



# Hand Washing Hygiene, Sanitation and Sustainable Development Goals in Umuahia North Local Government Area, Abia State, Nigeria

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## Abstract

A study on practices of hand washing hygiene, sanitation and sustainable development goals (SDGs), was carried out in Umuahia North local government area of Abia state, Nigeria, to investigate the causes of outbreaks of health care-associated infections (HCAIs). Questionnaires made up of 25 attributes were distributed to health care workers (HCWs) to elicit from them their perception of these practices in their units. Complete responses came from 63 respondents which represented 79.75% of questionnaires distributed. The 5-point Likert scale was used in measuring the relative impact indices (RIIs) of not observing health care rules. About 42 of the respondents (66.67%) fall within the low region of RII, 19 respondents (30.10%) belong to the moderate region of RII, while 2 respondents (3.33%) fall in high region of RII. Information from 96.77% of the respondents indicated that hand washing hygiene and sanitation is poorly practiced. Rank ordering of relative observance indices (ROIs) showed that of the 25 attributes used in the study, 16 fall in the principal negative variables (Type 3), 5 of the attributes fall in the moderately negative variables (Type 2), while 4 fall in the relatively acceptable variables (Type 1), evidencing that 84% of the attributes are poorly practiced by HCWs. This situation impacted on the achievement of SDG3 and SDG6. It is concluded that these are the reasons for outbreaks in the area and it is recommended that government should educate HCWs on the observed risk factors for poor adherence to recommended hand hygiene practices.

**Keywords:** Hand washing, Hygiene, Sanitation, Sustainable development goals, Abia state

## 1.0 INTRODUCTION

Thousands of people die every day around the world due to infections gotten in the process of receiving treatment in health care centers. The major pathways of pathogenic organisms into the body systems during health care are through the hands. Unclean or soiled hands transmit infections in a community as well as in the hospital settings [1]. Hand hygiene is important because, pathogenic organisms that cause health care-associated infections (HCAIs) can be transmitted on the hands of health care workers consequently giving rise to one out of every twenty patients having HCAI [2-4].

In developed countries, HCAI concerns 5-15% of hospitalized patients and can affect 9-37% of those admitted to intensive care units (ICUs) [5, 6]. Recent studies conducted in Europe reported hospital-wide prevalence rates of patients affected by HCAI that ranged

from 4.6%-9.5% [7, 8]. The risk for patients to develop surgical site infection (SSI), the most frequently surveyed type of HCAI in developing countries, is significantly higher than in developed countries. For instance, it is 30.9% in a pediatric hospital in Nigeria, 23% in general surgery in a hospital in the United Republic of Tanzania and 19% in a maternity unit in Kenya [9-11].

It has been reported that in terms of destruction of pathogenic organisms in order of effectiveness, of the three hand hygiene methods available, washing the hands with plain soap is the least effective. Antimicrobial soap tend to be more effective while alcohol-based hand-rub is the most effective [12, 13]. In the European Union, for example, about 16 million people, however, still lacked access to basic drinking water service. This people must rely on water that is prone to microbial contamination, the 3 million who rely on surface water for direct consumption [14]. For the upper-middle-income and lower-middle-income countries, only 38% and 28%, respectively, of wastewater is treated and a substantial part is released to the environment without treatment [15]. The developing world is riddled with social inequalities, including unequal access to sanitation [16]. In India, for example, the poorest wealth-quintile received only 3% of the sanitation

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improvements made during 1995-2008, whereas the two highest wealth-quintiles together received fully two-thirds of the improvements [17].

The “Sustainable Development Goals” (SDGs) are a set of global goals for fair and sustainable health at every level: from planetary biosphere to local community. The aim is to end poverty, protect the planet and ensure that all people enjoy peace and prosperity, now and in future. There are 17 sustainable development goals but for the purpose of this study, emphasis was laid on; good health and well-being (SDG 3), and clean water and sanitation (SDG 6). It is important to note that SDG3 and SDG6 cannot be achieved without hand washing hygiene and sanitation practices by observation of HCAI rules.

There have been incessant cases of health care-associated infections in Umuahia North local government area of Abia state, Nigeria. It is known that HCAs happen as a result of poor practices of hand washing hygiene and sanitation, which consequently affected realization of SDG3 and SDG6 in this community. Therefore, this study critically investigated this situation.

