



Knowledge and Use of Disinfection Policy in Some Government Hospitals in South-East, Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. Author ANO wrote the first draft of the manuscript. Author JNN did the field work and data collection. Author MCU wrote the protocols of the study. Author LOA managed the analyses of the study. Author AHO managed the literature searches. Author COE originated and designed the study. All authors read and approved the final manuscript.

Research Article

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ABSTRACT

Aims: This study was carried out to evaluate the knowledge and use of disinfection policy in government hospitals in south-east geopolitical zone of Nigeria and to compare the three categories of government hospitals.

Study Design: This was a descriptive, cross sectional study.

Place and Duration of Study: Intensive Care Units and Special Care baby Units (SCBU), Departments of Pharmacy (Compounding/Storage Unit), Medical Laboratory Services, Surgery, Obstetrics and Gynecology, between February and May 2012.

Methodology: A structured self administered and pre-tested questionnaires were administered to 200 randomly selected healthcare workers which included 40 Pharmacists, 59 Nurses, 55 Resident/General Practice Medical doctors and 46 Medical laboratory scientists, employed full-time in selected government hospitals in southeast geopolitical zone of Nigeria.

Results: The sample size and the response rate were 200 and 100% respectively.

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About 53.3% of the respondents have heard of the policy, but only 24.5% of them actually know what it means. Only about 22% of all the respondents have applied the policy. The study also reveals that the level of knowledge of disinfection policy is not significantly related to the level of its application by the healthcare workers in the southeast (P -value 0.143, for chi-square and 0.49, for Pearson Correlation). Up to 78% of the healthcare workers have an idea about the different levels of disinfection. The University Teaching Hospitals seem to have better knowledge and use of the policy than the Federal Medical Centres and the General Hospitals.

Conclusion: The knowledge of disinfection policy among the healthcare workers and its application is poor. This is worst in General Hospitals. There is therefore urgent need for a national policy on disinfection and health workers' education or training on the policy and its application in all hospitals in the nation.

Keywords: Knowledge; use; disinfection policy; government; hospitals.

1. INTRODUCTION

The decontamination of hospital environment and reusable of medical devices is a complex process that requires appropriate processing of equipment, adequate space, appropriately trained and competent personnel, continuous monitoring and auditing of decontamination practices [1]. It is a combination of processes (including cleaning, disinfection and sterilization) used to make a re-usable item safe for further use on patients and handling by staff [2]. Cleaning (the physical removal of foreign material) is always essential prior to disinfection or sterilization [3]. Disinfection (a process that destroys or inactivates microbes, but not all bacterial spores) can be carried out in the most economical method using hot-moist. Some viruses and spores are not destroyed by simple heat methods, but require autoclaving or use of special chemicals for their destruction [2]. Sterilization is complete destruction of all forms of microbiological life - including spores. Equipment and materials which come in contact with sterile body cavities, broken skin or mucous membranes should be sterilized, e.g. instruments, dressings and injection or irrigation fluids. Bench top autoclaves (steam under pressure) are an acceptable alternative for sterilizing instruments locally [4].

Categories of risk (to patients) may be assigned to equipment coming into contact with a patient, dictating the level of decontamination required and degree of concern. High-risk items such as sterile instruments, gloves, catheters, syringes and needles, have close contact with broken skin or mucous membrane or are those introduced into a sterile area of the body and should therefore be sterile. Intermediate-risk items such as endoscopes, respiratory and anesthetic equipment are in close contact with skin and mucous membranes and disinfection by decontamination and chemical disinfection will normally be applied. Low-risk items are in contact with normal and intact skin, e.g. stethoscopes, clinical thermometer and telephones. Decontamination methods required include cleaning and drying. Minimal Risk items such as bed-frames, lockers, flower vases, wall, floors, ceilings, sinks and drains are not in close contact with the patient but are in his/her immediate surroundings. Decontamination methods such as cleaning and drying are adequate [5].

