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Improving Hand Hygiene Compliance among Health Education Students of Ambrose Alli University, Ekpoma, Edo State, Nigeria

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***Abstract*— This study assessed improving hand hygiene compliance among health education students of Ambrose Alli University, Ekpoma, Edo State, Nigeria. Three research questions and one hypothesis guided the study. This study is a descriptive survey design. 200 education students of which all was Health Education in Ambrose Alli University, Ekpoma, Edo State was sampled out of the entire 4,987 population Faculty of Education students through a simple random technique. A questionnaire titled: Improving Hand Hygiene Compliance (IHHC) was used. Data collected were analyzed. The findings revealed that there was high level of compliance to hand hygiene among students; Health Education students had positive attitude and knowledge on hand hygiene compliance and there was no significant difference on the attitude and knowledge of male and female Health Education students hand hygiene compliance. Based on the findings of the study, the following recommendations were made; improved hand hygiene practice needs a multifaceted approach involving both individual and facility factors. This should include improved training programs and ongoing staff development. Most importantly, patients should be empowered to monitor those employed in their care. Poor or insufficient access to hand hygiene facilities also need to be addressed.**

***Index Terms*— Improving, Hand Hygiene, Compliance, Health Education Students.**

I. INTRODUCTION

Hand hygiene is an important healthcare issue globally and is a singe most cost-effective and practical measure to reduce the incident of associated infections and the spread of antimicrobial resistance across all settings from advanced health care system to primary healthcare centers (Mathur, 2011). In order word, it also helps to prevent several transmitted disease and promotion of a healthy life among individuals in the society. Most times, these infections are the most common adverse events resulting to stay in the hospital especially those connected to health job. In spite of been a very smile action, compliance with hand hygiene among health students is as low as less than 40% (Longtin, Sax, Allegranzi, Schneider and Pittet, 2014). To address this problem of lack of compliance with hand hygiene, continuous efforts are being made to identify effectiveness and sustainable strategies. One of such efforts is the introduction of an evidence-based concept of " My five moment for hand hygiene" by World Health Organization. These five moments that call for the use of hand hygiene include the moment before touching a patient, before performing aseptic and clean procedure after being at risk of exposure to body fluids, after touching a patient, and after touching patient surroundings. This concept has been aptly used to improve understanding, training, monitoring and reporting hand hygiene among health students and among healthcare workers in general (Sax, Allegranzi, Uckay, Larson, Boyce and Pittet, 2007).

In spite of the fact that some recent research has recommended more cautious approach in the universal adoption of this concept (Chou, Achan and Ramachandran, 2012). Another strategy is to ensure proper education of the trainee healthwork force, and in this regard, multiple studies have been conducted to study the hand hygiene practice of nursing and medical students. Such studies are important as students in their clinical training phase throng the healthcare facilities can be potentially transmit infections besides being the healthcare providers of future when their pattern of training will reflect on their infection control practices. Snow (2013) found the medical students to have a low rate of hand hygiene. Mortel (2012), found the nursing students' hand hygiene knowledge and self-reported practices to be significantly better than that of medical students. Studies have been conducted in various parts of Nigeria to study hand hygiene practices in certified healthcare providers (Qushmaq, Heels-Ansdell, Cook, Loeb and Meade, 2008), but only one significant study has been undertaken where medical students were also evaluated (Bukhari, Hussain, Banjar, Almaimani, Karima and Futani, 2012). But in one of these studies WHO' s concept of " My five moments for hand hygiene" has been utilized to evaluate hand hygiene practices. Hence, the WHO' s concept was made the basis of the present study to evaluate hand hygiene awareness and compliance among undergraduate health students.

Hand hygiene is a milestone of infectious disease control, and promotion of improved hand hygiene has been recognized as an important public health measure (Scheithauer, Haefner and Schwanz, 2013). It has been long gone to be a convenient, effective and also cost-effective means of preventing communicable diseases. According to the definition of World Health Organization, hand hygiene is a general term referring to any action of hand cleansing i.e. it is the act of cleaning ones hand with or without the use of water or another liquid, or with the use of soap, for the purpose of removing soil, dirt and/or microorganisms (WHO, 2007). A causal link between hand hygiene and rates of infectious disease illness has also

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been established earlier. Globally, >3.5million children younger than 5 years, (WHO, 2007) mainly concentrated in developing countries including Bangladesh, die from diarrhea and acute lower respiratory tract infections.

