



## Assessment of Senior Secondary School Students' Hand Washing Compliance and Effect on their Health Status in Lagos State

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### Abstract

*The purpose of this study was to establish the factors which support or inhibit the development of effective hand hygiene maintenance among senior secondary school students in Bariga, Shomolu LGA of Lagos State, Nigeria. The study used descriptive survey research design, with a sample of 280 participants randomly drawn from a population of 1000 students in four senior secondary schools in Bariga, Shomolu LGA, Lagos State. The instrument used for the study was Students' Hand Washing Questionnaire (SHWQ); with a reliability coefficient of 0.73, determined, using Cronbach alpha correlation coefficient method. Two hypotheses were formulated and tested at 0.05 level of significance; using Pearson correlation coefficient and multiple regression correlation. The findings revealed that there is significant impact of hand hygiene compliance on health status of students of senior secondary school students in Bariga Shomolu LGA, Lagos ( $R = .943$ ;  $p < 0.05$ ;  $r = 0.098$ ;  $r^2 = .010$ ; and adjusted  $r^2 = .016$ ).  $R$ -squared value shows that 16% of the factors put under consideration was responsible for health status of students, while other factors representing (84%) not considered among the variables were responsible for the remaining factors. The Durbin Watson value is 2.295, which indicates presence of auto correlation. This implies that there is significant impact of hand hygiene compliance on health status of students. The study concluded that further training is needed by the students, for them to improve their hand washing practice behaviour and hygiene maintenance in schools. The study recommended among others that Government should effectively provide infrastructural materials for hygiene maintenance in the schools, so as to continuously sustain schools' capabilities in sustaining excellent sanitary condition of the schools.*

**Keywords:** Hand washing; Compliance, Health Status, Secondary School Students.

### Introduction

A school as a social institution where school children learn and interact with one another, determines and provides not only the curricula, but also the necessary healthy environment which influence the children's behaviour. In this regard, the school includes in the curricula lessons and essential activities in hygiene that prevent infections, control the spread of infections and reduce illnesses among school children, thereby sustaining a safety environment for plays and a high quality health status for school children. Malange, (2010) showed that many schools in developing countries are burdened with various communicable diseases. The schools face serious challenges of poor sanitation, which present a significant risk in the transmission of pathogens among students.

Hands are very essential organs in the body; they are used not only to demonstrate but also to carry out many activities, which highly expose them to germs than any other organ in the body. Hands are thus a source of transmission of pathogen through direct contact with infected objects,

fluids, foods and other body parts. The prevalence of poor hand hygiene associated with infection is high in developing countries. Hand washing is the leading measure to prevent infection and involves washing the hands and nails with soap and water (Lai & Kavitha, 2016). Okuneye (2014) sees hand washing as very important practice to prevent transmission of germs at home. Washing the hands thoroughly with soap and running water for at least 15 seconds to 1 minute is generally effective in removing germs (microorganisms) from the hands, especially when it is done with antibacterial soap (Aiello, Coulborn, Perez & Larson, 2008).

Hand washing day is declared by World Health Organization to promote hand hygiene. Grub (2003) explained that frequent hand washing protects the individual and others. Students' compliance with hand hygiene practices is important as the leading measure to prevent infections and the guideline must be followed (Nair, Hanunattappa, Hiremath, Swa & RaghumathPooja, 2014). Standhope and Lancaster (2004) noted that infections control measure plays essential role in reducing the risk of diseases such as diarrhea, measles, cholera, dysentery and typhoid. Lucas and Gilles (2006) reported that an individual with a disease such as hepatitis B may be a carrier of the disease and may not be aware that such contagious infection exists within his/her body. Ilika & Obionu, (2002) emphasized the role of hygiene and health education in controlling the infectious diseases.

Hand hygiene is considered as a hallmark of such infection control practices, which serve as effective way of removing transient bacteria from the hands of the students and community with proper compliance to hand hygiene (Curtis & Cairncross 2003). However, successful hand washing behaviour change requires both the availability of facilities (e.g. a hand washing station with soap and water) and adoption of a good hand washing habit. These hygiene behaviour change measures help to improve children's hand washing compliance, environmental and food hygiene practices, with effective reduction of gastrointestinal and respiratory tract infections by up to 50%, the two disease condition are leading causes of childhood morbidity and mortality around the world (Rabie and Curtis, 2006).