The principles of disinfection policy in healthcare facilities have been described in several reports [3,6,7,8]. The benefit of introducing comprehensive disinfection policies is the reduction of hospital acquired infection [9] but their implementation has sometimes been perceived as unsatisfactory [10,11]. Chemical disinfectants together with detergents are

used for the disinfection of impressions, prosthetic, orthodontic appliances and the disinfection of surfaces that can become contaminated with blood and saliva [12,13]. Bagg et al. [14] in a survey, found that a large number of dental practices have no written policies on disinfection and sterilization procedures. The lack of standard infection control measures and policy has been blamed for hospital acquired infections and many studies have shown that hospital surfaces and frequently used medical equipment become contaminated by a variety of pathogenic and non-pathogenic organisms [4,6,15,16]. The hands and gloves of healthcare workers readily acquire pathogens after contact with contaminated hospital surfaces or patients and can transfer these organisms to subsequently touched patients and inanimate surfaces.

There has been recent upsurge (from 2.6% to 5.9%) in hospital acquired infection among hospitalized patients in Nigeria [17,18,19]. This has continually lowers the quality of healthcare services being provided in the country. Effective and correct use of disinfectants – application of disinfection policy - minimizes the occurrence of hospital acquired infections [19]. The policy provides the guidelines on how to use disinfectants in different levels of disinfection. It aims to control the use of chemicals for disinfection and antisepsis and give guidelines on their use. Nosocomial infection has been a plague that torments the hospital community, prolonging the number of days patients are hospitalized and often complicates the patient's treatment. The control of microorganisms is therefore of prime importance in hospital and industrial environments. Hospitals generally have disinfection policy, although the degree of adherence to and implementation of the policy content may vary.

This study is aimed at verifying the knowledge and application of disinfection policy, the frequency with which the policy is reviewed, the establishment of the infection control committee in some government owned hospitals in south-east, Nigeria and the comparison of the three categories of government hospitals.

2. METHODOLOGY

This descriptive, cross sectional study was carried out among health care workers using questionnaires to evaluate the knowledge and use of disinfection policy in government hospitals in south-east geopolitical zone of Nigeria. The zone has seven University Teaching Hospitals (UTHs), two Federal Medical Centres (FMCs) and numerous General Hospitals (GHs). The UTHs provide tertiary health care services and train medical students and Resident Doctors, the FMCs also provide tertiary health care services but may or may not train medical students and Resident Doctors while GHs provide only secondary health care services. A total of 200 clinically oriented health care workers who had been employed full-time for at least two years in 10 government hospitals were selected randomly. They include 55 Resident/General Practice Medical doctors, 40 pharmacists, 46 medical laboratory scientist and 59 Nurses. This population was targeted because they work in sensitive areas of the hospital where disinfection is a serious issue. The questionnaires were pre-tested in a General Hospital in the zone. Some knowledge means that the respondents were able to define the Policy and state its provisions or what it is supposed to achieve while no knowledge is when none of these exist.

3. RESULTS AND DISCUSSION

The study reveals that the level of knowledge of disinfection policy is not significantly related to the level of its application by the healthcare workers in the southeast ($P < 0.05$). Among

the healthcare respondents, 55 (27.5%) were Medical doctors, 40 (20.0%) were pharmacists, 46 (23.0%) were medical laboratory scientist and 59 (29.5%) were Nurses.

Table 1 shows the analysis of awareness of disinfection policy in the hospitals visited. Hospital number 4 had the poorest awareness while hospital number 9 had the best. From the study, 107 (53.5%) of the healthcare workers have heard about the policy. This shows that about the average number of the healthcare workers visited are aware of the existence of the policy. Similar work done in the southwest geopolitical zone of the country also reflects such poor awareness level [20]. This holds a low prospect for the control of hospital-acquired infections (HAIs) in the country and calls for rigorous awareness campaign or inclusion into the continuous education programme undertaken by the different health professions.

Table 2 shows the analysis of percent respondents who has been aware of disinfection policy for over a year ago. The results was in order of $9 > 2 = 5 = 8 > 1 = 3 > 6 > 10 = 7 > 4$. Of the 107 (53%) of the healthcare workers that are aware of the policy, scarcely above half (53.27%) have been aware of the policy for over a year. Most (26.18%) came from UTHs, still in accordance with similar study [20], probably because of the cadre of health personnel found there and the need to pass various accreditations needed for the continuity of the academic institutions.