## 2.0 METHODOLOGY

The research reported here was carried out in Umuahia North local government area of Abia state, Nigeria. The data for the study were collected using a survey design which included the administration of questionnaires to respondents in 20 hospitals within the study area. The respondents were the health care workers such as doctors, matrons, nurses, ward maids, medical laboratory scientists and radiologists, making a total of 2548 respondents. The questionnaire sought to elicit from the respondents their perception of level of not observing hand washing hygiene, sanitation and sustainable development goals in their respective health care units. The questionnaire instrument was based on 25 variables of health care-associated infections (HCAI) and sustainable development goals SDGs, all based on open-ended questions. The respondents were required to scale their perceptions of the degree of impact of not observing hand washing hygiene, sanitation and sustainable development goals based on the 25 attributes on a 5-point Likert scale corresponding to “5”, for excellent, “4”, for very good, “3”, for good, “2”, for fair and “1” for poor.

### 2.1 Data Analysis

#### 2.1.1 Computation of Relative Impact Indices (RIIs)

RIIs were computed from the relationship;

$$RII_i = \frac{\sum_{i=1}^N l_i}{\sum_{i=1}^N I_i} \times 100 \quad (1)$$

Where  $RII_i$  represents the relative impact index for health care and SDG rules;  $N$  is the number of variables for measuring impact of not observing HCAI and SDG,  $l_i$  stands for the actual score by a respondent on each attribute and  $I_i$  represents the maximum or potential score that each variable could have.

Three categories of impacts were used for inference. RIIs below 60% were classified in the low impact region; 60-79% RIIs were classified as having moderate impact level; while 80% RII and above were referred as having high relative impact due to inobservance of rules to mitigate HCAI.

#### 2.1.2 Source of Observance and Inobservance

Equation (1) treated all the variables holistically, such grossness masks the contribution of each variable's contribution to mitigation of impacts related to HCAI in the community due to laissez-faire attitude of health care workers (HCWs). Here, the degree by which each attribute is observed during health care services is measured so that hospitals management can be properly advised. This takes us to the relative observance index of an attribute (ROIA) given by the expression;

$$ROIA_x = \frac{\sum_{i=1}^N o_{ix}}{\sum_{i=1}^N O_{ix}} \times 100 \quad (2)$$

where  $ROIA_x$  is the relative observance index of variable “x”;  $N$  is the number of respondents;  $o_{ix}$  is the actual score on the 5-point Likert scale by “i” respondent on variable “x” while  $O_{ix}$  is the score that respondent “i” could give to attribute “x” on the Likert scale.

Based on the 5-point Likert scale, the minimum score by a respondent is when the person scores 1 (Poor) on all the attributes which equals  $1 \times 26 = 26$ , which is equivalent to 20%, while the maximum score by a respondent is when the person scores 5 (Excellent) on all the attributes which gives,  $5 \times 26 = 130$ , equivalent 100%.

#### 2.1.3 Sample Size

Sample size was determined using Glenn (2003) [18] formula thus;

$$n = \frac{n'}{1 + \left(\frac{n'}{N}\right)} \quad (3)$$

Where:  $n$  = sample size from finite population,  $n'$  = sample size from infinite population =  $\frac{s^2}{v^2}$

where  $s^2$  is the variance of the population elements and  $V^2$  is the standard error of sampling population, and  $N$  is the total population of respondents.

**3.0 RESULTS AND DISCUSSION**

The sample size for the study was computed thus.

$$n' = \frac{0.55^2}{0.07^2} = 61.73$$

$$N = 2548$$

$$n = \frac{61.73}{\left[1 + \left(\frac{61.73}{2548}\right)\right]} \cong 61$$

Add 30% of  $n$  to compensate for questionnaires that responses may not be obtained

$$0.3 \times 61 \cong 18$$

$$\therefore n = 79$$

**Table 1:** Distribution of questionnaires among respondents

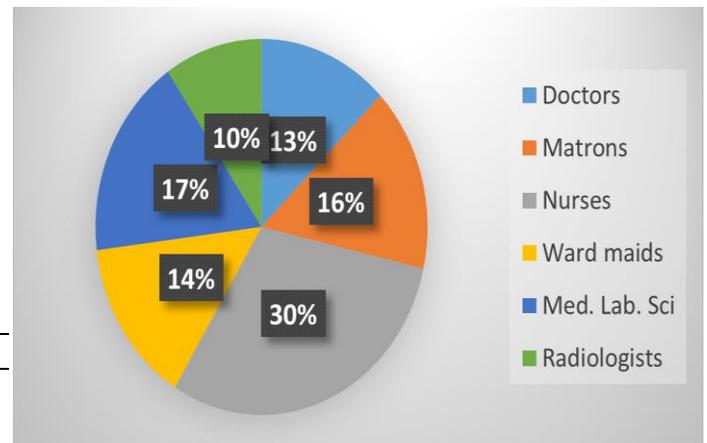
Type of response	No.of questionnaires	Percentage (%)
Number distributed	79	100
Complete responses	63	79.75
Number not returned	16	20.25

