial entities and digital media, alongside healthcare professionals including physicians, chemists, and nursing personnel, have the potential to significantly contribute to the field of education (Matuschek et al., 2020).

Wearing a mask offers benefits and has been shown to prevent infections. However, dangers and negative effects must be considered. Specifically for general population use, masks may block airflow medically, but surgical masks rarely cause respiratory difficulties. Hypercapnia can cause negative consequences (Matuschek et al., 2020). In light of this finding by Matuschek et al. (2020), the use of masks is included as a variable of prevention to be assessed by this study.

Also, COVID-19's rapid growth and high fatality rates have led to strict handwashing requirements in several countries and jurisdictions. The COVID-19 pandemic has brought attention to handwashing. A basic, primary preventive action most individuals can take themselves Handwashing with soap and water for 20 seconds or using alcohol-based hand sanitisers are the primary protective measures against infection (CDC, 2020). Handwashing among healthcare workers (HCWs) needed improvement long before the epidemic (Centre for Disease Control, 2019; Erasmus, et al., 2010).

The transmission of germs is significantly facilitated by hands (Edmonds-Wilson, et al., 2015). The transfer of these organisms to other individuals arises from inadequate hand hygiene practices. In the realm of healthcare systems and services, a persistent presence of awareness campaigns has been observed aimed at promoting the practice of hand hygiene among healthcare professionals, patients, and visitors (Stone, et al., 2012). The current COVID-19 epidemic has emphasised handwashing education for both health professionals and the general population. Many public health messages emphasise handwashing and its proper practice. Effective handwashing is vital to preventing the spread of COVID-19. Various media, including social media, television, radio, print commercials, and billboards, support this message. Service users, legislators, public personalities, and others are now washing their hands more often, which is evident on daily news reports as well as on social media and other advertising platforms (Alzyood, et al., 2018).

Finally, only preventative measures and a healthy lifestyle with an effective immune system are recommended by the WHO to fight COVID-19. The WHO recommended alcohol-based hand sanitisers (ABHS) with ethanol, isopropyl alcohols, and hydrogen

peroxides in various ratios for frequent hand hygiene. Overuse of these preparations can be harmful to humans and the environment, and the chemicals emitted by their evaporation are detrimental to the environment. Alcohol poisoning in children can cause confusion, vomiting, drowsiness, respiratory arrest, and death, and the American Association of Poison Control Centres reported 9504 alcoholic hand sanitiser exposure cases in children under 12 in the first five months of 2020. These hand sanitisers also raise the risk of antibiotic resistance and viral illnesses (Mahmood, et al., 2020).

The adoption of effective hand hygiene practices is crucial to the COVID-19 pandemic, and the World Health Organisation (2020) recommends frequent handwashing or the use of hand sanitisers with soap or an alcohol concentration of at least 60%. The World Health Organisation (WHO) also recommended two alcohol-based formulations for hand hygiene in healthcare settings, intending to sensitise the hands and minimise the transmission and infectivity of the coronavirus. The aforementioned suggestions are derived from the criteria of rapid, efficient, and wide-ranging antibacterial efficacy, along with convenient accessibility and recognised safety. According to the World Health Organisation (2020), alcohol-based hand sanitisers are primarily composed of ethanol, isopropyl alcohols, and hydrogen peroxides, which are combined in various proportions.

According to Abuga and Nyamweya (2021), alcohol-based hand sanitisers (ABHS) are helping prevent SARS-CoV-2, the 2019 coronavirus epidemic, as hand hygiene is a vital recommendation to kill pathogens. These products dry quickly, reducing the need for soap, water, and towels. As the WHO proposed ABHS as an alternate hand hygiene measure in 2020, hand sanitisers became widely used due to their portability. Alcohol concentration has been the main focus of ABHS performance, although added substances and auxiliary factors affect efficacy, safety, and long-term utility (Abuga & Nyamweya 2021). In light of this, the use of hand sanitisers is another theme to be investigated in this study.

On another note, incorrect application of ABHS will render the product ineffective as a hand sanitiser. Users of ABHS should apply enough to thoroughly moisten both hands. If

an effective ABHS is used in the right proportions, the applied product should dry quickly, so the user may get back to what they were doing before. Consequently, stickiness, long drying durations, and aftereffects are all unpleasant and may hurt patient compliance (Abuga & Nyamweya, 2021). A study done with medical students found that only three steps of the WHO's six-step hand hygiene approach were necessary to achieve the same level of bacterial inactivation (Sutter et al., 2010). This demonstrates that the required outcomes can be achieved with greater adherence by streamlining the hand hygiene routine.

In terms of knowledge and adherence, A descriptive cross-sectional study by Shrestha and colleagues (2021) among community health workers in various Nepalese provinces revealed that 99.5% (397 participants) claimed a virus causes COVID-19, while 98.5% (393 participants) thought it is spread by close contact with infected persons. Most participants, 90.2% (360), knew that the first novel coronavirus was detected in Wuhan, China. In addition, 87.2% (348) knew that COVID-19 symptoms included fever, cough, and shortness of breath. The majority of participants 70.7% (282) knew about COVID-19 isolation, and 82.2% (328) knew about prevention. The results showed that most of the volunteers (63.2% of them) knew how to stop COVID-19. People may have a high amount of knowledge because they are well-educated and have access to a lot of information. In the study, it was found that a person's gender affected both how much they knew and how they felt about things. Males were found to know more about COVID-19 prevention and have a better attitude about it.

