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AVAILABILITY AND ADEQUACY OF WATER, SANITATION AND HYGIENE (WASH) FACILITIES IN SECONDARY SCHOOLS

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Abstract

Hand-washing practice, which is globally recognized as the simplest, most affordable and effective way of curtailing the spread of infectious diseases, is still low in developing countries. This is largely influenced by the dearth and adequacy of Water, Sanitation and Hygiene (WASH) facilities. This paper investigated the level of availability and adequacy of WASH facilities in secondary schools in a developing, sub-Sharan country, particularly Lagos State, Nigeria. Protection Motivation Theory (PMT) guided this research. In all, 620 pupils were selected through multi-stage sampling methods. Two local government areas were selected from each of the three senatorial zones in the study area. Through purposive sampling method, Junior Secondary 3 (JS 3 or Basic 9), and Senior Secondary 3 (SS3) were selected from each local government of the State, comprising schools that are owned by Lagos State Government the others are privately owned. Research instruments adopted included questionnaire, focus group discussion guide, document observation and unobtrusive observation of hand hygiene facilities. Quantitative data were analyzed through the Statistical Package for Social Sciences (SPSS), while focus group data and related online media materials were analyzed based on research themes. Findings showed that majority of the respondents (87.4%) admitted that the most common type of toilet facility was a water closet, followed by a pit latrine (13.7%) and open space (1.6%) for defecation. Although respondents were on average satisfied with the level of provision of running water in secondary schools in Lagos State, the majority considered the provision of wash hand basin to be very inadequate. Researchers therefore recommend improvement of structures and facilities relating to WASH in schoolls throughout Lagos State, Nigeria.

Keywords: Availability and adequacy; Water; Sanitation; Hygiene (WASH) facilities; Secondary schools.

1. Introduction

The latest in the history of global pandemics is the outbreak of Corona virus disease 19 (COVID-19) which has brought about physical, psychological, mental, and socio-economic dislocations globally. The viral infection is transmissible and caused by severe acute respiratory syndrome corona virus 2 (SARS-CoV-2). The disease began in Wuhan, China and has spread globally. In 2009, H1N1 also known as the Swine flu spread rapidly around the

world. Equally, the outbreak of the Ebola virus disease (EVD) also known as Ebola hemorrhagic fever (EHF), also increased global disease burden. Thus, the imporevement of personal and community hygiene, including hand hygiene (HH) is a necessity (Biran et al. 2020; Uneke et al, 2014). Towards the end of 2015, as the date for the attainment of the Millennium Development Goals (MDGs), was closing down, the United Nations Organisation (UNO) adopted a new global development template called Sustainable Development Goals (SDGs) (or global goals) with Goal 3.3 focusing on healthy lives and promoting well-being for all at all ages, and specifically combating epidemics including water-borne diseases and other communicable diseases. Similarly, Goal 6.2 of the SDGs aims at achieving universal access, by 2030, to adequate and equitable sanitation for all; ending open defecation; and paying special attention to the needs of women and girls as well as those in vulnerable situations. Water, Sanitation and Hygiene (WASH) are therefore very critical to human health. Furthermore, this study investigates level of availability and adequacy of WASH facilities associated with hand hygiene among secondary school students in Lagos State, Nigeria.

Acquisition of enduring healthy habits is most important and easiest at the childhood and adolescent stages of life. Peltzer and Pengpid (2014) estimate that 1.4 million deaths of children of school age are prevented in India due to hand-washing with soap. Hand-washing is important for children and adolescents since these groups are the most susceptible to infections gained from unwashed hands (Peltzer & Pengpid, 2014). Although hand-washing is globally recognized as the simplest, most affordable and effective means of stopping the spread of infections through feces, body fluids and contact with animals and other inanimate objects, its practice is still low in developing countries (Biran et al., 2020; Shehu et al., 2019; Uneke et al., 2014; Vivas et al., 2010). Availability and adequacy of WASH facilities are critical to practice of good hand hygiene everywhere in the world.

The aim of this paper was to investigate the level of availability and adequacy of WASH materials in secondary schools in Lagos State, Nigeria. The specific objectives are to: find out the categories of WASH facilities available in Secondary Schools in Lagos State, Nigeria; and investigate the perception of respondents on level of adequacy of available WASH facilities in selected secondary schools in Lagos State. The following two research questions guided the study: a) What are the categories of WASH facilities available in Secondary Schools in Lagos State, Nigeria? b) What is the perception of respondents on level of adequacy of available WASH facilities in selected secondary schools in Lagos State?