The transmission of communicable diseases is responsible for >164 million lost school days per school year among students up to twelfth grade worldwide. Approximately 2.4 million deaths can be prevented annually by good hygiene practice, reliable sanitation and drinking water (Mittal, Morris and Kelz, 2011). A meta-analysis on 30 hand hygiene studies found that improvement in hand-washing reduced the incident of upper respiratory tract infections by 21% and gastrointestinal illnesses by 31%. Another evidence showed that hand-washing with soap could reduce the risk of diarrheal diseases by 42%-47%, and hand-washing promotion could save a million of lives. (Mittal, Morris and Kelz, 2011).

Also, hand hygiene has been identified as the simplest and the most cost effective method of preventing most common infections that cause mortality and morbidity in human population. Hand hygiene is a general term that applies to hand-washing, antiseptic hand-washing, alcohol based hand rub or surgical hygiene/antiseptic (Curtis and Cairncross, 2003; Uneke, Ndukwe, Oyibo, Nwakpu, Nnabu and Prasopa-Plaizier, 2014). Hand-washing which is the easiest and commonest among these hand hygiene practices refers to washing hand with plain soap and running water and remains the most sensible and affordable strategy for hand hygiene among the general population.

Studies in Nigeria Universities have shown that the level of knowledge of students was improved through education. Information on hand washing with soap is one source of knowledge among efforts made to enhance knowledge and practices of students. Improvement of knowledge regarding hand washing and frequency of hand washing practice and after the intervention was high like 42% of students shared the information they got with their parents before gaining admission and also at their tender age. The intervention proved effective in improving awareness and highlights the potential of school for hand washing promotion activities (26). Parents were the most frequent source of information on hand washing (91.86%), followed by health workers (50.0%), teachers (34.9%) and friends (2.3%) in Indonesia (Larson, 2012).

Study from on effectiveness of hand hygiene teaching on knowledge and compliance of hand washing among students at a selected school in Northern parts of Nigeria shows that promotion of hand washing increase in knowledge after provision of education. During the pretest, two (10%) students had moderately adequate knowledge and 18 (90%) students had inadequate knowledge and in the pretest, 13 (65%) of the students had adequate knowledge and seven (35%) had moderately adequate knowledge on hand hygiene. There was a highly significant difference in the mean value of knowledge between the pretest and the post-test at $p<0.001$ level (Larson, 2012). Studies from Vietnam and Peru indicated their school children understood how to prevent communicable diseases like diarrhea, bellyaches; and the flu through washing their hands using clean water and soap (34).

In South Africa, the level of knowledge about waterborne diseases was relatively high (76.7=1.75%), but knowledge on transmission routes was inadequate. The study also revealed that majority of the respondents had no knowledge when it comes to water-based diseases and their prevention (78.4=1.71%) (Larson, 2012).

In Angolale, Northern Shoa of Ethiopia, study conducted of KAP assessment of school children on hygiene about 5% of students were classified as having adequate knowledge of proper hygiene and the importance of hand washing after defecation was reported by 76.6% of students but actual practice was only 14.8% (Abd Elaziz, Bakr, 2011). School based hand washing promotion program on knowledge and hand washing behavior of under-graduates girls students in Southern part of Nigeria showed that after the program intervention, 95% of the girls felt that hand should be washed frequently. Study conducted in South Africa, revealed that the level of attitude on hygiene was high (91.4=1.16%).

According to study conducted also in Nigeria having the habit of hand washing at particular junctures during the day, the motivated need for personal or household cleanliness, and lack of cognitive concern about the cost of soap use are all related with hand washing behavior in Nigeria. These factors each represents a different kind of psychological cause. A perceived link between clean hands and sexual attractiveness also appeared in the factor analysis, but was not a determinant of actual behavior (Abd Elaziz, Bakr, 2011). Studies in Northern Ethiopia on knowledge, attitudes and practices of hygiene among school children showed that overall, the preference for hand washing was 98.8% before meals and 53.1% meals.