However, the study in India and China by Han, et al. (2020) and Maheshwari, et al. (2020) found the opposite. Males might be more likely to be in this group because, in Nepal, they still have a better chance of being introduced to different fields and orientation programmes. Females don't get as much attention at training and workshops because people think they have responsibilities at home and can't give their full attention to the programmes (Shrestha et al., 2021). However, it is imperative to note that there is a paucity of studies focusing on schoolchildren as regards COVID-19 transmission; hence, the level of knowledge for this other literature is scanty.

There are also early signs that gender affects how often people wear masks. For example, during the SARS-CoV-1 outbreak in 2003, guys didn't wear masks as well as women did (Lau, et al., 2004). Haischer, et al. (2020) found that during the COVID-19 pandemic, women buyers in Wisconsin were more likely to wear masks in June, July, and early August. Also, Capraro and Barcelo (2020) found that men are more likely to think that wearing a mask is "shameful," "not cool," a "sign of weakness," and a "stigma" than women are.

These reviews of the literature have led the researchers to assert that possessing accurate and comprehensive knowledge, as well as adopting appropriate attitudes, regarding COVID-19 is of essential importance in effectively preventing and controlling SARS-CoV2. This is particularly crucial for frontline healthcare workers, who face daily exposure to the virus. Understanding the aetiology and modes of transmission of a disease enhances individuals' probability of developing a heightened awareness regarding the dissemination of infectious diseases, as well as the implementation of preventive actions aimed at mitigating transmission rates.

Research Question

The following question was raised to guide the course of the research:

1. What is the level of knowledge and level of adherence to COVID-19 protocols among secondary schools before and after health education intervention in Kwara State?

Research Hypotheses

The following research hypotheses were formulated and tested in the study.

1. There is no significant effect of a health education intervention on secondary school Students' awareness of COVID-19 protocols in Kwara State.

2. There is no significant effect of a health education intervention on adherence to COVID-19 protocols among secondary school students in Kwara State.

3. There is no significant interaction effect of gender and health education intervention on knowledge of COVID-19 protocols among secondary schools.

4. There is no significant interaction effect of gender and health education intervention on adherence to COVID-19 protocols among secondary schools.

Methods and Instruments

In this work, a quasi-experimental research design was used. A non-randomized pre- and post-test control group design was used in this study. The pre-test learning outcome was utilised to determine the entry behaviour or prior knowledge of the study's participants. The post-test was used to determine how much information had been gained since the treatment. A pre-test assessment, an intervention, and a post-test assessment make up this research design. Students from intact classes were part of the design. The experimental group received health education on COVID-19 protocols, including handwashing, nasal mask use, social distancing, and hand sanitiser use, while the control group received personal hygiene instruction. The study's population included all senior secondary school students in Ilorin, Kwara State, with the target population consisting of 116 senior secondary school students in the Ilorin East and South Local Government Areas. It is important to note that the purpose of having experimental and control groups is to have sufficient data to be reasonably sure the relationship between the independent and dependent variables is not due to chance, and the selection of the experimental group was largely by balloting conducted by research assistants and not by choice or preference.

A multistage sampling technique was used to sample senior secondary (SSSII) students from two public schools in intact classrooms. The pretest and post-test data for this study were collected using multiple-choice questions created by the researchers with a reliability coefficient of 0.81. To answer research questions, data were analysed using percentages, means, and standard deviations, while Analysis of Covariance (ANCOVA) was used to test hypotheses at the 0.05 level of significance.

Senior Secondary (SSSII) students from two public schools in intact classes were sampled using a multistage sampling technique. The first school was for the experimental

group I (Health Education Intervention on COVID-19 Protocols), while the second school was made up of the control group (personal hygiene).

In stage 1, stratified random sampling was used to stratify Kwara State into 16 local government areas. They include Asa, Baruten, Edu, Ekiti, Ifelodun, Ilorin East, Ilorin South, Ilorin West, Irepodun, Isin, Kaima, Moro, Offa, Oke-Ero, Oyun, and Pategi Local government areas.

In stage two, two (2) local government areas were selected as targets for the Experimental and Control groups using simple random sampling of the fish bowl method out of the sixteen (16) local governments in Ilorin, Kwara State. The two local governments selected were the Ilorin East and Ilorin South Local Government Areas.

In stage 3, random sampling technique was used to select one school out of the 30 senior secondary schools in Ilorin East, and the selected school was Cherubim and Seraphim Senior Secondary School (C & S).

In stage 4, simple random sampling technique was used to select one secondary school out of the 21 senior secondary schools in Ilorin South Local Government Area, and the selected school was Sango Senior Secondary School.

In stage 5, the researchers used random sampling technique to determine which of the classes in the senior section would be used for the study, out of SS1, SS2, and SS3 classes. SS2 was chosen and used for both groups in the different schools.

In the final stage, the researchers, with the aid of research assistants, determined which of the schools would be the experimental or control group, and through simple random sampling of the fish-bowl method, Cherubim & Seraphim Secondary School was selected as the experimental group, while Sango Senior Secondary School automatically stood as the control group.