In spite of the strategic importance of water and sanitation to healthy living, there is a significant challenge in delivering these services in different locations such as schools and hospitals in Nigeria. According to WaterAid (2019) only 15.7% of schools in Nigeria have basic water and sanitation facilities, and the situation is even more disturbing for female pupils in schools as only a third of these facilities are gender-sensitive. Access to a hand washing facility in school that even have those facilities is not a given. The access increased only very marginally from 74.2% in 2011 to 74.5% in 2017, with just over half of these having access to basic hygiene, including water and soap. This poor level of progress in provision of critical facilities led to President Muhammadu Buhari asserts a WASH state of emergency in November 2018.

The Federal Government therefore established a framework for achieving the 6th point in the Sustainable Development Goals (SDGs) by striving towards 'Making Nigeria Open-Defecation-Free by 2025' and establishing the National Action Plan (NAP) on WASH, which has three phases up to 2030 (WaterAid, 2019). All these promotional strategies and campaigns require the combined effort of public health educators, government officials, members of a community and the mass media (Moffitt, 2005). When carrying out a health campaign, there is the need to identify the behaviour that needs changing, followed by the need to adopt a team approach and a clear message, which must be developed and communicated through existing media channels (Parker & Thorson, 2009; Popescu & Verman, 2000; Sood et al., 2014). For the message to be effective, it must be attractive, accessible, culturally relevant and convincing. The message strategy must also provide opportunities to promote community interaction through interactive sessions, with health experts serving as resource persons. For effective health campaign, there is also the need to continuously reinforce the message. This is because it is through continuous exposure and creative repetition of messages, otherwise called redundancy, that the audience takes notice of the essential health issues (Olatunji, 2011).

Proper hand washing is essential before, during and after preparing food or eating; before and after caring for the sick; before and after treating a cut or wound; and after using the toilet (either to defecate or urinate) (CDCP, 2011). Other instances when hand hygiene is required after changing diapers or cleaning up a child who has used the toilet; after blowing your nose, coughing, or sneezing; after touching an animal, animal feed, or animal waste; after handling pet food or pest treats; and after touching garbage. Definitely, the situation is

not limited to, including when a person comes into contact with a corpse or dead animals and after handling any form of chemicals.

Effective hand washing protocols include: wetting hands with cleaning running water (warm or as tolerated); turning off the tap, and applying soap; lathering both hands by robbing them together with the soap, while ensuring that the back of both hands are lathered, between fingers and under the nails; and scrubbing both hands at least 30 seconds (CDCP, 2011). While scrubbing the hands, the individual should hum the "Happy Birthday" song from the beginning to end twice. Other activities include rinsing both hands well under clean, running water; drying hands using a clean towel or air dry them; (or tissue paper) and using paper towel to turn off the water after the completion of the exercise. It is only in the absence of soap and running water that the use of alcohol-based hand sanitizer is advised. Even here, CDCP (2011) cautions that "Alcohol-based hand sanitizers do NOT eliminate all types of germs, however, it can reduce the number of microbes on the hands". The correct usage of the hand sanitizer will equally involve applying the product into the palm of one hand; rubbing both hands together; and rubbing the product over all surfaces of both hands and fingers until the palms are entirely dried. These series of activities require availability and adequacy of WASH materials.

There are significant studies dealing with hand hygiene practices (Assefa & Kumie, 2014; Lindell & Perry, 2000; Nigerian Centre for Disease Control, 2017; Shobowale et al., 2016; Shobowale et al., 2017; Thanh Xuan & Hoat, 2013). However, none of these studies specifically addressed the issue of availability and accessibility to WASH facilities in secondary schools in Lagos State, Nigeria. A notable study by Thanh Xuan and Hoat (2013) investigated level of hand-washing behaviour (HWB) and hand-washing with soap (HWWS) compliance among school children in the multi-ethnic rural area of northern Vietnam. The study was conducted in six primary and secondary schools and in the homes of four ethnic villages in northern Vietnam. Quantitative methods were added to face-to-face interviews with, and demonstration of hand-washing protocol to 319 school children in first, fourth, and seventh grades. Qualitative methods included structured observations at six schools and 20 homes of 24 children.

Thanh Xuan and Hoat (2013) reveal that among the 319 school children interviewed, 66% reported HWWS. However, through the demonstration protocol, only 10 out of 319 school children, performed HWWS satisfactorily. There is therefore a huge gap between actual practice of hand-washing with soap and awareness of the practice. The percentage of students

who washed their hands at recommended times (30–60 sec) was 58%. This proportion increased by grade (from 34% among grade 1 to 67% among grade 7; $p<0.05$). All 20 homes of school children visited had soap and water but none of the six schools had soap for hand-washing. The study is a description of poor compliance of school children with HWWS in a multi-ethnic population in Vietnam. The study concludes that education on hand-washing needs to be prioritized among multi-ethnic children at school.