Table 1 show the distribution of questionnaires among respondents. Of the 79 questionnaires distributed among respondents, complete responses were received from 63 respondents representing 79.75% of the questionnaire distributed. The number of questionnaires not returned were 16, corresponding to 20.25 % of questionnaires.

**Table 2:** Distribution of respondent’s years of experience

Years of experience	Number of respondents	Percentage (%)
1-5 years	16	25.40
6-10 years	24	38.10
11-15 years	17	26.98
16-20 years	4	6.35
20 years - Above	2	3.17
Total	63	100

Table 2 presented distribution of respondents’ years of experience. Greater percentage fall between 1 to 15 years with total percentage value of 90.48%, however, those with 6 to 10 years of experience were dominant having percentage value of 38.10%.



**Fig. 1:** Occupational distribution of respondents

Figure 1 is a pie chart depicting the occupational distribution of respondents. The distribution showed that 10% of the respondents are radiologists, it was 13%, 14%, 16%, 17% and 30% for doctors, ward maids, matrons, medical laboratory scientists and nurses respectively.

Table 3 is for HCAI and SDGs attributes for measuring impact of not observing the rules for sanitation and hand washing hygiene in healthcare units.

**Table 3:** Health care-associated infections/Sustainable development goals (HCAI/SDGs) attributes

1. Prolonged hospital stay
2. Long-term disability
3. Increased resistance to microorganism to antimicrobials
4. High costs for the health systems and emotional stress for patients and their families
5. Overall sink-to-patient bed ratio of 1:10
6. Accessibility of necessary infrastructure to allow health care workers (HCWs) to practice hand hygiene
7. Readily accessible alcohol-based hand rub at the point of care
8. Provision of regular training on the importance of hand hygiene based on the “My five moments for hand hygiene” approach
9. Provision of regular training on the importance of hand hygiene based on the “Correct procedures for hand rubbing and hand washing to all HCWs

10. Monitoring hand hygiene practices and infrastructure, along with related perceptions and knowledge among HCWs
11. Provision of performance and results feedback to the staff
12. Prompting and reminding HCWs about the importance of hand hygiene
13. Prompting and reminding HCWs about the appropriate indications and procedures for performing hand hygiene.
14. Performance of hand hygiene by HCWs where and when care is provided
15. Provision of appropriate leadership, administrative support, financial resources and support for hand hygiene and other infection prevention
16. Support strengthening of infection control capacities within health-care settings
17. Promote hand hygiene at the community level to strengthen both self-protection and the protection of others
18. Accessibility of necessary infrastructure to allow health care workers (HCWs) to practice hand hygiene
19. Readily accessible alcohol-based hand rub at the point of care
20. Provision of regular training on the importance of hand hygiene based on the “My five moments for hand hygiene” approach
21. Access to quality essential healthcare services
22. Access to safe, effective, quality and affordable essential medicines and vaccines for all
23. Strengthen the prevention and treatment of narcotic drug abuse
24. Strengthen the prevention of harmful use of alcohol
25. Access to improved water and sanitation facilities

**Table 4:** Relative Impact Index distribution

RII Regions	Number of respondents	Percentage of total respondents
20-59 low region	42	66.67
60-79 moderate region	19	30.10
80 and above, high region	2	3.23
		Percentage
Modal RII class (grouped data)		20-59
Median of RII (grouped data)		43.33
Mean		46.78
Minimum		20.00
Maximum		89.63
Range		69.63

Table 4 showed the relative impact index distribution which is a reflection of the impacts of not observing sanitation and hand washing hygiene in healthcare units. Here, we have 42 respondents corresponding to 66.67% in the low region of RII, known as the principal negative variables or type 3 variables, 19 respondents which is 30.10% of respondent fall in the moderate region, notably the moderately negative variables or type 2 variables. The remaining 2 respondents representing 3.23% belong to the high region, relatively

acceptable variables or the type 1 variables. These results imply that information from 96.77% of the respondents showed that hand washing hygiene and sanitation is poorly practiced in the health units in Umuahia North local government area of Abia state, Nigeria.