Study factors influencing knowledge and practice of wash program area in Nigeria indicate that washing hands specifically using soap after defecation was found to be a common practice among the study participants. Another study conducted in Vietnam on hand washing among school children indicated that the most common time for hand washing was before eating (60%) but only 23% of school children reported HW after defecation and very few did before cooking. Only four children reported to hand washing at all critical times (before cooking, after defecation and before eating). The same study showed 66% report of HWWS. However, through the demonstration protocol, only 10 out of 319 school children performed HWWS satisfactorily. The percentage of students who washed their hands at recommended times (30-60 sec) was 58%. This proportion increased by grade from 34% from grade 1 to 67% among grade 7. Correlates of self-reported HWWS were more common in higher grades (grade 4 vs grade 1: odds ratio (OR) = 4.14 (2.00-8.36), grade 7 vs grade 1: OR=0.28 (Abd Elaziz, 2011).

Studies in South Africa revealed that washing of hands between the urban and rural schools was variable, 70.3% (urban) and 29.7% (rural), but was above 65% with the schools (rural and urban). Those who practiced hand washing pointed out that they did mostly before eating and after visiting the toilet. This practice was mostly affected by the fact that water was not always available in some rural schools (Salami, Canola and Gek, 2012).

According to study in Ghana on hand washing, practice among school children from those who visit school toilets majority (90.2%) of students practiced hand washing with soap after defecation. Private schools were found to be 63% (P=0.02) less likely to wash their hands with soap after eating compared to their public school counterparts (36%). According to study in Egypt, even doctors showed greater (37.5%) compliance on hand washing than other HCW, still only 11.6% did it in an appropriate way in Cairo (Salami, Canola and Gek, 2012).

Study in Northern Ethiopia on knowledge, attitudes and practice on hygiene among school children show that nearly all participants reported washing their hands the day before the interview (98.7%) but only (32.2%) of the children reported using soap. The students washed their hands before meals and 46% washed after defecation. The majority of the participants reported usually washing hands before and after meals (99.4% and 93.9%) respectively (Pataraka, 2010).

According to study done in Babile town on prevalence of intestinal helminthic infections and associated risk factors among schools children from the study participants four hundred and eight (98.3%) of the children regularly practiced hand washing before meals, but 67 (16.1%) of them did not know the purpose. Two hundred and seventy-one (65.3%) and three hundred and two (302) (72.8%) of the children did not trim their and left-hand fingernails, respectively. Two hundred and eighty-nine (64%) of the children had dirt in their right-hand fingernails, and all of them were right-handers.

Prevention of infectious disease has become one of the daunting challenges facing developing countries all over the world in varying degrees. One area of special concern is the control of disease in school population where students live in very close proximity with each other. One of the most important vehicles of transmission of disease in such environment is the hand, spelling the need for appropriate hand hygiene. The hand readily becomes contaminated from so many activities like using the toilet, changing a baby' s diaper (nappy), handling raw food, playing, shaking hands, cleaning, after handling pets and domestic animals, after wiping or blowing the nose or sneezing into the hands and after caring for an infected person. In such critical moments, hand hygiene especially hand-washing with soap and running water has been significantly proven and recommended as a cost effective and high impact intervention in reducing morbidity and mortality due to infectious diseases.

Despite the proven importance and benefits of washing hand, proper hand-washing is not as pervasive as desired to prevent infections until now, especially in the developing countries that bears the greatest burden of infectious diseases. A survey undertaken in some Northern University in Nigeria indicated that hand-washing practice with soap before eating was much lower than after defecation and a gap persists between perception, compliance and practice of proper hand-washing practice with soap.

However, studies on improving hand hygiene compliance among health education students of Ambrose Alli University, Ekpoma, Edo State and Nigeria in general are lacking; hence, a knowledge gap exist which this study sought to fill by:

1. assessing the level of compliance to hand hygiene among students.
2. assessing the attitude and knowledge of Health Education students' hand hygiene compliance.
3. ascertaining if there is any difference on the attitude and knowledge of male and female Health Education students on hand hygiene compliance.

1. *Research Questions*

The following research questions guided the study:

1) What is the level of compliance to hand hygiene among students?
2) What is the attitude and knowledge of Health Education students hand hygiene compliance?
3) Is there any difference on the attitude and knowledge of male and female Health Education students on hand hygiene compliance?

2. *Research Hypothesis*

The hypotheses were formulated and tested in the study:

1) There is no significant difference on the attitude and knowledge of male and female Health Education students on hand hygiene compliance.