A related study (Assefa & Kumie, 2014) assessed factors influencing hygiene behaviour among school children. A cross- sectional study was conducted in Mereb-Leke District, Tigray National Regional State among school children. The study population consisted of those who are in the second cycle as they are more mature and most senior in primary schools. A multi-stage probability sampling procedure with three stages was used to select schools that participated in the study. A total of 528 school children were randomly selected from students networking list of selected schools. Structured questionnaire and observational checklist at home and school setting were used to collect data.

Children were grouped according to level of compliance with either the positive or negative hygiene behaviour outcome. Out of these, 326 (61.7%) had positive hygiene behaviour. The study established further that knowledge on water handling (AOR, 2.24; 95% CI 1.54, 3.26), hand washing (AOR, 1.70; 95% CI 1.12, 2.57) and awareness on water handling matters (AOR, 2.0; 95% CI 1.37, 2.90), hand washing practice (AOR, 2.36; 95% CI 1.62, 3.45) were significantly associated with hygiene behaviour status. Being a member of hygiene and sanitation club (COR 0.42; 95% CI 0.26, 0.68), parent's health package status (COR 0.62; 95% CI 0.43, 0.90), training on hygiene and sanitation and experience of visiting model school (COR 1.99; 95% CI 1.37, 2.88) had significance influence on hygiene behaviour. In sum, the study shows that knowledge, awareness and training are not necessarily equal to actual practice or performance of a new behaviour.

The need to comprehensive education and information on hand hygiene among school children cannot be over emphasized (Assefa & Kumie, 2014). However, some aspects of the questionnaire adopted for the present study also examine students; HH practices after urinating, defecating and emerging from laboratory practical sessions. Against the above backdrop, the present study with its focus on information sources, knowledge and practices of hand washing among secondary school students, Lagos State, Nigeria is somewhat similar to the one conducted by Assefa and Kumie (2014), although the settings and period of both research differ. Moreover, the present study differs from the ones conducted by Thanh Xuan

and Hoat (2013) although both previous studies pointed attention to inadequacy of WASH facilities as hindrances to good hand hygiene in schools. Specifically, in the case of Assefa and Kumie (2014), structured questionnaire and observational checklist at home and school setting were used to collect data. The present study is limited to secondary school environment, although it is similar to the research effort of Assefa and Kumie (2014) because it uses structured questionnaire. This study made use of questionnaire as an instrument for collection of data, in addition to the focus group discussion (FGD0 guide to make it remarkably different from Assefa and Kumie (2014) in terms of research instruments. The resent study thus relied on both quantitative and qualitative data.

Theories are crucial to the understanding of health campaigns (Glanz, 1997). Often, the social cognitive theory as originally proposed by Teasdale (1978), Heffernan (1988), and Schunk (2012) has been applied with success, in studies dealing with behavioral changes and modifications. However, this study relied on Protective Motivation Theory (PMT) as a the main theory in the understanding of hand hygiene as an health –related behavior (Block & Keller, 1998). Its importance is hinged on the fact that it explicitly incorporates the role of health-related messages in effecting behavioural change. According to the theory, viewing a health-related message provides the impetus for an individual to assess the severity of an event, probability of the event's occurrence, belief in the efficacy of the recommendation provided in the message and belief that one has the ability to perform the recommendation.

Protection motivation theory states that stakeholders' motivations or intentions to protect them from harm are enhanced by four critical cognitions or perceptions: the severity of the risks, the personal vulnerability to the risks, self-efficacy or confidence in one's ability to perform the risk-reducing behaviour, and the response efficacy of the risk- reduction behavior (Rogers, 1983). It also posits that people's intentions to protect themselves are weakened by the perceived costs of the risk-reducing behaviours and the perceived benefits of the alternative risk-enhancing behaviors. PMT is organized as two mediating sub-processes that consumers use in evaluating threats (threat-appraisal process) and in selecting among coping alternatives (coping appraisal). Assessments of threats (severity, vulnerability, and benefits) and coping factors (self -efficacy, response efficacy, and costs) combine to form a motivation in stakeholders to protect themselves from the risk. According to PMT, people can be motivated to engage in desirable health behaviours not only to avoid health risks but also to avoid social or interpersonal risks (Pechmann et al., 2003). The research in PMT has focused on the impact of health information (e.g., antismoking messages) on the elicitation of both the

appraisal of the threat and of the coping techniques (e.g. Floyd, Prentice-Dunn, & Rogers, 2000; Mulilis and Duval, 1995; Rippetoe & Rogers, 1987) cited by Lindell and Perry (2004).

2. Methods

This study investigated availability and adequacy of WASH materials in secondary schools in Lagos State, Nigeria. There are 235, 352 secondary schools in the 20 federally recognised local councils in Lagos State (Atofojomo, 2018), which formed the population of study. The field work took place between January and October 2019. The study was delimited to students in Junior Secondary School 3 (JSS3) and Senior Secondary 3 (SS3) students, (aged between 13 and 17 years) in Lagos State; schools in both urban and rural settings, government- and privately-owned were investigated.