There are a number of factors that underscore poor hygiene health behaviour, especially among school children. These include frequency of being in contact with contaminants and poor access to hand washing facilities (Lopez-Quintero, Freeman & Neumark, 2009). In Lagos State, some schools are littered with heaps of refuse, which often block the drainage and constitute filthy environment; such conditions are inimical to health and endanger quality of life. Ben-Nwankwo, Balogun, and Busari (2012) explained that these refuse heaps sites serve as a risk factor for breeding of mosquitoes, cockroaches, rats and other microbes that causes diseases. Parents, teachers and school proprietors have the responsibility of ensuring that school children are provided decent and healthy environment in their schools. This is a basic need. As Agiobu-Kemmer (2001) observed, school children depend on adults to fulfil their basic needs, which are most times inadequately done.

In developing countries, 4.9 million children per 1000 per year die of diarrheal illnesses in the first five years of life 1.8 million deaths per year is a result of diarrhea in children aged less than five years (Patel, Ovung, Badhomys and Didey, 2012 & Menilsen, 2012). Cholera and dysentery are severe dehydrating ailments and sometimes life threatening forms of diarrhea. Diarrhea occurs due to poor environmental personal and hand hygiene. Currently an estimated 2.5 billion people do not have access to basic sanitation, and 1.1 billion of those people still practice open defecation which



constitute 15 per cent of the world's total population of 7 billion on the earth planet today. This is not only 'an affront to human dignity', but also a serious public health issue as faecal–oral transmitted diseases such as diarrhea (Park,2015).

Centre for Disease Control and Prevention (2017) explains that effective hand washing is simple and the basic intervention to control and prevent the spread of infections, yet, it is infrequently practiced. Therefore, the various components of school health services, including hygiene maintenance of the health of the school children require serious attention. It is expected that school environment should be kept clean and tidy because of the health implication attached to the practice. Previous surveys in developing countries (Akani, Nkanginieme, Oruamabo, 2001); World Health Organization, 2005); Ekpo, Odoemena, Mafiana and Sam-Wobo, 2008); Ezeonu and Akani, 2009) indicated that despite the relative simplicity of hand washing everywhere, the practice is still low to alleviate contamination and transmission of contagious diseases. However, the World Health Organization (WHO) (2009) has made a significant effort based on control of diarrhoea through the introduction of hand washing guidelines. The technique is aptly used to improve understanding, training, monitoring and reporting hand washing.

Also, Ahmadu, Rimamchika, Ibrahim, Nnanubumom, Godiya and Emmanuel (2013) assert that inadequate institution commitment to good hygiene practice could be a great constraint and could be resolved by implementing educational programme, developing policies, administering services, and conducting research. Therefore, the intent of this study was to assess the hand washing compliance on health status of senior secondary school students in Bariga Shomolu LGA in Lagos State

### **Research Design**

Descriptive survey research design was used for this study. It is non-experimental design in which the variables are not manipulated, but rather observed and measured to determine the hand hygiene compliance on health status of the four selected senior secondary schools in Bariga Shomolu Local Government Area of Lagos State, Nigeria.

### **Population of the Study**

The Population consisted of 1000 students from the four Senior Secondary Schools under study in Bariga, Shomolu Local Development Government Area of Lagos State, Nigeria.

### **Sample and Sampling Technique**

A sample consisting of 300 respondents drawn from the four senior secondary schools were used for the study, consisting of 75 Senior Secondary School Students from each selected school. Respondents were tested on their hand hygiene compliance on health status of senior secondary school students as practiced daily at home. The sample size was calculated using the formula:

$$n = \frac{x^2NP(1 - P)}{d^2(N - 1) + x^2p(1 - p)}$$

Where:

n = required sample size

N = the given population (1000)

p = population proportion assumed to be 0.5

d = the degree of accuracy set at 0.05

$x^2$  = table value of chi-square (3.841 for 0.95 confidence interval)

(Kangahi, Indoshi, Okwach, and Osido, 2012).

For N = 1000; p = 0.5; d = 0.05 and  $x^2 = 3.841^2$

$$n = \frac{3.841^2 \times 1000 \times 0.5 \times 0.5}{0.05^2 \times (1000 - 1) + 3.841^2 \times 0.5 \times 0.5} = \frac{960.250}{3.46025}$$

= 277 participants

While 10% attrition rate will be allowed:  $5/100 \times 277 = 14$

Therefore, total =  $277 + 14 = 291 \sim 300$  participants

Therefore, desired sample size = 300.