Results

Table 1: *Distribution of the Pupils Sampled Based on Gender*

Groups	Gender	Frequency (%)	Sub-Total (%)
Experimental Group	Male	25 (21.5%)	47 (40.5%)
(Covid-19 protocol)	Female	22 (19.0%)	
Control Group	Male	46 (39.7%)	69 (59.5%)
(personal hygiene)	Female	23 (19.8%)	
Total			**116 (100.0%)**

Table 1, shows the demographic information of the groups (experimental group and control group). Out of 116 (100%) students sampled for this study, 47 (40.5%) of the respondents formed the experimental group (those taught with covid-19 protocol), from which 25 (21.5%) were males and 22 (19.0%) were females, while 69 (50.5%) of the respondents constituted the control group (those taught with personal hygiene), out of which 26 (39.7%) were males and 23 (18.8%) were females.

Answering Research Questions

The mean and standard deviation were used to answer research question one with no corresponding hypothesis, while other research questions that had corresponding hypotheses were addressed via hypotheses.

Research Question: What are the knowledge and adherence levels of COVID-19 protocols among secondary school students before and after health education intervention in Kwara State?

Table 2: Descriptive Statistics of knowledge and adherence levels of covid-19 protocols among secondary school students before and after health education intervention in Kwara State

		Groups			
		Experimental (covid-19 protocol)		**Control** (personal hygiene)	
Covid-19		**Pre-test**	**Post-test**	**Pre-test**	**Post-test**
Knowledge	Mean	7.68	18.61	8.30	11.91
	S/D.	2.16	2.49	2.03	2.27
	Remark	**Low**	**Very High**	**Low**	**Fairly High**
Adherence	Mean	0.89	2.21	1.09	1.24
	S/D.	0.39	0.70	0.42	0.51
	Remark	**Low**	**Fair**	**Low**	**Low**

The experimental and control groups' knowledge of COVID-19 in the post-test was higher than their knowledge in the pre-test, as shown in Table 2. In contrast, students exposed to the COVID-19 protocol had a very high COVID-19 knowledge score (18.61) when compared to those exposed to the personal hygiene protocol, which had a very high mean score (11.91) in the post-test.

In the pre-test, students' adherence to the COVID-19 procedure was low in both the experimental and control groups, as shown in Table 2. In contrast, students exposed to the COVID-19 treatment had a fair adherence to the routine with a mean score (2.21) when compared to those exposed to the personal hygiene protocol with a mean score (1.24) which was poor in the post-test. Figure 1 summarizes this information.

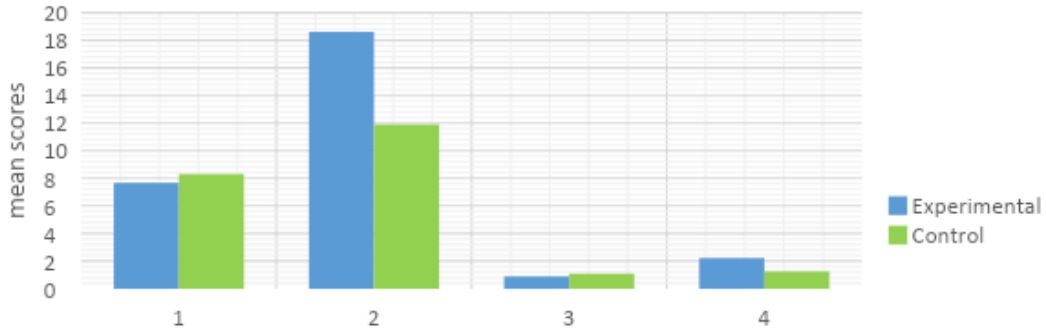

Figure 1: Knowledge level of covid-19 protocols among secondary school students before and after health education intervention in Kwara State

Hypotheses Testing

At the 0.05 alpha level, all hypotheses were tested using Analysis of Covariance (ANCOVA).

Hypothesis 1: There is no significant effect of a health education intervention on secondary school students' awareness of COVID-19 protocols in Kwara State.

Table 3a: Analysis of Covariance data demonstrating the efficacy of a health education intervention on secondary school students' awareness of COVID-19 protocols in Kwara State.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	675.195[a]	2	337.597	122.894	.000
Intercept	169.361	1	169.361	61.652	.000
Pretest	458.295	1	458.295	166.831	.000
Treatment	12.839	1	12.839	4.674	.033
Error	310.418	113	2.747		
Total	26341.000	116			
Corrected Total	985.612	115			

a. R Squared = .685 (Adjusted R Squared = .679)

When computed at the 0.05 alpha level, the F-value of 4.674 was achieved with a p-value of 0.033, as shown in Table 43a. The null hypothesis one is not kept because the p-value (0.03) is smaller than the alpha level (0.05), and so there was a statistically significant effect of a health education intervention on the understanding of COVID-19 protocols among secondary school students in Kwara State ($F_{(1, 113)} = 4.674$, p0.05).

Table 3b shows the results of the Multiple Comparison Analysis to demonstrate where the differences are (i.e. the actual effect of the health education intervention on knowledge of COVID-19 protocols among students)

Table 4b: Pairwise comparisons examination of the influence of a health education intervention on secondary school students' awareness of COVID-19 protocols.