The descriptive and analytical survey design was executed through research closed and open ended questionnaire; focus group discussion guide, unobtrusive observational guide and documents generated from Online newspaper reports on Handwashing campaigns in Nigeria during the period of study. The research thus involved quantitative and qualitative data.

A total of 650 respondents were selected through a combination of purposive, stratified and simple random sampling methods. Through stratified random sampling, the Lagos State was divided along the existing three senatorial zones. Two local government areas were selected from each of the three senatorial zones. Moreover, through purposive sampling, two secondary schools were selected from each local government, with one of them being government-owned and the other privately owned. Two classes or levels of secondary education were selected from each participating school, using purposive sampling method. The two classes selected were Junior Secondary 3 (JS 3 or Basic 9), and Senior Secondary 3 (SS3).

The researchers developed a questionnaire that had five subsections on demographic data; awareness of messages on hand-washing; sources of information; level of accuracy of knowledge; and hand hygiene practice. Focus group discussion and document observation guides were also developed. The questionnaire was first subjected to internal validation process through inputs from scholars in the field of health communication in the School of Communication, Lagos State University. It was subsequently trial-tested on a group of secondary school students in a Local Government area in the state that was excluded from the selected schools. Based on feedback through the pre-test, some items on the questionnaire that seemed ambiguous were amended for clarity. To ensure that the questionnaire is reliable,

it was subjected to Cronbach Alpha test. The calculated Cronbach Coefficient of 0.88 was obtained, which is far above the threshold value of 0.7. This is an indication that the questionnaire is reliable.

Research assistants involved in data gathering were trained on the objectives of the research, target population, method of sampling of respondents, questionnaire administration techniques, and how to carry out non-obtrusive observation of hand hygiene facilities and hand washing practices in schools. Questionnaire data were collected, cleansed, collated and analyzed through the Statistical Package for Social Scientists (14th Edition), to test the research hypotheses, through Chi square and Analysis of Variance (ANOVA). Data are presented through tables, pie charts, bar charts, histograms and other relevant formats. Discussion of findings focused on research questions and hypotheses.

3. Results and Discussions

The study population consisted of students, teachers and service providers relating to WASH facilities in schools. However, questionnaire copies were administered only on students in the area of study, Teachers were not included in the survey because the research design only sought the opinion of students. Secondary data from service providers were also relied upon.

Using simple random sampling method, a total of 28 students were selected from each class through balloting (112 students x 1 Local Government Areas (LGAs) x 6 LGAs = 672 students). There were four schools selected from each of the six selected LGAs. Since two local government areas were selected from each Senatorial zone, a total of 224 respondents were selected from each of Lagos East, West and Central Senatorial zones. Thus, a total of 672 copies of the questionnaire were therefore administered. Although all the copies were returned, a total of 620 (or 92. 2%) was found usable and adopted for the research report. About 33.1% of the 620 respondents were drawn from schools situated in Lagos West; 38.1% from Lagos East; and 28.9% of respondents attend schools located in Lagos Central. Based on local government areas, 14.0% of the respondents attend the schools located in Ikeja; 19.2% in Badagry; 18.9% in Somolu; 19.4% in Epe; 11.0% in Surulere; while 17.7% of the respondents attend school situated in Mainland.

Therefore, a majority (56.1%) of the secondary school students are based in rural areas. In addition, 55.5% of the students attend government-owned secondary schools while 44.5% attend privately-owned secondary schools. Respondents' age group include: 10 – 12 age bracket (15.2%); 13 – 15 age bracket (54.5%); 16- 18 age range (29.5%) while respondents

aged 19 years and above represent the least group (0.8%). About 50.2% of the respondents were junior secondary school students (precisely, JSS3) while 49.8% were senior secondary school students, with near parity gender distribution (50.2% males and 49.8% females), which may reflect the gender distribution at the national level.

3.1. Availability of Hand-washing facilities in Schools

Data presented in Table 1 were generated through the questionnaire; qualitative data generated through a focus group, participant observation and online newspaper items are embedded in the discussion of findings.