The sample size of each school = Average population for each school (250) / Total population of the four schools (1000) x desired sample size (300)

Thus,  $\frac{250}{1000} \times 300 = 75$ ; Thus the 4 schools sample size =  $75 \times 4 = 300$

### Sampling Technique

A multi-stage sampling technique in 3 stages was used as follows:

**Stage 1:** Four senior secondary schools in Bariga Local Council Developing Area (LCDA), Shomolu LGA, from 3 out of 6 districts were selected purposively based on the following criteria.

- The senior secondary school must have at least 250 respondents in case some participants for the study decided to withdraw;
- Availability of the students to participate in the survey study.

**Stage 2:** Systematic sampling technique (Osuala, 2001). was used to select students from the four senior secondary schools. A sample interval (K) of 5 was calculated ( $K = N/n = 1000/300 = 3$ ). Thus, on each visit to a class in the school, random sampling technique (balloting) was done to select the first sample unit among the first 3 students in the class and subsequent students were selected at intervals of 3. The selected students who did not meet the eligibility criteria were skipped and the students who were eligible were chosen until seventy-five (75) students from each of the secondary schools were selected, giving the grand total of three hundred (300) senior secondary school students.

### Research Instrument

The instrument: Students' Hand Washing Questionnaire (SHWQ) was used in collecting for this study. It is a validated instrument and a structured questionnaire developed by the researcher. The items of the questionnaire consisted of responses designed to answer research the questions and to test the research hypotheses. The items are based on psychometric scale used to gauge the hand hygiene compliance of the senior secondary school students and its effect on their health status, in Bariga Lagos. SHWQ has 16 items with four-option responses, with rating scales of 4,3,2,1 for



responses as follows: Never = 1, Sometimes = 2, Often = 3, Always = 4. Copies of the questionnaire were administered to the respondents to fill out and these were retrieved immediately on completion.

### Validity and Reliability of the Instruments

The instruments were reviewed by experts for content and face validity; and trial tested in a senior secondary school in Akoka Yaba, Lagos, using 10 respondents who were not from the senior secondary schools of the main study. The internal consistency of the instrument was ascertained through Cronbach Alpha method, and gave a coefficient value of 0.73.

### Data Analysis

In the analysis of the study data, the Statistical Packages for Social Science (SPSS) version 22 and descriptive statistics of frequency count and percentage were used. Pearson correlation coefficient and multiple Regression correlation statistics were used to analyze the data collected in order to test the hypotheses raised in this study, at 5% level of significance.

### Results

The result is presented according to the research question and hypothesis that guided the study.

**Research Question:** Will students' hand washing compliance have impact on their health status?

A total of 280 senior secondary school students completely filled out the questionnaire and with the returned rate of 93%. The participants' age mean was 16.74 years. 10.7% of the respondents were Islam, 85.7% were Christians while 3.6% professed no religion.

**Table 1: Hand Hygiene Compliance and Student Health Status**

S/N	Response	Never	Sometime	Often	Always
	<b>Variables</b>				
1.	I wash my hand after toilet	-	94 (33.6%)	-	186 (66.4%)
2.	Before and after eating, hands need to be washed	18 (6.4%)	84 (30%)	40 (14.3%)	138 (49.3%)
3.	I never wash hand under running water	116 (41.4%)	102 (36.4%)	24 (8.6%)	38 (13.6%)
4.	I use soap to wash my hand	82(29.3)	88(31.4)	98(35)	12 (4.3)
5.	I wash my hands as soon as I get home	86 (30.7%)	88 (31.4%)	56 (20%)	50 (17.9%)
6.	Touching of any surface does not necessary contaminate my hand.	62 (22.1%)	164 (58.6%)	28 (10%)	26 (9.6%)
7.	I adhere to correct hand hygiene practices at all times	-	130 (46.4%)	58 (20.7%)	92 (32.9%)