Treatment	Mean	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
Experimental (I)	18.61[a]	6.70*	.357	.033	1.331	2.742
Control (J)	11.91[a]	-6.70*	.357	.033	-2.742	-1.331
Grand Mean = 15.26						

* the mean difference is significant at 0.05 level

b. Adjustment for Multiple Comparisons: Bonferroni

As demonstrated in Table 3b, students in the experimental group who were exposed to the COVID-19 protocol had a higher mean knowledge score of 18.61 than those in the control group who were exposed to personal hygiene and had a mean score of 11.91. The mean knowledge difference of 6.70 shows the influence of health education interventions on knowledge of COVID-19 procedures among secondary school students in Kwara State.

Hypothesis 2: In secondary school students in Kwara State, there is no significant effect of a health education intervention on adherence to COVID-19 protocols.

Table 4a shows the influence of a health education intervention on adherence to COVID-19 procedures among secondary school pupils in Kwara State using an analysis of covariance.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	**2.114[a]**	**2**	**1.057**	**3.045**	**.052**
Intercept	**35.731**	**1**	**35.731**	**102.935**	**.000**
Pretest	**.253**	**1**	**.253**	**.729**	**.395**
Treatment	**1.961**	**1**	**1.961**	**5.700**	**.019**
Error	**38.877**	**113**	**.344**		
Total	**113.000**	**116**			
Corrected Total	**40.991**	**115**			

a. R Squared = .052 (Adjusted R Squared = .035)

When computed at the 0.05 alpha level, the F-value of 5.700 was achieved with a p-value of 0.019, as shown in Table 4a. The null hypothesis two is not retained because the p-value (0.02) is smaller than the alpha level (0.05), and so there was a statistically significant effect of a health education intervention on adherence to COVID-19 procedures among secondary school students in Kwara State ($F_{(1, 113)} = 5.700$, p 0.05).

Table 4b shows the results of the Multiple Comparison Analysis to demonstrate where the differences are (i.e. the actual effect of the health education intervention on adherence to COVID-19 protocols among students)

Table 4b: Pairwise comparison examination of the efficacy of a health education intervention on secondary school students' adherence to COVID-19 procedures.

Treatment	Mean	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
Experimental (I)	2.21[a]	0.97*	.112	.019	0.489	0.044
Control (J)	1.24[a]	-0.97*	.112	.019	-0.044	-0.489
Grand Mean = 1.725						

* the mean difference is significant at 0.05 level

b. Adjustment for Multiple Comparisons: Bonferroni

As indicated in Table 4b, students in the experimental group who were exposed to the COVID-19 protocol had a stronger adherence to the procedure (2.21) than those in the control group who were exposed to personal hygiene and had a mean score of 1.24. The mean difference of 0.97 shows the effect of a health education intervention on adherence to COVID-19 guidelines among secondary school pupils in Kwara State.

Hypothesis 3: there is no significant interaction effect of gender and health education intervention on secondary school students' knowledge of COVID-19 protocols in Kwara State.

Table 5 shows the interaction effect of gender and health education intervention on COVID-19 protocol awareness among secondary school students in Kwara State.

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*
Corrected Model	*361.230*[a]	*2*	*180.615*	*79.468*	*.000*
Intercept	*83.524*	*1*	*83.524*	*36.749*	*.000*
Pretest	*360.556*	*1*	*360.556*	*158.639*	*.000*
Gender	*1.863*	*1*	*1.863*	*.820*	*.370*
Error	*100.004*	*44*	*2.273*		
Total	*8561.000*	*47*			
Corrected Total	*461.234*	*46*			

a. R Squared = .783 (Adjusted R Squared = .773)

When computed at the 0.05 alpha level, the F-value of 0.820 was achieved with a p-value of 0.370, as shown in Table 5. The null hypothesis three was retained because the p-value (0.37) was greater than the alpha level (0.05), indicating that there was no statistically significant interaction effect of gender and health education intervention on knowledge of COVID-19 protocols among secondary school students in Kwara State ($F_{(1, 44)} = .820$, $p>0.05$). This means that both male and female students who were exposed to the COVID-19 protocol received the same treatment from the health education intervention instructional package, and there was no difference in their knowledge of the procedure between male and female students.

Hypothesis 4: There is no significant interaction effect of gender and health education intervention on secondary school students' adherence to COVID-19 regimens.

Table 6a shows the interaction effect of gender and health education interventions on adherence to COVID-19 protocols among secondary school students in Kwara State using analysis of covariance.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	6.158[a]	2	3.079	8.116	.001
Intercept	22.875	1	22.875	60.295	.000
Pretest	4.820	1	4.820	12.705	.001
Gender	2.392	1	2.392	6.304	.016
Error	16.693	44	.379		
Total	42.000	47			
Corrected Total	22.851	46			

a. R Squared = .269 (Adjusted R Squared = .236)

When computed at the 0.05 alpha level, the F-value of 6.304 was achieved with a p-value of 0.016, as shown in Table 6a. The null hypothesis four is not retained because the p-value (0.016) is less than the alpha level (0.05), indicating that there was a statistically significant interaction effect of gender and health education intervention on adherence to COVID-19 protocols among secondary school students in Kwara State ($F_{(1, 44)} = .820$, $p > 0.05$).