Table 1. Available Hand-Washing facilities in Schools

No.	Item	Categories	Frequency	%
1	Type of Toilet Facilities	Water closet	525	84.7
		Pit latrine	85	13.7
		Open space	10	1.6
		Others	-	-
		Total	620	100
2	Number of sinks available around toilet area	Three or more	184	29.9
		Two	152	24.5
		One	111	17.9
		None	173	27.9
		Total	620	100
3	Number of sinks available around classroom	Three or more	25	4.0
		Two	27	4.4
		One	39	6.3
		None	529	85.3
		Total	620	100
4	Number of sinks available around science Laboratory area	Three or more	233	37.6
		Two	100	16.1
		One	87	14.0
		None	200	32.3
		Total	620	100
5	The School authority provides tablet/liquid soap along wash hand basin	Always	145	23.4
		Sometimes	155	25.0
		Rarely	71	11.5
		Never	249	40.2
		Total	620	100

No.	Item	Categories	Frequency	%
6	The School authority also provides hand sanitizer along with the wash hand basin	Always	82	13.2
		Sometimes	115	18.5
		Rarely	103	16.6
		Never	320	51.6
		Total	620	100

(Source: Field Work, 2019)

Table 1 shows that a majority of the respondents (87.4%) acknowledged that the most common type of toilet facility is water closet, followed by pit latrine (13.7%) and open space (1.6%) for defecation. Thus, water closet toilets are predominant, although the existence of open defecation is disturbing. Similarly, a majority (54.4%) admitted that there are between two and three (or more)wash hand sinks around the toilet areas, 17.9% claimed availability of just one sink; while 27.9% of the respondents indicate non-availability of sinks around their toilet areas. Thus wash hand basing around toilet areas are barely adequate. However, a majority of the respondents (85.3%) admitted that wash-hand sinks are not available around classroom areas. A majority of the respondents (51.7%) claim that the school authorities never or rarely provide tablet/liquid soap along with wash hand basins. Equally, another majority of the respondents (51.6%) claim that the school authorities never provide hand sanitizer around the wash-hand basinareas, while an additional 16.6% are not satisfied with the level of provision of hand sanitizers in schools.

Table 2 shows the perception of respondents on adequacy of available WASH facilities in secondary schools in Lagos State, Nigeria. Supplementary qualitative data are introduced during the discussion of findings.

Table 2. Perception on Adequacy of Hand-Washing facilities in Schools

No.	Item	Categories	Frequency	%
7	Which of the following is the correct situation in your School?	The School provides wash hand basin with water in a bowl	130	21.0
		The School provides running water along with the wash hand basin	359	57.9
		Each student buys water in sachet for use	108	17.4
		There is no access to water	23	3.7
		Total	620	100
8	Which of the following is the correct situation in your school?	The School provides a hand towel for use along with the wash hand basin	62	10.0

No.	Item	Categories	Frequency	%
		The School provides Tissue Paper along with the wash hand basin	163	26.3
		Each student uses own towel/tissue paper	387	62.4
		None	8	1.3
		Total	620	100
9	The School authority also provides hand sanitizer along with the wash hand basin	Always	82	13.2
		Sometimes	115	18.5
		Rarely	103	16.6
		Never	320	51.6
		Total	620	100

(Source: Field Work, 2019)

As shown in table 2, a majority of the respondents (57.9%) are satisfied with the level of provision of running water along with the wash hand basin in secondary schools in Lagos State**.** It is equally revealing that 21% claim that schools only provide wash hand basin with water in a bowlwhile 17.4% reported that each student buys water in sachet for use while a negligible number (3.7%) claim that there is no access to water in their respective schools. Investigation shows further that 62.4% reported that each student uses own tissue/ hand towel during visits to the toilet or wash hand areas, which shows that a majority perceived that provision of tissue paper and hand towel for use after hand cleaning are inadequate. Additionally, a majority (68.2%) reported that schools either rarely or never provided hand sanitizer for students' use.

Tables 1 and 2 provide data on availability and adequacy of toilet facilities and hand washing facilities in secondary schools respectively. From Table 1 it is apparent wash hand basins are available in toilet areas, but rarely existed around the classroom areas and laboratories; and table or liquid soap, including hand sanitizers are considered rarely available in secondary schools in Lagos State, Nigeria. However, the existence of open toilet (or open defecation in schools) is against the position advocated by the United Nations, which through the MDGs (2000-2015) and the SDGs strove to eliminate open defecation in every part of the world MDGs and later SDGs (WaterAid, 2019). Failure to substantially implement water, sanitation and hygiene (WASH) component of the MDG was one of the reasons that accounted for the low level of achievement of the MDGs in Nigeria and necessitated the declaration of a state of emergency in WASH by the Federal Government according to WaterAid (2019).

It was possibly in response to the rampant nature of open defecation in Lagos State that RB West Africa, through one of its brands, Harpic partnered with the Lagos State Ministry of Environment to upgrade and refurbish 25 public toilet units for four communities in Lagos state. The refurbished public toilets were located in Ojota, Oshodi, Costain and Alausa. UNICEF states that Nigeria is among the nations in the world with the highest number of people practicing open defecation, estimated at over 46 million people with a projected 56 million new cases in the next 10 years. The practice has negative effect on the populace, especially children, in the areas of health and education and had contributed to the country's failure to meet the MDG target.