8.	I wash my hand only once daily	96 (.3%)	102 (36.4%)	50 (17.9%)	32 (11.4%)
9.	Sometimes I have more important things to do than hand hygiene	68 (24.3%)	90 (32.1%)	66 (23.4%)	56 (20.0%)
10	I am reluctant to ask others to engage in hand washing	64 (22.1%)	110 (39.3%)	62 (22.1%)	44 (15.7%)
11	Hand hygiene is an essential part of my role.	28 (10.0%)	128 (45.7%)	34 (12.1%)	90 (32.1%)
12	Infection prevention team have a positive influence on my hand washing	16 (5.7%)	48 (17.1%)	28 (10.0%)	188 (64.1%)
13	Hand hygiene prevention notice boards remind me to wash hand.	16 (5.7%)	46 (16.4%)	82 (29.3%)	136 (48.6%)
14	It is difficult for me to attend hand washing course due to time pressure	82 (29.3%)	142 (50.7%)	12 (4.3%)	44 (15.7%)

Table 1 showed that 33.6% of the respondents said that sometimes they washed their hands after toilet while 66.4% said they always washed. This implies that majority of the respondents wash their hands always after toilet. 14.3% often, 49.3% always while 6.4% never washed their hands before and after eating. Again, 41.4% of the respondents reported that they never washed their hands under running water, 36.4% sometimes, 8.6% often while 13.6% always. It was further observed from the above table that 29.3% of the respondents never used soap to wash their hands, 31.4% sometimes, 35% often while 4.3% always. Most of the participants (30.7%) never washed their hands as soon as they get home, 31.4% sometimes, 20% often while 17.9% always. Thus, the majority of the respondents sometimes wash their hands as soon as they get home.

Result shows that 22.1% of the respondents never feel that touching of any surface does not necessarily contaminate their hand, 58.6% reported sometimes, 10% often while 9.3% reported always. While 46.4% of them sometimes adhere to correct hand hygiene practices at all times, 20.7% often while 32.9% always. Thus, majority of the respondents said sometimes that they adhere to correct hand hygiene practices at all times. 34.3% of the respondents never wash their hand only once daily, 36.4% reported sometimes, 17.9% often while 11.4% always.

### Research Hypothesis

There is no significant impact of hand hygiene compliance on health status of students.



**Table 2: Results of Two-Tailed Pearson Correlations Matrix of the Relationship between Independent (Hand Hygiene) and Dependent Variables, (Health Status) N = 280.**

Variables	Pearson Correlation	N	Significant Level
Hand hygiene compliance	0.943	280	-0.004

Health status of students

\*\* . Correlation is significant at the 0.05 level (2-tailed).

The hypothesis from table 2 above shows that there is significant influence of hand hygiene compliance on health status of students with the significant value of (0.004) and Pearson moment correlation value (0.943). Hence, the null hypothesis (Ho) was rejected while the alternate hypothesis (Hi) was accepted and thereby concludes that there is significant impact of hand hygiene compliance on health status of students.

**Table 3a: The impact of hand hygiene on health status of the senior secondary school students.**

Model Summary <sup>b</sup>					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.098 <sup>a</sup>	.010	.016	.943	2.295

- a. Predictors: (Constant), Hand hygiene compliance,
- b. b = Dependent variable : Health status of students

**Table 3b: Coefficients**

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.089	.157		19.675	.000
	Hand hygiene compliance	.067	.041	.098	1.634	.000

- a. Dependent Variable: Health status of students

From Table 3a & b above, the model was estimated and shows that there is a significant Hand hygiene compliance = 3.089 - 0.067 on health status of students. However, the analysis for the of regression correlation coefficient shows that a unit increase in hand hygiene compliance will lead to increase in the health status of students by 0.067. Indeed, the R-squared value of 0.016 reveals that 16% of the factors put under consideration was responsible for health status of students while other factors representing (84%) not considered among the variables were responsible for the remaining

factors. More so, with the Durbin Watson value of 2.295 means that there is presence of auto correlation. This supported the information collected previously with Pearson correlation in table 2 at five per cent significance level. It was revealed from the analysis that there is significant impact of hand hygiene compliance on health status of students.

## **Discussion**

### **Hand Washing Compliance on Health Status of Senior Secondary School Students in Bariga, Lagos**

In Table 1, it was observed that vast majority of the respondents always washed their hands before and after eating. Again, 41.4% of the respondents reported that they never washed their hand under running water, which is consistent with previous studies (Scott, Curtis, Rabie, Garbrah-Aidoo, 2007; Lopez-Quintero, Freeman, Neumark 2009). It was also observed that just before eating, after using toilets and after playing were the major episodes when the students washed their hands. It is clear that hand washing is the simplest cost effective health prevention technique of any micro-organisms (WHO, 2009 and CDC, 2017). Poor hand washing behaviour was also observed in majority of the senior secondary students, who already have good background knowledge of hand washing.