II. METHODS

This study is a descriptive survey design. It is a descriptive survey design because it afforded the researcher the opportunity to use a sampled population which can be used to make a generalization. The population of the study was all students of Ambrose Alli University, Ekpoma, Edo State. But because it was not possible to study the entire population under investigation, the population was limited to students of Faculty of Education with a total number of four thousand nine hundred and eighty seven (4,987) students as stated from the Student Statistics Bulletin for the year 2017/2018 academic session. 200 education students of which all was Health Education in Ambrose Alli University, Ekpoma, Edo State was sampled out of the entire 4,987 population Faculty of Education students through a simple random technique. A random sampling technique is adopted to ensure equal chance of any of both male and female students in the selected department of the Faculty of Education, Ambrose Alli University, Ekpoma, Edo State.

The instrument used was questionnaire titled: Improving Hand Hygiene Compliance (IHHC) which was divided into two sections. The first section collected teachers' bio-data, while Section B was on improving hand hygiene compliance. The questionnaire comprised 20-items.

The instrument was validated by experts in the Faculty of Education of Ambrose Alli University, Ekpoma. The instrument was trail, tested on a pilot group of 20 respondents within the study population. The test-retest reliability technique will be used to determine the internal consistency of the questionnaire items and the reliability. The Pearson' s Product Movement Correlation coefficient will also be employed to determine the reliability coefficient if a result of 0.75 or higher is obtained, the data will be adjudged to be suitable for use. Thereafter, the researchers administered the questionnaire to the respondents. Research question 1 & 2 were analysed using frequencies and percentages while the research hypothesis was tested using t-test of independent.

III. Results

Data are presented below:

Research Question 1: What is the level of compliance to hand hygiene among students?

Answer to research question one is presented in the table below:

OPTIONS	RESPONDENTS	PERCENTAGE %
SA	94	47%
A	69	34.5%
U	-	-
D	30	15%
SD	7	3.5%
Total	200	100%

Source: *Field Survey, 2018.*

Result in the table above revealed that 94 which is 47% of students strongly agreed that there is a high level of compliance to hand hygiene, 69 (34.5%) agreed while 30 (15%) disagreed with opinion and 7 (3.5%) strongly disagreed. This implies that there was high level of compliance to hand hygiene among students

Research Questions 2: What is the attitude and knowledge of Health Education students hand hygiene compliance?

Answer to research question one is presented in the table below:

OPTIONS	RESPONDENTS	PERCENTAGE %
SA	75	37.5%
A	86	43%
U	11	5.5%
D	29	14.5%
SD	-	-
Total	200	100%

Source: *Field Survey, 2018.*

The result in the table above showed that 75 (37.5%) strongly agree that attitude and knowledge of Health Education students hand hygiene compliance are relatively high and encouraging, 86 (43%) agree, 11 (5.5%) are undecided while 29 (14.5%) disagree with this opinion. This clearly indicated that Health Education students had positive attitude and knowledge on hand hygiene compliance.

The result in the hypothesis is presented below:

Hypothesis 1: There is no significance difference on the attitude and knowledge of male and female Health Education students hand hygiene compliance

Table 1: t-test summary analysis of difference on the attitude and knowledge of male and female Health Education students hand hygiene compliance

Variable	N	Mean	SD	Df	t-cal	t-crit	Remark
Male	98	2.04	1.74	498	2.85	3.08	H_o
Female	102	2.01	1.71				Retained

The result in the table above showed that the calculated t-value of 2.85 was less than the t-critical value of 3.08 at 0.05 level of significance. Hence, the null hypothesis was retained. This implies that there was no significant difference on the attitude and knowledge of male and female Health Education students hand hygiene compliance.

IV. Discussions

The result from research question 1 revealed that 94 (47%) strongly agree that there is a high level of compliance to hand hygiene among students, 69 (34.5%) agree while 30 (15%) disagrees with the opinion and 7 (3.5%) strongly disagree. Also, result from research question 2 shows that 75 (37.5%) strongly agree that attitude and knowledge of Health Education students hand hygiene compliance are relatively high and encouraging, 86 (43%) agree, 11 (5.5%) are undecided while 29 (14.5%) disagree with this opinion. This finding accord with the study of Mathur (2011) who stated that hand hygiene is an important healthcare issue globally and is a singe most cost-effective and practical measure to reduce the incident of associated infections and the spread of antimicrobial resistance across all settings from advanced health care system to primary healthcare centers. In order word, it also helps to prevent several transmitted disease and promotion of a healthy life among individuals in the society. Most times, these infections are the most common adverse events resulting to stay in the hospital especially those connected to health job.