Table 3 shows the analysis of the knowledge of disinfection policy in the hospitals. The result was in order of $9 = 2 > 3 > 1 > 8 > 10 = 6 > 5 > 4 = 7$. From the study, 49 (24.5%) of the healthcare workers actually know what disinfection policy means. This reveals a poor knowledge of the policy among the healthcare workers. This shows that even though some healthcare workers have heard of disinfection policy, they do not know what it is. They could neither define it nor state the provisions of the policy. They could not state clearly what the policy is supposed to achieve. A report revealed the importance of education sessions in knowledge improvement of health-worker towards HAIs containment [21].

Table 4 shows the analysis of the application of disinfection policy in the hospitals. The application of the policy is highest in hospital number 2 and poorest in hospital number 7. The study also reveals that the level of knowledge of disinfection policy is not significantly related to the level of its application by the healthcare workers in the southeast (P-value 0.143, for chi-square and 0.49 for Pearson Correlation). Up to 107 (53.5 %) of the healthcare workers are aware of the policy but only 44 (22 %) of them apply it. The results above show that the level of knowledge and application of disinfection policy in hospitals in southeast are generally poor and thus does not provide for effective utilization of disinfection. This could be the reason for upsurge in nosocomial infection in hospitalized patients seen in some parts of the country [17,18] and defeats the goal of the policy which is to reduce the number of Hospital-Acquired Infections to zero by improving infection prevention practices. Similar studies conducted in Texas, the Audie Murphy VA Hospital shows a significant reduction in its infection rate following the implementation of key disinfection control policies and procedures, thus between September 2010 and February 2011, the rate of infection by multi-drug-resistant organisms, including methicillin-resistant *Staphylococcus aureus* (MRSA), *C. difficile* and others dropped by 82 percent [22]. Hospital-acquired infections (HAIs) are the fourth leading cause of death in the USA [23]. With the adoption of room cleaning with portable UV light, Cooley Dickinson Hospital has been able to achieve considerable milestones in 2011. Such laudable achievements include a 54 % reduction in *Clostridium difficile* infections, a 58 % reduction in MRSA infections/colonization, and a 65 % reduction in vancomycin-resistant enterococci infections [23].

Table 5 shows the analysis of the supervision of the application of the policy in the hospitals. The healthcare workers in hospital 2 have the highest positive response while healthcare workers in hospital 5 have the least. From the study, 151 (75.5 %) of the healthcare workers mentioned either one or more of the following Medical doctors, Pharmacists, Medical laboratory scientist and Nurses as people that supervise the application of the policy. Supervision of the application of the policy is a direct function of the Infection Control Committee and it has been observed that effective monitoring and continuous education improves compliance of health-worker with infection prevention practices [20,21].

As seen in Table 6, only 40 (20%) of the healthcare workers answered that they review the policy often. This shows the need for continuity in the application and constant review of hospital disinfection policy to minimize the level of transmission of nosocomial infection to patients visiting the hospital. This will improve the quality of healthcare delivery in the country otherwise, the incidence of nosocomial infections will be expectedly high [18].

Table 7 shows that only 57 (28.5%) of the healthcare workers visited answered that they have Infection Control Committee in their institutions. This shows that greater percentage of the health workers (71.5 %) do not actually know whether the committee exists or not. The committee is usually charged with the responsibility of establishing, reviewing and maintaining disinfection policy and sees to the control of nosocomial infections in the hospitals. The high number of worker unaware of the existence of Infection Control Committee in their institutions was also reported in another study in Nigeria and has been linked with low rate of notification of HAIs to the relevant authority. The study also suggested routine on-the-job sensitization seminars to health workers to improve the practice of reporting of HAIs [20].

Table 8 shows the analysis about the members of specialize infection control committee in the hospitals. From the study, 147 (73.5%) of the healthcare workers mentioned either one or more of the following Medical doctors, Pharmacists, Medical laboratory scientist and Nurses as the members of the committee showing that the committee members are mainly health professionals. This is encouraged as they are in a better position to manage the responsibilities placed on hospitals by the high prevalence of HAIs seen in the country [24].