Table 6b shows the results of the Multiple Comparison Analysis to demonstrate where the differences are (i.e. the actual effect of the health education intervention on adherence to COVID-19 protocols among students)

Table 6b: Pairwise comparison analysis of the interaction effect of gender and health education intervention on secondary school students' adherence to COVID-19 procedures.

					95% Confidence Interval for Difference[b]	
Gender	**Mean**	**Mean Difference (I-J)**	**Std. Error**	**Sig.[b]**	**Lower Bound**	**Upper Bound**
Male (I)	1.87[a]	-0.75*	.183	.016	-0.044	-0.489
Female (J)	2.62[a]	0.75*	.183	.016	0.489	0.044
Grand Mean = 1.725						

* the mean difference is significant at 0.05 level

a. Covariates appearing in the model are evaluated at the following values: pretest = .5532

b. Adjustment for Multiple Comparisons: Bonferroni

Table 6b shows that female students in the experimental group who were exposed to the COVID-19 regimen showed stronger adherence to the protocol (2.62) than their male counterparts, who had a mean score of 1.87. As a result, female students were found to follow COVID-19 guidelines more frequently than male students.

Discussion

Hypothesis One: Health education intervention improved secondary school students' awareness of COVID-19 procedures in Kwara State. Students in the experimental group who were subjected to covid-19 regimen had more knowledge than those in the control group who were exposed to personal hygiene. This suggests that the health education intervention improved students' COVID-19 procedure knowledge. This shows that health education is crucial for COVID-19 protocol awareness. Due to the rapid spread and high death rates of COVID-19, various countries and jurisdictions have implemented protocols to prevent its spread. Health educators are responsible for disseminating knowledge to the public. This finding is consistent with Matuschek, et al. (2020), who found that public law, private and digital media, and Healthcare providers like doctors, chemists, and nurses helped educate adults and students on COVID-19 protocols. Martinelli et al. (2021) also underlined the relevance of health education on COVID-19 procedures.

Hypothesis 2: Health education interventions also significantly improved COVID-19 protocol adherence among secondary school students in Kwara State. Students exposed to the COVID-19 regimen in the experimental group adhered more than those exposed to personal cleanliness in the control group. Therefore, health education intervention for secondary school students in Kwara State's COVID-19 protocol adherence is significant. According to NCDC (2020), this measure requires non-physical greetings (no handshaking or hugs), at least 2 metres (6 feet) physical distance between you and others, and the closure of places of gathering, such as schools, places of worship, sporting and social events. Nande, et al (2021) found that COVID-19 guidelines reduce encounters by closing schools, allowing work-from-home regulations, requiring masks, and locking

down. Despite being used worldwide, these strategies have not immediately or consistently lowered infections. This supports Grey et al.'s (2020) study that health education and promotion are important parts of disease prevention activities in general, but during outbreaks and health emergencies, they offer well-established tools (especially critical in the absence of specific drug therapies and vaccines) to communicate and engage quickly and effectively with the public and prevent infections.

Hypotheses Three: This study found no statistical interaction effect of gender and health education intervention on secondary school pupils in Kwara State's awareness of COVID-19 protocols. This means that both male and female students exposed to covid-19 protocol received the same health education intervention instructional package and had the same knowledge of the procedure. This contradicts Shrestha et al. (2021), who showed that gender was substantially associated with knowledge level because men tend to know more. Males may know more about this category since they are more likely to be exposed to different fields and orientation programmes in Nepal. Female participants are less interested in training and seminars because they feel they have household obligations and can't contribute fully (Shrestha et al., 2021).

Hypothesis Four: Finally, gender and health education interventions interacted to affect COVID-19 protocol adherence among secondary school students in Kwara State. Female students in the experimental group adhered to covid-19 procedure 2.62 times more than male students (1.87). Thus, female students followed COVID-19 guidelines better than males. Wittenberg-Cox (2020) noted in a Forbes piece that women-led countries like Germany and New Zealand had adapted better to the epidemic. In contrast, the US and Brazil, which have the poorest records, are governed by men who have strong macho ideals and deny the necessity for masks.

Early research suggests gender affects mask-wearing adherence, which supports the previous finding. During the 2003 SARS-COV-1 pandemic, men used masks less than women (Lau, et al., 2004). In June, July, and early August, Wisconsin shoppers were more likely to use masks due to the COVID-19 pandemic, according to Haischer, et al.

(2020). According to Capraro & Barcelo (2020), men regard mask-wearing as "shameful," "not cool," a "sign of weakness," and a "stigma" more than women.

Conclusion

Given the findings of this study and the fact that health education and promotion are important components of disease prevention activities in general, the researchers concluded that health education intervention is extremely important in sensitising and fostering knowledge of and adherence to COVID-19 protocols. According to the findings, students can benefit from a health education intervention to improve their awareness of COVID-19 guidelines. Furthermore, the effect of a health education intervention on adherence to COVID-19 protocols among secondary school students in Kwara State is noteworthy, as students who were exposed to COVID-19 protocol in the study were more adherent to COVID-19 protocol than students who were exposed to personal hygiene. Furthermore, both male and female students exposed to the COVID-19 protocol received the same health education intervention instructional package, and there was no difference in male and female students' knowledge of the protocol, while female students were found to adhere to COVID-19 protocols better than male students.