Logically, it will affect the achievement of “Sustainable Development Goal 3” which is good health and well-being, and “Sustainable Development Goal 6” which has to do with availability of clean water and practice of sanitation.

**Table 5:** Rank ordering of relative observance indices for the 25 variables of HCAI/SDGs

<b>Principal negative variables (Type 3 variables)</b>	ROI <sub>x</sub>
Accessibility of necessary infrastructure to allow health care workers (HCWs) to practice hand hygiene	18.52
Overall sink-to-patient bed ratio of 1:10	19.26
Strengthen the prevention of harmful use of alcohol	19.26
Provision of regular training on the importance of hand hygiene based on the “My five moments for hand	

<b>Principal negative variables (Type 3 variables)</b>	<b>ROIx</b>
hygiene” approach	20.00
Strengthen the prevention and treatment of narcotic drug abuse	20.00
Access to improved water and sanitation facilities	20.74
Provision of regular training on the importance of hand hygiene based on the “Correct procedures for hand rubbing and hand washing to all HCWs	23.70
Access to safe, effective, quality and affordable essential medicines and vaccines for all	30.37
Readily accessible alcohol-based hand rub at the point of care	31.11
Increased resistance to microorganism to antimicrobials	33.33
Support strengthening of infection control capacities within health-care settings	40.00
Access to quality essential healthcare services	41.48
Long-term disability	45.18
Provision of appropriate leadership, administrative support, financial resources and support for hand hygiene and other infection prevention	45.19
Accessibility of necessary infrastructure to allow health care workers (HCWs) to practice hand hygiene	48.89
Provision of performance and results feedback to the staff	54.81
<b>Moderately negative variables (Type 2 variables)</b>	
Prolonged hospital stay	60.74
Provision of regular training on the importance of hand hygiene based on the “Correct procedures for hand rubbing and hand washing to all HCWs	65.19
Readily accessible alcohol-based hand rub at the point of care	69.63
Promote hand hygiene at the community level to strengthen both self-protection and the protection of others	70.37
High costs for the health systems and emotional stress for patients and their families	71.11
<b>Relatively acceptable variables (Type 1 variables)</b>	
Performance of hand hygiene by HCWs where and when care is provided	81.48
Monitoring hand hygiene practices and infrastructure, along with related perceptions and knowledge among HCWs	82.96
Prompting and reminding HCWs about the importance of hand hygiene	88.15
Prompting and reminding HCWs about the appropriate indications and procedures for performing hand hygiene.	89.63

Holistic analysis masks the contribution of each variable as to whether sanitation and hand washing hygiene is well practiced in the study area or not. Table 5 show the weight of each variable in terms of positivity or negativity regarding sanitation and hand washing hygiene. In Table 5, 21 out of the total 25 variables fall in the unacceptable region which indicates that 84% of the variables of sanitation and hand washing hygiene are sub standardly practiced. While 4 out of the total 25 variables, which is 16% had standard practices.

The variable with the least score was “Accessibility of necessary infrastructure to allow health care workers (HCWs) to practice hand hygiene”, with 18.52%, while the one with the highest score was “Prompting and reminding HCWs about the appropriate indications and procedures for performing hand hygiene” which had 89.63%, and the range was 71.11%.

#### **4.0 CONCLUSION AND RECOMMENDATIONS**

Failure to perform appropriate hand hygiene is considered to be the leading cause of HCAI and the spread of multi-resistant organisms and has been recognized as a significant contributor to outbreaks. The study carried out in Umuahia North local government area of Abia state, Nigeria revealed that of the 25 attributes of hand washing hygiene and sanitation attributes considered, 21 attributes representing 84% of the entire variables fall short of standard practice by healthcare workers, evidencing ignorance on the part of healthcare workers in hospitals and allied healthcare units. This scenario is instrumental to many reported cases of cross-transmissions experienced in hospitals based on the findings from this study.

It is therefore recommended that; government should educate healthcare workers on the observed risk factors for poor adherence to recommended hand washing

hygiene practices; self-reported factors to poor adherence to hand washing hygiene should be looked into and addressed. Finally, the additional perceived barriers to appropriate hand washing hygiene practices should be removed. These three recommendations are broad and should be observed in their diversified form during inculcation of the know-how to appropriate recipients, precisely the healthcare workers.

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