Table 9 shows the analysis of the frequency of the committee's meeting in the hospitals, Twenty-five (12.5%) of the healthcare workers answered that the committee meet often. This result is confirmatory that only few health-care workers are aware of the existence of the committee and this defeats the goal of disinfection policy. This also reveals the urgent need for in-house training of the workers on infection prevention practices and HAIs reporting system. The subject may also be included in the continuous mandatory education organized by various health professions in the country. Knowledge and advocacy leads to behavioural change and improves patient care [21].

Table 1. Analysis of awareness of disinfection policy

Hospitals Visited	1	2	3	4	5	6	7	8	9	10	Total
Number that answered yes	12 (60)	12 (60)	11 (55)	4 (20)	12 (60)	10 (50)	11 (55)	13 (65)	14 (70)	8 (40)	107 (53.5)
Number that answered no	8 (40)	8 (40)	9 (45)	16 (80)	8 (40)	10 (50)	9 (45)	7 (35)	6 (30)	12 (60)	93 (46.5)

Table 2. Analysis of the duration of the awareness of disinfection policy

Hospitals Visited	1	2	3	4	5	6	7	8	9	10	Total
Number > 1 year	6 (5.61)	8 (7.48)	6 (5.61)	1 (0.93)	8 (7.48)	5 (4.67)	3 (2.80)	8 (7.48)	9 (8.41)	3 (2.80)	57 (53.27)
Number ≤ 1 year	6 (5.61)	4 (3.74)	5 (4.67)	3 (2.80)	4 (3.74)	5 (4.67)	8 (7.48)	5 (4.67)	5 (4.67)	5 (4.67)	55 (46.73)

Table 3. Analysis of the knowledge of disinfection policy

Hospitals Visited	1	2	3	4	5	6	7	8	9	10	Total
Number with fair knowledge	6 (30)	8 (40)	7 (35)	2 (10)	3 (15)	4 (20)	2 (10)	5 (25)	8 (40)	4 (20)	49 (24.5)
No. with poor knowledge	14 (70)	12 (60)	13 (65)	18 (90)	17 (85)	16 (80)	18 (90)	15 (75)	12 (60)	16 (80)	151 (75.5)

Table 4. Analysis of the application of disinfection policy

Hospitals Visited	1	2	3	4	5	6	7	8	9	10	Total
Number that answered yes	5 (25)	8 (40)	5 (25)	2 (10)	3 (15)	4 (20)	1 (5)	5 (25)	7 (35)	4 (20)	44 (22)
Number that answered no	15 (75)	12 (60)	15 (75)	18 (90)	17 (85)	16 (80)	19 (95)	15 (75)	13 (65)	16 (80)	156 (78)

Table 5. Analysis of the supervision of the policy

Hospitals visited	1	2	3	4	5	6	7	8	9	10	Total
'no Supervision'	14	12	15	16	18	16	17	13	14	16	49
	(70)	(60)	(75)	(80)	(90)	(80)	(85)	(65)	(70)	(80)	(24.5)
Supervised by 'medical personnel'	6	8	5	4	2	4	3	7	6	4	151
	(30)	(40)	(25)	(20)	(10)	(20)	(15)	(35)	(30)	(20)	(75.5)

Table 6. Analysis of the review of disinfection policy

Hospitals Visited	1	2	3	4	5	6	7	8	9	10	Total
'no idea'	16	15	16	18	19	17	17	15	15	16	160
	(80)	(75)	(80)	(90)	(95)	(85)	(85)	(75)	(75)	(80)	(80)
'often Reviewed'	4	5	4	2	3	3	5	5	5	4	40
	(20)	(25)	(20)	(10)	(15)	(15)	(25)	(25)	(25)	(20)	(20)

Table 7. Analysis about the existence infection control committee

Hospitals Visited	1	2	3	4	5	6	7	8	9	10	Total
'Yes'	4	6	10	14	1	2	4	7	7	2	57
	(20)	(30)	(50)	(70)	(5)	(10)	(20)	(35)	(35)	(10)	(28.5)
'No idea'	16	14	10	6	19	18	16	7	7	18	143
	(80)	(70)	(50)	(30)	(95)	(90)	(80)	(65)	(65)	(90)	(71.5)