Limitations

The limitation of this study was the increasing cost and complexity of the study, introducing ethical issues or practical constraints, creating potential biases or threats to validity, and limiting the applicability or relevance of the study.

Recommendations

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

1. The government should increase awareness and sensitization on the importance of adhering to COVID-19 protocols.

2. Ministries of Health and Education should ensure the adherence of schools to social distancing guidelines in the classroom and within the school premises.

3. The Ministry of Health and other concerned agencies should ensure the provision of hand sanitising and hand-washing equipment within the school premises.

4. The school management should mandate the use of nose masks for all students, staff, and visitors before entry into the school premises.

5. Professional organisations across various disciplines should work in partnership to pilot health education intervention measures to promote adherence to COVID-19 protocols, especially among men.

6. Parents should encourage their wards to adhere to COVID-19 protocols not only in school but in other public gatherings.

Suggestions for Further Studies

This study is thus limited in geographical, sample, and statistical scope. Further studies should therefore be conducted using a larger geographical sample size and more robust statistical techniques to enhance the generalizability of the findings.

References

Abuga, K., & Nyamweya, N. (2021). Alcohol-Based Hand Sanitizers in COVID-19 Prevention: A Multidimensional Perspective. *Pharmacy*, *9*(1), 64. https://doi.org/10.3390/pharmacy9010 064

Alzyood, M., Jackson, D., Aveyard, H., & Brooke, J. (2020). COVID-19 reinforces the importance of hand washing. *Journal of Clinical Nursing*, *29*(15-16). https://doi.org/10.1111/jocn.15313

Amzat, J., Aminu, K., Kolo, V. I., Akinyele, A. A., Ogundairo, J. A., & Danjibo, M. C. (2020). Coronavirus outbreak in Nigeria: Burden and socio-medical response during the first 100 days. *International Journal of Infectious Diseases*, *98*, 218–224. https://doi.org/10.1016/ j.ijid.2020.06.067

Bandura, A. (1998). Health promotion from the perspective of social cognitive theory. *Psychology Health*, *13*, 623–649. Google Scholar.

Bhandari, P. (2021, July 15). *Designing a Questionnaire*. Scribbr. https://www.scribbr.com/ methodology/questionnaire/

Capraro, V., & Barcelo, H. (2020). *The effect of messaging and gender on intentions to wear a face covering to slow down COVID-19 transmission*. https://doi.org/10.31234/osf.io/tg7vz

Cascella, M., Rajnik, M., Cuomo, A., Dulebohn, S. C., & Di Napoli, R. (2023, August 18). *Features, Evaluation and Treatment Coronavirus (COVID-19)*. PubMed; StatPearls Publishing. https://www.ncbi.nlm.nih.gov/books/NBK554776/

Centers for Disease Control and Prevention. (2019). *Hand Hygiene in Healthcare Settings*. Centers for Disease Control and Prevention. https://www.cdc.gov/handhygiene/index.html

Centre for Disease Control and Prevention. (2020). *Novel Coronavirus 2019, Wuhan, China*. Centers for Disease Control and Prevention. https://www.cdc.gov/coronavirus/2019-ncov/index.html

Cho, E. B., Choi, S.-H., Chung, J.-W., & Lee, M.-K. (2018). Usefulness of national respiratory virus surveillance data for clinicians who manage adult patients. *Journal of Medical Virology*, *90*(8), 1304–1309. https://doi.org/10.1002/jmv.25199

Courtemanche, C., Garuccio, J., Le, A., Pinkston, J., & Yelowitz, A. (2020). Strong Social Distancing Measures in the United States Reduced the COVID-19 Growth Rate. *Health Affairs*, *39*(7), 10.1377/hlthaff. https://doi.org/10.1377/hlthaff.2020.00608

Edmonds-Wilson, S. L., Nurinova, N. I., Zapka, C. A., Fierer, N., & Wilson, M. (2015). Review of human hand microbiome research. *Journal of Dermatological Science*, *80*(1), 3–12. https://doi.org/10.1016/j.jdermsci.2015.07.006

Erasmus, V., Daha, T. J., Brug, H., Richardus, J. H., Behrendt, M. D., Vos, M. C., & van Beeck, E. F. (2010). Systematic review of studies on compliance with hand hygiene guidelines in hospital care. *Infection Control and Hospital Epidemiology*, *31*(3), 283–294. https://doi.org/10.1086/650451

Gray, D. J., Kurscheid, J., Mationg, M. L., Williams, G. M., Gordon, C., Kelly, M., Wangdi, K., & McManus, D. P. (2020). Health-education to prevent COVID-19 in schoolchildren: a call to action. *Infectious Diseases of Poverty*, *9*(1). https://doi.org/10.1186/s40249-020-00695-2

Haischer, M. H., Beilfuss, R., Hart, M. R., Opielinski, L., Wrucke, D., Zirgaitis, G., Uhrich, T. D., & Hunter, S. K. (2020). Who is wearing a mask? Gender-, age-, and location-related differences during the COVID-19 pandemic. *PLOS ONE*, *15*(10), e0240785. https://doi.org/10.1371/journal.pone.0240785