Furthermore, in the table, 29.3% of the respondents said that they never used soap to wash their hand, 31.4% said sometimes, 35% said often while 4.3% said always. A great proportion of the study population used soap. Also, adequate hand hygiene is a great deterrent to the spread of gastro intestinal and respiratory tract infections in children, especially when antibacterial agent and soap are applied under running water for effective removal of germs (microorganisms) from the hands. Previous studies have shown that using soap or sanitizer in hand washing is hallmark for infection control practices, which in turn reduces the absenteeism in the schools (Yalcin, Yalcin & Altin; 2004, Aiello, 2008, IngeNandrup-Bus 2009, Kinley Britt, 2011, Mohammed, Nihar, Bashayer, Hiba, Rasha, & Zaid Al Saheli, 2016). Nair, Hanunattappa, Hiremath, Swa and Raghumath Pooja (2014) stressed that obviously, WHO guideline for hand washing must be a hallmark for infection control practices. Most of the participants (30.7%) said that they never washed their hands as soon as they get home, whereas 69.3% of participants wash their hands as soon as they get home. Okuneye (2013) sees hand washing is very important practice in which school should always be encouraged for students to engage. 22.1% of the respondents never feel that touching of any surface does not necessarily contaminate their hand, 58.6% reported sometimes, 10% often and 9.3% always. Again, 46.4% of them responded sometimes they adhered to the correct hand hygiene practices at all times, 20.7% often, while 32.9% reported always. Thus, majority of the respondents sometimes adhered to correct hand hygiene practices at all times. 34.3% of the respondents never wash their hand only once daily, 36.4% said sometimes, 17.9% said often while 11.4% said always. This implies that majority of the respondents said that sometimes they washed their hand only once daily. Hence, critical times for hand washing include after using the toilet and before handling food, (Master, Longe & Dickson, 1997, Scott BRT, 2007, WHO, 2004 & Suresh Lal, 2008).

Findings obtained from the data analysis using Pearson correlation coefficient (Table 2), revealed a significant influence of hand hygiene compliance on health status of students, with the significant value of (.004) and Pearson moment correlation value (.943). Hence, the null hypothesis



( $H_{01}$ ) was rejected while the alternate accepted.

This finding is in agreement with studies of Ahmad Rimamchika, Ibrahim, Nnanubumom, Godiya, and Emmanuel (2013) and Alwashali, Slim, Jghalef, EL Far, & Fadli, (2014), Emmanuel, Akpabio & Eti-ido and Udofia (2017) who showed that some socio-economic factors related to provision of functional hand washing infrastructure and services, including enforcement of standard practices in an open space environment, with greater interest in the category of users, account for excellent hand hygiene compliance. Therefore, students should be encouraged and strengthened towards ensuring adequate health promotion, through proper hand washing measures.

## Conclusion

This study has established that hand hygiene compliance has a great impact on health status of senior secondary school students. It identified factors which affect students' health in schools, including inadequate government support on hygiene maintenance and lack of needed hand washing facilities. Provision of environmental education to students will enhance hygiene improvement. The government support for various schools are essential for sustainable hygiene maintenance for teachers' and students' health promotion.

## Recommendations

There should be adequate training of teachers and students on hygiene maintenance in school. A particular day should be set aside each term for school environmental programme designed to observe hygiene sanitation and hand washing practice, in line with World Hand Hygiene Compliance guideline.

Environmental Education should be introduced in Secondary schools to improve attitudes of students towards environmental care and hygiene maintenance. Government-NGO (non-governmental organizations) collaboration may also prove to be effective on hand hygiene compliance especially with World Health Hand Washing Guideline in schools and in achieving Sustainable Goal 3 on good health and wellbeing.

## Limitation of the Study

Due to the nature of the distance of the schools, the researcher was unable to get access to other local government areas. The assessment of the hand hygiene compliance was carried out only in four senior secondary schools in Shomolu local government area of Lagos State, and therefore the result of this study may not be generalised for all secondary schools in the State.

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