There are additional facilities that go along with a well-functioning water closet toilet system. These include provision of toilet papers, water basins/sinks, soaps along with hand sanitizers. But data reveal that a majority of the respondents (85.3%) admitted that wash-hand basins are not available around classroom areas; along with science laboratory areas. School authorities rarely provided tablet/liquid soap and sanitizers.

In a study, Doron et al. (2011) found that strategic placement of hand-rub dispensers and information yielded an upsurge in the compliance rates in hand hygiene among medical doctors and nurses. The study identified factors that contribute to the non-compliance of hand washing in the clinical setting, including the inconsistency and inadequacy of placement of sinks and hand sanitizer dispensers; insufficient reminders (visual and interpersonal) to clinicians from other staff and deficits in clinician knowledge, attitude and accountability.

The present study has thus non-availability or inadequacy of toilets and related WASH facilities in secondary schools in Lagos State predispose students to poor hand hygiene practices. This implies that provision of the right amount of toilets, running water, tissue paper, wash hand basins/sinks soap and hand sanitizers, although not widely available, are critical to effective hand hygiene practices among secondary students in Lagos State.

Data presented in Table 2 show that although a majority of respondents are barely satisfied with the level of provision of running water in secondary schools in Lagos State, a majority also considered the provision of wash hand basin as grossly inadequate, while also expressing dissatisfaction with non-provision of towel/tissue paper and hand sanitizers in schools. In an open-ended section of the questionnaire, respondents pointed out challenges in schools to include 'inadequacy of water supply'; 'non-availability of soap and other hand washing facilities'; 'some respondents pointed out that they found hand washing practices stressful and tasking'; and 'inadequacy of information on the health benefits of hand washing'.

When participants during focus group were asked to discuss the availability and adequacy of WASH facilities in their school, one of them (Participant E) said "we don't have any of those facilities, the water closet in the toilet are broken, the basin in the toilet are not well channeled even the basins in the lab that is meant for scientific use not for handwashing is not working." Another group member (Participant B) added: "the taps in the labs, I have never seen them running even when we are having practical sessions. I don't see them running. We have to fetch water from the well to wash our hands". The inadequacies of handwashing facilities in the school is best captured by Participant K who said "there are no effective facilities for washing hands in the school, even in the toilet there is no water, except you fetch from the well".

Participants in the private school gave more cautious responses on the availability of facilities in for handwashing. Participant N clearly identified soap, water and basin as useful materials for handwashing and all other participants agreed with her. Participant "O" however revealed that "there are four wash hand basins in all, but there is no consistent running water, no soap and no towels or hand sanitizers". Unobtrusive observations by our field officers confirm the claims of the FG members. In a field report submitted by one of the research assistants, it was noted that the school visited (a Millennium Secondary School in Lagos, Nigeria) "does not provide students with adequate facilities for hand washing especially wash hand basins and soaps." In another school, the field staff reported that "the School did not provide adequate hand washing items as well as running water… students provided sachet water for own use. Also, each student uses own tissue paper". A similar situation was reported with regard to the schools located in rural areas of the state that participated in the research. The present study is in line with previous ones (Assefa & Kumie, 2014; Thanh Xuan & Hoat, 2013), showing poor attention by authorities to provision of WASH facilities, factors identified as hindrances to good hand hygiene in schools.

Protection motivation theory states that stakeholders' motivations to adopt a recommended action are dependent on assessment of severity of the risks, the personal vulnerability to the risks, self-efficacy and the response efficacy of the risk- reduction behavior (Rogers 1983). It also posits that people's intentions to protect themselves are weakened or enhanced by the perceived costs of the risk-reducing behaviours. PMT is organized as two mediating sub-processes that consumers use in evaluating threats (threat-appraisal process) and in selecting among coping alternatives (coping appraisal). Thus, although individuals may have a strong intension to engage in hand hygiene, inadequacy of WASH facilities may hinder the practice,

as is obvious from the present study. Based on PMT, people can be motivated to engage in desirable health behaviours and to avoid social or interpersonal risks to the extent that WASH facilities are available and adequate.

4. Conclusion

In line with the preceeding discussion, respondents perceive that available WASH facilities in schools were inadequate to handle the requirements of good hand hygiene practice in secondary schools in Lagos State, Nigeria. Based on this argument, water closet toilets, wash hand basins, pipe borne or running water, hand washing soap, sanitizers and tissue paper are grossly inadequate. Existence of pit latrines and open defecation in some secondary schools in Lagos State was also confirmed.