Han, N. T., Khanh, V. T., Ngan, K. V., Tam, V. V., An, L. P., & Giao, H. (2020). Knowledge and attitude toward COVID-19 among healthcare workers at District 2 Hospital, Ho Chi Minh City. *Asian Pacific Journal of Tropical Medicine*, *13*(6), 260. https://doi.org/10.4103/1995-7645.280396

Harapan, H., Itoh, N., Yufika, A., Winardi, W., Keam, S., Te, H., Megawati, D., Hayati, Z., Wagner, A. L., & Mudatsir, M. (2020). Coronavirus disease 2019 (COVID-19): A literature review. *Journal of Infection and Public Health*, *13*(5), 667–673. https://doi.org/10.1016/j.jiph.2020.03.019

Inglis, R., Barros, L., Checkley, W., Cizmeci, E. A., Lelei-Mailu, F., Pattnaik, R., Papali, A., Schultz, M. J., & Ferreira, J. C. (2021). Pragmatic Recommendations for Safety while Caring for Hospitalized Patients with COVID-19 in Low- and Middle-Income Countries. *The American Journal of Tropical Medicine and Hygiene*, *104*(3_Suppl), 12–24. https://doi.org/10.4269/ajtmh.20-1128

Jones, C. L., Jensen, J. D., Scherr, C. L., Brown, N. R., Christy, K., & Weaver, J. (2015). The Health Belief Model as an Explanatory Framework in Communication

Research: Exploring Parallel, Serial, and Moderated Mediation. *Health Communication*, *30*(6), 566–576. NCBI. https://doi.org/10.1080/10410236.2013.873363

Lau, J. T. F. (2004). SARS related preventive and risk behaviours practised by Hong Kong-mainland China cross border travellers during the outbreak of the SARS epidemic in Hong Kong. *Journal of Epidemiology & Community Health*, *58*(12), 988–996. https://doi.org/10.1136/jech.2003.017483

Lewandowsky, S., Schmid, P., Habersaat, K. B., Nielsen, S. M., Seale, H., Betsch, C., Böhm, R., Geiger, M., Craig, B., Sunstein, C., Sah, S., MacDonald, N. E., Dubé, E., Fancourt, D., Larson, H. J., Jackson, C., Mazhnaya, A., Dutta, M., Fountoulakis, K. N., & Kachkachishvili, I. (2023). Lessons from COVID-19 for behavioural and communication interventions to enhance vaccine uptake. *Communications Psychology*, *1*(1), 1–6. https://doi.org/10.1038/s44271-023-00036-7

Maheshwari, S., Gupta, P., Sinha, R., & Rawat, P. (2020). Knowledge, attitude, and practice towards coronavirus disease 2019 (COVID-19) among medical students: A cross-sectional study. *Journal of Acute Disease*, *9*(3), 100. https://doi.org/10.4103/2221-6189.283886

Mahmood, A., Eqan, M., Pervez, S., Tabinda, A. B., Yasar, A., Brindhadevi, K., & Pugazhendhi, A. (2020). COVID-19 and frequent use of hand sanitizers; human health and environmental hazards by exposure pathways. *Science of the Total Environment*, *742*, 140561. https://doi.org/10.1016/j.scitotenv.2020.140561

Martín-Sánchez, F. J., Martínez-Sellés, M., Molero García, J. M., Moreno Guillén, S., Rodríguez-Artalejo, F., Ruiz-Galiana, J., Cantón, R., De Lucas Ramos, P., García-Botella, A., García-Lledó, A., Hernández-Sampelayo, T., Gómez-Pavón, J., González del Castillo, J., Martín-Delgado, M. C., & Bouza, E. (2022). Insights for COVID-19 in 2023. *Revista Española de Quimioterapia*, *36*(2), 114–124. https://doi.org/10.37201/req/122.2022

Martinelli, L., Kopilaš, V., Vidmar, M., Heavin, C., Machado, H., Todorović, Z., Buzas, N., Pot, M., Prainsack, B., & Gajović, S. (2021). Face Masks During the COVID-19 Pandemic: A Simple Protection Tool With Many Meanings. *Frontiers in Public Health*, *8*. https://doi.org/10.3389/fpubh.2020.606635

Matuschek, C., Moll, F., Fangerau, H., Fischer, J. C., Zänker, K., van Griensven, M., Schneider, M., Kindgen-Milles, D., Knoefel, W. T., Lichtenberg, A., Tamaskovics, B., Djiepmo-Njanang, F. J., Budach, W., Corradini, S., Häussinger, D., Feldt, T., Jensen, B., Pelka, R., Orth, K., & Peiper, M. (2020). Face masks: benefits and risks during the COVID-19 crisis. *European Journal of Medical Research*, *25*(1). https://doi.org/10.1186/s40001-020-00430-5

Mayo Clinic. (2020). *Coronavirus - Symptoms and causes*. Mayo Clinic; Mayo Clinic. https://www.mayoclinic.org/diseases-conditions/coronavirus/symptoms-causes/syc-20479963

McAlister, A. L., Perry, C. L., & Parcel, G. S. (2008). How individuals, environments, and health behaviors interact. *Health Behaviour*, *169*, 169–188. https://www.bums.ac.ir/dorsapax/FileManager/UserFiles/Sub_32/93616.pdf#page=207