Table 8. Analysis about the members of specialize infection control

Hospitals Visited	1	2	3	4	5	6	7	8	9	10	Total
'no idea'	16	5	9	6	0	2	3	5	5	2	53
	(80)	(25)	(45)	(30)	(0)	(10)	(15)	(25)	(25)	(10)	(26.5)
'Medical Personnel'	4	15	11	14	20	18	17	15	15	18	147
	(20)	(75)	(55)	(70)	(100)	(90)	(85)	(75)	(75)	(90)	(73.5)

Table 9. Analysis about the frequency of the committee's meetings

Hospitals Visited	1	2	3	4	5	6	7	8	9	10	Total
'often'	20 (100)	17 (85)	12 (60)	20 (100)	20 (100)	19 (95)	16 (80)	16 (80)	15 (75)	20 (100)	25 (12.5)
'No idea'	0 (0)	3 (15)	8 (40)	0 (0)	0 (0)	1 (5)	4 (20)	4 (20)	5 (25)	0 (0)	175 (87.5)

**Note: The numbers in brackets are in %*

From the study, also the knowledge of different levels of disinfection was evaluated; 170 (85%) mentioned gloves, catheters, syringes and needles and surgical materials as high risk items which are sterilized with autoclave. About 146 (72.5%) mentioned endoscope, respiratory and anesthetic equipment as intermediate risk item and also that they are disinfected. On the other hand 150 (75%) mentioned floors, ceilings, writing pad, tables as low risk item and are sanitized by cleaning.

Utilization of the following disinfectants were evaluated; Izal, Jik, Dettol, 2% glutaraldehyde, Isopropyl alcohol, Chlorhexidine, Cetrimide, 5% Hypochlorite. Almost 60% of the hospitals visited have between 5 and 7 of the disinfectants listed above as their disinfectants for disinfection; 30% of them have 4 of the disinfectants for their disinfection while only 10% has 3 of the disinfectants for their disinfection. Similar study conducted at Ronald Ross General hospital Mufuira, Zambia revealed that healthcare workers though have sound knowledge (100%) of infection control policy have varied levels of compliance on different components of infection prevention. The highest level of compliance (100%) was with single use of needles and syringes while the lowest (35.1%) was with decontamination of needles and syringes with 0.5% chlorine solution prior to disposal; compliance with hand hygiene was moderate (61%) [25]. The study revealed that the level of knowledge and compliance of healthcare workers in southeastern Nigeria to the provisions of Disinfection policy is not as a result of negative attitude but a factor of the management structure and the environment. When used correctly, disinfection has an important role to play in controlling infection [24,26,27].

Fig. 1 shows that the awareness, knowledge, application, supervision of the application and review of the internal policy although low in the three categories of the hospital, is highest in the University Teaching Hospitals. This may be due to the level of attentions paid to the Teaching Hospitals due to the need to pass various accreditations needed for the continuity of the academic institutions and/or higher cadre of health-care personnel employed there [20]. Similar study conducted at Ronald Ross General hospital Mufuira, Zambia revealed that healthcare workers though have sound knowledge (100%) of infection control policy have varied levels of compliance on different components of infection prevention [25]. There is serious need to develop a national policy on disinfection as well as massive education of hospital workers on infection control measures as these will help reduce the prevalence of hospital-acquired infections in our hospitals and improve healthcare delivery in the country.