A major limitation of this study was that the self-report nature of the questionnaire did not allow the researchers to obtain first-hand data on the hand washing practices among the students. Similarly, the observational method was casual rather than systematic, which limited the opportunity to confirm the real-life situation of hand hygiene practices among students. However, the identified limitations did not adversely affect the outcome of the research because of the mixed method of data collection through questionnaire, document observation, unobtrusive observation, and focus group discussion, which especially gave opportunities to students to report on the handwashing habits among their colleagues. Therefore, the combination of the research methods yielded required data on the availability and adequacy of WASH facilities in school that significantly mitigated the observed limitation associated with use of self-report questionnaire.

In order to effectively resolve the challenges of inadequacy as well as insufficiency of toilets and handwashing facilities in schools, government and school owners should increase funding to schools so as to modernize the physical structures in schools and consequently increase and upgrade number of toilet facilities in schools. Pit latrines and open defecation should be eradicated in schools. Similarly, access to pipe borne or treated water supplies should be expanded while tissue paper, handwashing basins or sinks, soap and hand sanitizers should be guaranteed through improved funding of schools. It is further recommended that school owners should enhance Water, Sanitation and Hygiene (WASH) facilities in schools, while state and local governments in Nigeria should provide adequate WASH facilities in public places. In this regard, school owners (private and public) should provide pipe borne water in schools, along with water closet facilities, including wash hand basins, soap, hand

towel and hand sanitizers in and or around every classroom in schools. In conclusion, the cross-sectional country-wide survey and direct observational research designs should be integrated into future studies in the area of adequacy of WASH facilities in schools. This will create the framework for periodic evaluation of the availability and adequacy of WASH facilities, both within and outside the school environment, against the backdrop of Goal 6.2 of the UN's SDGs, particularly the need to achieve universal and equitable access to WASH facilities as well as ending open defecation.

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Author Contribution

Olatunji R. W was partly responsible with 52% for the research concept note development; literature review; Desk/Internet research and data gathering; partly responsible for data analysis, report writing, editing; and responsible for dissemination of findings. Noeem Taiwo Thanny was partly responsible with 48% for Literature Review; fully responsible for focus group discussion sessions; coordination of questionnaire administration; and partly responsible for data analysis, and report writing and editing.

References

Assefa, M., & Kumie, A. (2014). Assessment of factors influencing hygiene behaviour among school children in Mereb-Leke District, Northern Ethiopia: a cross-sectional study. *BMC Public Health, 14*(1), 1000. https://doi.org/10.1186/1471-2458-14-1000

Atofojomo, O. A. (2018). *Media preferences and uses among in-school adolescents in Lagos State,Nigeria*, PhD Thesis in the Department of Broadcasting, School of Communication, Lagos State University, Ojo, Lagos.

Block, L. G., & Keller, P. A. (1998). Beyond protection motivation: An integrative theory of health appeals. *Journal of applied social psychology*, *28*(17), 1584-1608. https://doi.org/10.1111/j.1559-1816.1998.tb01691.x

Biran, A., White, S., Awe, B., Greenland, K., Akabike, K., Chuktu, N., ... & Van der Voorden, C. (2020). A cluster-randomised trial to evaluate an intervention to promote handwashing in Nigeria. *International Journal of Environmental health Research*, 1-16. https://doi.org/10.1080/09603123.2020.1788712

Centre for Diseases Control and Prevention (CDCP). (2011). *Keeping hands clean*. http://www.cdc.gov/healthywater/hygiene/hand/handwashing.html

Doron, S. I., Kifuji, K., Hynes, B. T., Dunlop, D., Lemon, T., Hansjosten, K., Cheng, T., Curley, B., Snydman, D. R., & Fairchild, D. G. (2011). A Multifaceted Approach to Education, Observation, and Feedback in a Successful Hand Hygiene Campaign. *The Joint Commission Journal on Quality and Patient Safety*, *37*(1), 3-AP3. https://doi.org/10.1016/S1553-7250(11)37001-8

Glanz, K. (1997). *Theory at a glance: A guide for health promotion practice* (No. 97). US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute.

Global Handwashing Day. (2010). *Health in your hands: a public-private partnership*.

Heffernan, C. J. (1988). Social foundations of thought and action: A social cognitive theory. Albert Bandura Englewood Cliffs, New Jersey: Prentice Hall, 1986, xiii+ 617 pp. Hardback. US $39.50. *Behaviour Change*, *5*(1), 37-38.

Lindell, M., & Perry, R. (2004). *Communicating Environmental Risk in Multiethnic Communities*. Sage Publications. https://doi.org/10.4135/9781452229188

Lindell, M. K., & Perry, R. W. (2000). Household Adjustment to Earthquake Hazard: A Review of Research. *Environment and Behavior*, *32*(4), 461-501. https://doi.org/10.1177/00139160021972621

Moffitt, M. A. (2005). "Campaign" in Heath, R. L. (Ed.). *Encyclopedia of Public Relations*, Vol. 1, pp.109-111. Thousands, Oaks: Sage Publications.