Moosa, I. A. (2020). The effectiveness of social distancing in containing Covid-19. *Applied Economics*, 1–14. https://doi.org/10.1080/00036846.2020.1789061

Nande, A., Adlam, B., Sheen, J., Levy, M. Z., & Hill, A. L. (2021). Dynamics of COVID-19 under social distancing measures are driven by transmission network structure. *PLOS Computational Biology*, *17*(2), e1008684. https://doi.org/10.1371/journal.pcbi.1008684

Nigeria Centre for Disease Control and Prevention. (2020). *Nigeria Centre for Disease Control and Prevention*. Www.ncdc.gov.ng. https://www.ncdc.gov.ng/

Odukoya, O. O., Adeleke, I. A., Jim, C. S., Isikekpei, B. C., Obiodunukwe, C. M., Lesi, F. E., Osibogun, A. O., & Ogunsola, F. T. (2020). Evolutionary trends of the COVID-19 epidemic and effectiveness of government interventions in Nigeria: A data-driven analysis. *MedRxiv: The Preprint Server for Health Sciences*, 2020.05.29.20110098. https://doi.org/10.1101/ 2020.05.29.20110098

Omaka-Amari, L. N., Aleke, C. O., Obande-Ogbuinya, N. E., Ngwakwe, P. C., Nwankwo, O., & Afoke, E. N. (2020). Coronavirus (COVID-19) Pandemic in Nigeria: Preventive and Control Challenges within the First Two Months of Outbreak. *African Journal of Reproductive Health*, *24*(2). https://www.ajrh.info/index.php/ajrh/article/view/2294

Pinchoff, J., Santhya, K., White, C., Rampal, S., Acharya, R., & Ngo, T. D. (2020). Gender specific differences in COVID-19 knowledge, behavior and health effects among adolescents and young adults in Uttar Pradesh and Bihar, India. *PLOS ONE*, *15*(12), e0244053. https://doi.org/10.1371/journal.pone.0244053

Rashedi, J., Mahdavi Poor, B., Asgharzadeh, V., Pourostadi, M., Samadi Kafil, H., Vegari, A., Tayebi-Khosroshahi, H., & Asgharzadeh, M. (2020). Risk Factors for COVID-19. *Le Infezioni in Medicina*, *28*(4), 469–474. https://pubmed.ncbi.nlm.nih.gov/33257620/

Rashedi, R., Samieefar, N., Akhlaghdoust, M., Mashhadi, M., Darzi, P., & Rezaei, N. (2022). Delta Variant: The New Challenge of COVID-19 Pandemic, an Overview of Epidemiological, Clinical, and Immune Characteristics. *Acta Bio Medica : Atenei Parmensis*, *93*(1), e2022179. https://doi.org/10.23750/abm.v93i1.12210

Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1988). Social Learning Theory and the Health Belief Model. *Health Education Quarterly*, *15*(2), 175–183. https://doi.org/10.1177/ 109019818801500203

Scarinci, I. C., Bandura, L., Hidalgo, B., & Cherrington, A. (2011). Development of a Theory-Based (PEN-3 and Health Belief Model), Culturally Relevant Intervention on Cervical Cancer Prevention Among Latina Immigrants Using Intervention Mapping. *Health Promotion Practice*, *13*(1), 29–40. https://doi.org/10.1177/1524839910366416

Shrestha, A., Thapa, T. B., Giri, M., Kumar, S., Dhobi, S., Thapa, H., Dhami, P. P., Shahi, A., Ghimire, A., & Rathaur, E. S. (2021). Knowledge and attitude on prevention of COVID-19 among community health workers in Nepal-a cross-sectional study. *BMC Public Health*, *21*(1). https://doi.org/10.1186/s12889-021-11400-9

Stone, S. P., Fuller, C., Savage, J., Cookson, B., Hayward, A., Cooper, B., Duckworth, G., Michie, S., Murray, M., Jeanes, A., Roberts, J., Teare, L., & Charlett, A. (2012). Evaluation of the national Cleanyourhands campaign to reduce Staphylococcus aureus bacteraemia and Clostridium difficile infection in hospitals in England and Wales by improved hand hygiene: four year, prospective, ecological, interrupted

time series study. *BMJ*, *344*(may03 2), e3005–e3005. https://doi.org/10.1136/bmj.e3005

Sutter, S. T., Frei, R., Dangel, M., & Widmer, A. F. (2010). Effect of Teaching Recommended World Health Organization Technique on the Use of Alcohol-Based Hand Rub by Medical Students. *Infection Control & Hospital Epidemiology*, *31*(11), 1194–1195. https://doi.org/10.1086/656745

WHO. (2020). *Coronavirus Disease (COVID-19) Oubreak: Rights, Roles and Responsibilities of Health Workers, Including Key Considerations for Occupational Safety and Health*. https://www.who.int/docs/default-source/coronaviruse/who-rights-roles-respon-hw-covid-19.pdf?sfvrsn=bcabd401_0

Wittenberg-Cox, A. (2020). *What Do Countries with The Best Coronavirus Responses Have in Common? Women Leaders*. Forbes. https://www.forbes.com/sites/avivahwittenbergcox/2020/04/13/what-do-countries-with-the-best-coronavirus-reponses-have-in-common-women-leaders/