Also, Scheithauer, Haefner and Schwanz (2013) opined that hand hygiene is a milestone of infectious disease control, and promotion of improved hand hygiene has been recognized as an important public health measure. It has been long gone to be a convenient, effective and also cost-effective means of preventing communicable diseases. Most of the respondents rated high compliance in the study area. This findings are in contradiction to the study of Longtin, Sax, Allegranzi, Schneider and Pittet (2014), they stated that in spite of been a very smile action, compliance with hand hygiene among health students is as low as less than 40%. Despite the proven importance and benefits of washing hand, proper hand-washing is not as persuasive as desired to prevent infections until now, especially in the developing countries that bears the greatest burden of infectious diseases. To address this problem of lack of compliance with hand hygiene, continuous efforts are being made to identify effectiveness and sustainable strategies. One of such efforts is the introduction of an evidence-based concept of " My five moment for hand hygiene" by World Health Organization. These five moments that call for the use of hand hygiene include the moment before touching a patient, before performing aseptic and clean procedure after being at risk of exposure to body fluids, after touching a patient, and after touching patient surroundings.

The result in the table above showed that 75 (37.5%) strongly agree that attitude and knowledge of Health Education

students hand hygiene compliance are relatively high and encouraging, 86 (43%) agree, 11 (5.5%) are undecided while 29 (14.5%) disagree with this opinion. This clearly indicated that Health Education students had positive attitude and knowledge on hand hygiene compliance. This finding was in agreement with Larson, (2012) who investigated on effectiveness of hand hygiene teaching on knowledge and compliance of hand washing among students at a selected school in Northern parts of Nigeria. It was found that promotion of hand washing increase in knowledge after provision of education. During the pretest, two (10%) students had moderately adequate knowledge and 18 (90%) students had inadequate knowledge and in the pretest, 13 (65%) of the students had adequate knowledge and seven (35%) had moderately adequate knowledge on hand hygiene. There was a highly significant difference in the mean value of knowledge between the pretest and the post-test at $p<0.001$ level.

However, the result in the hypothesis reveals that there is no significant difference on the attitude and knowledge of male and female Health Education students hand hygiene compliance. This finding is in line with the study of Mortel (2012) who found nursing students' hand hygiene knowledge and self-reported practices to be significantly better than that of medical students. Studies have been conducted in various parts of Nigeria to study hand hygiene practices in certified healthcare providers. On the other hand, hand hygiene has been identified as the simplest and the most cost effective method of preventing most common infections that cause mortality and morbidity in human population. Hand hygiene is a general term that applies to hand-washing, antiseptic hand-washing, alcohol based hand rub or surgical hygiene/antiseptic (Curtis and Cairncross, 2003; Uneke, Ndukwe, Oyibo, Nwakpu, Nnabu and Prasopa-Plaizier, 2014). Hand-washing which is the easiest and commonest among these hand hygiene practices refers to washing hand with plain soap and running water and remains the most sensible and affordable strategy for hand hygiene among the general population.

V. Conclusions

Based on the findings of the study, the researchers concluded that hand hygiene has a significant impact in the prevention of infection among students. It also showed that the level of compliance to hand hygiene among students was significantly high. Most of the respondents rated high compliance in the study area. Also, there is no significant difference on the attitude and knowledge of male and female Health Education students on hand hygiene compliance. The knowledge and attitude about hand hygiene amongst students was good. However, the practice of hand hygiene was only fair.

VI. Recommendations

Based on the findings, the researchers recommended that improved hand hygiene practice needs a multifaceted approach involving both individual and facility factors. This should include improved training programs and ongoing staff development. Most importantly, patients should be empowered to monitor those employed in their care. Poor or insufficient access to hand hygiene facilities e.g. running water, sink availability, antiseptic soaps or alcohol hand-rubs products, hand paper towel, also need to be addressed, together with work related factors such as understaffing and time management.

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