Nigerian Centre for Disease Control. (2017). *Ebola*. https://ncdc.gov.ng/diseases/info/E#

Olatunji, R. W. (2011). Uses of redundancy in print advertisements in Nigeria. *Journal of Promotion Management*, *17*(2), 257-272. https://doi.org/10.1080/10496491.2011.553785

Parker, J. C, & Thorson, E. (2009). *Health Communication in the New Media Landscape*. Springer Publishing Company.

Pechmann, C., Zhao, G., Goldberg, M. E., & Reibling, E. T. (2003). What to convey in antismoking advertisements for adolescents: The use of protection motivation theory to identify effective message themes. *Journal of marketing*, *67*(2), 1-18. https://doi.org/10.1509%2Fjmkg.67.2.1.18607

Peltzer, K., & Pengpid, S. (2014). Oral and hand hygiene behaviour and risk factors among in-school adolescents in four Southeast Asian countries. *International journal of environmental research and public health*, *11*(3), 2780-2792. https://doi.org/10.3390/ijerph110302780

Popescu, L. & Verman. (2000). Strategies for Developing a Health Promotion Campaign. *Common Health*, 24-26. https://aiha.com/wp-content/uploads/2015/07/24-Strategies-for-Developing-a-Health-Promotion-Campaign.pdf

Rogers, R. W. (1983). Cognitive and psychological processes in fear appeals and attitude change: A revised theory of protection motivation. *Social psychophysiology: A sourcebook*, 153-176. https://ci.nii.ac.jp/naid/10004535663/

Schunk, D. H. (2012). Social cognitive theory. https://psycnet.apa.org/record/2011-11701-005

Shehu, N., Onyedibe, K., Igbanugo, J., Okolo, M., Gomerep, S., Isa, S., & Egah, D. (2019). Hand hygiene knowledge, training and practice: a cross-sectional study in a tertiary health institution, North-Central Nigeria. *Nigerian journal of clinical practice*, *22*(7), 1008-1008. link.gale.com/apps/doc/A592874898/AONE?u=anon~da7ca336&sid=googleScholar&xid=a60293b8

Shobowale, E. O., Onyedibe, K. I., Adegunle, K. B., & Elikwu, C. J. (2017). An observational and trend analysis study of hand hygiene practices of healthcare workers at a private Nigerian Tertiary Hospital. *Annals of Medical and Health Sciences Research*. https://www.amhsr.org/abstract/an-observational-and-trend-analysis-study-of-handrnhygiene-practices-of-healthcare-workers-at-a-privaternnigerian-tertia-4108.html

Shobowale, E. O., Adegunle, B., & Onyedibe, K. (2016). An assessment of hand hygiene practices of healthcare workers of a semi-urban teaching hospital using the five moments of hand hygiene. *Nigerian medical journal: journal of the Nigeria Medical Association*, *57*(3), 150. https://dx.doi.org/10.4103%2F0300-1652.184058

Sood, S., Shefner-Rogers, C., & Skinner, J. (2014). Health communication campaigns in developing countries. *Journal of creative communications*, *9*(1), 67-84. https://doi.org/10.1177%2F0973258613517440

Teasdale, J. D. (1978). Self-efficacy: Toward a unifying theory of behavioural change?. *Advances in behaviour research and therapy*, *1*(4), 211-215. https://doi.org/10.1016/0146-6402(78)90009-7

Thanh Xuan, L. T., & Hoat, L. N. (2013). Handwashing among schoolchildren in an ethnically diverse population in northern rural Vietnam. *Global health action*, *6*(1), 18869. https://doi.org/10.3402/gha.v6i0.18869

Uneke, C. J. Ndukwe, C. D., Oyiboc, P. G. Nwakpua, R. C., & Prasopa-Plaizier, N. (2014) Promotion of hand hygiene strengthening initiative in a Nigerian teaching hospital: Implication for improved patient safety in low-income health facilities. *Brazilian Journal of Infectious Diseases*, *18*, 21-27. https://www.scielo.br/j/bjid/a/Mh57JVQDNSVHWF8JWdtWFCQ/?format=html&lang=en

UNICEF. (2014). *State of the world's children 2015*. New York: UNICEF

Vivas, A., Gelaye, B., Aboset, N., Kumie, A., Berhane, Y., & Williams, M. A. (2010). Knowledge, attitudes, and practices (KAP) of hygiene among school children in Angolela, Ethiopia. *Journal of preventive medicine and hygiene*, *51*(2), 73. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3075961/

WaterAid. (2019). *Equal to the task: financing for a state of emergency in Nigeria's water, sanitation and hygiene sector*. Development Initiatives.