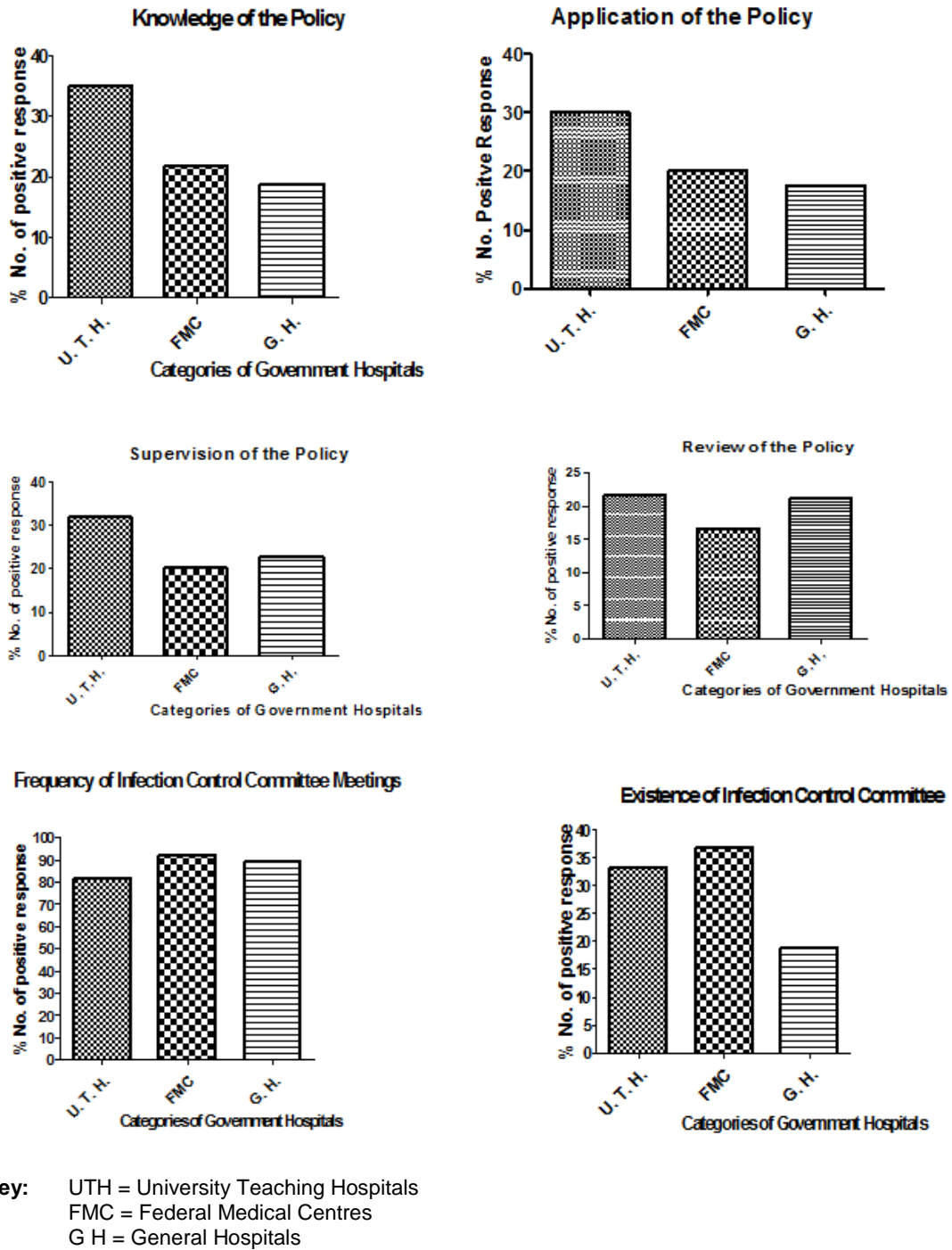


Fig. 1. Comparisons of the three categories of Hospitals visited

4. CONCLUSION AND RECOMMENDATIONS

This study reveals the need for constant advocacy in the application and adherence to the provisions of Disinfection policy by healthcare workers in hospitals to eliminate or at least minimize nosocomial infections. It also revealed that the level of knowledge, application and adherence to the provisions of Disinfection policy is generally poor. Therefore we recommend that the hospital management;

- ✓ Should enact the provisions of disinfection policy in their institutions.
- ✓ Should set up a committee that will educate and monitor the healthcare workers to ensure that they understand properly the provisions of the policy and that they adhere strictly to it in their daily operations.
- ✓ Should set up an infection control committee, if not available, and empower them to establish and review continuously disinfection policy and ensure effective disinfection.

CONSENT

All respondents gave verbal consent before participating in the study.

ETHICAL APPROVAL

This work is supported by ETHICAL APPROVAL received from Anambra State University Teaching Hospital, Amaku, Awka and is not against the public interest. The release of the information therein is allowed by legislation.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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