Original Research Article

ASSESSMENT OF MITIGATION MEASURES IN PREVENTING BACTERIAL INFECTIONS IN SELECTED PUBLIC HEALTH CENTRES IN AKURE, ONDO STATE.

ABSTRACT

A hospital acquired infection or nosocomial is an infection whose development is favored by a hospital environment. They are usually acquired by either a patient during a hospital visit (or when hospitalized), hospital staff or patients' relatives that visit when the patient is on admission in the hospital. Nosocomial infections can cause severe pneumonia and infection of the urinary tract, wounds, blood stream and other parts of the body.Nosocomial infections are commonly encountered in Africa and in Nigeria in particular.Factors such as hospital hygiene / cleanliness, personal hygiene of patients, overcrowding hospital wards and illiteracy increases the risk of nosocomial. The assessment of mitigation measures put in place to reduce bacteria present in surfaces of facilities (pillow, bed sheets, door handles, toilet seats and the floor) in wards of selected basic health centres (Arakale, Aule, Ayedun, Isolo, Oba-Ile and Orita-Obele) in Akure was evaluated using both questionnaire and on-sight assessment techniques.The results showed that there was a direct relationship between the hand washing or sanitizer used and the bacterial load present in the various surfaces examined. Therefore, adequate ward hygiene in these health centres is necessary to reduce the risk of nosocomial infections for both patients and visitors.

INTRODUCTION

A hospital acquired infection or nosocomial is an infection whose development is favored by a hospital environment. They are usually acquired by either a patient during a hospital visit (or when hospitalized), hospital staff or patients' relatives that visit when the patient is on admission in the hospital (Prescott *et al.*, 2011). Nosocomial is responsible for 1.7 million hospital-associated infections in the United States and about 25,000 deaths in Europe annually from all types of microorganisms including bacteria (Pollack and Andrew, 2010). Nosocomial infections

can cause severe pneumonia and infection of the urinary tract, blood stream and other parts of the body.

Nosocomial infections are commonly encountered in Africa and in Nigeria in particular. According to Cheesbrough (2010), this is primarily due to factors such as hospital hygiene / cleanliness, personal hygiene of patients, overcrowding hospital wards and illiteracy. These infections are usually difficult to attack with antibiotics. Equally, antibiotics resistance is fast spreading to more Gram positive and Gram negative bacteria that can infect people within the hospital environment.

Nosocomial infections occur worldwide and affect both developed and resource-poor countries. Infectionsacquired in health care settings are among the major causes of death and increased morbidity among hospitalized patients. They are a significant burden both for the patient and for public health. A prevalence survey conducted under the auspices of WHO in 55 hospitals of 14 countries representing 4 WHO Regions (Europe, Eastern Mediterranean, South-East Asia and Western Pacific) showed an average of 8.7% of hospital patients had nosocomial infections. At any time, over 1.4 million people worldwide suffer from infectious complications acquiredin hospital (Danchaivijitr*et al*., 2005). The highest frequencies of nosocomial infections were reported from hospitals in the Eastern Mediterranean and South-East Asia Regions (11.8 and 10.0% respectively), with a prevalence of 7.7 and 9.0% respectively in the European and Western Pacific Regions (Vasque*et al*., 2000). The most frequent nosocomial infections are infectionsof surgical wounds, urinary tract infections and lower respiratory tract infections. The WHO study, and others, have also shown that the highest prevalence of nosocomial infections occurs in intensive care units and in acute surgical and orthopaedic wards. Infection rates are higher among patients with increased susceptibility because of old age, underlying disease, or chemotherapy

Hospital-acquired infections add to functional disability and emotional stress of the patient and may, in some cases, lead to disabling conditions that reduce the quality of life.

Nosocomial infections are also one of the leading causes of death (Gastmeier, 2008). The economiccosts are considerable (Emmerson, 2006). The increasedlength of stay for infected patients is the greatestcontributor to cost. One study showedthat the overall increase in the duration of hospitalizationfor patients with surgical wound infectionswas 8.2 days, ranging from 3 days for gynaecologyto 9.9 for general surgery and 19.8 for orthopaedicsurgery. Prolonged

stay not only increases direct coststo patients or payers but also indirect costs due tolost work. The increased use of drugs, the need forisolation, and the use of additional laboratory andother diagnostic studies also contribute to costs.Hospital-acquired infections add to the imbalancebetween resource allocation for primary and secondaryhealth care by diverting scarce funds to themanagement of potentially preventable conditions.The advancing age of patients admitted to healthcare settings, the greater prevalence of chronic diseasesamong admitted patients, and the increaseduse of diagnostic and therapeutic procedures which affect the host defense will provide continuingpressure on nosocomial infections in the future.Organisms causing nosocomial infections can betransmitted to the community through dischargedpatients, staff, and visitors (Ducel, 2005). If organisms are multiresistant,they may cause significant disease in thecommunity.

In Akure, Ondo State, several communities which are densely populated have primary health centres to cater for the immediate health need of the people. According to Ondo State Health/Hospital Management report (2010), Government has taken some steps to improve on the hygiene status of these primary health centres to minimize nosocomial infections. However, there is no constant evaluation of the hygienic status of these primary health centres.

In our previous study, antibiotic sensitivity assay on pathogenic microorganisms isolated from selected areas in some primary health centres in Akure metropolis, Nigeria was reported in which six different primary health centres were visited. A total of 720 swab samples were collected from bed sheet, door handles, floor, pillow and toilet; it was noted that the highest bacterial counts ranged from 53.33±1.86 to 1.67±0.33 cfu/ml from toilet in maternity and pillows in pediatric wards respectively. The bacterial isolated include; *Escherichia coli, Staphylococcus aureus, Staphylococcus epidermidis, Proteus mirabilis, Bacillus subtilis, Pseudomonas aeruginosa, Klebsiella pneumonia,* while the fungi were*Candida albicans* and *Candida dubliensis*.The bacterial isolates were mostly resistant to tetracycline and streptomycin, *Pseudomonas aeruginosa* and *Staphylococcus aureus* were the most resistant bacteria isolates many antibiotics used. However, ofloxacin exerted the highest inhibitory effect against all the bacteria (Omoya and Afolabi, 2016).

Therefore is necessary to carry out a study on assessment of mitigation measures in preventing bacterial infections in selected Public Health Centres (PHC) in Akure, Ondo State as a follow up to our previous study(Omoya and Afolabi, 2016).There is no study or records of the relationship

between contaminated facilities as reported by Omoya and Afolabi (2016) in these primary health centres, the spread of infections and the safety of the public that visit these health centres. Such records will in turn help prevent the spread of nosocomial infections from formites to patients, staff and visitors or the general public from the health centres. Hence, there is need to evaluate the mitigation measures put in place both by the government and the health centres to reduce nosocomial infections within and outside these health facilities for safety of the populace, patient and staff of the health centres.

MATERIALS AND METHODS

Description of study area

The study area is Akure South Local Government Area. Akure South Local Government Area was carved out of Ondo Municipal Government of Akure central in 1996 after the creation of Ekiti State. It covers a land area of 15, 500 square kilometers. It has a population density of 3, 300 persons per square kilometer (National Population Census, 2006). The Akure South Local Government Area shares boundaries with Akure North Local Government Area and Akure East Local Government Area respectively.

Akure South Local Government Area has a total population of 360, 268; comprising of 173, 153 males and 187, 115 females according to the 2006 national population with 2010 estimated population of 459,164 using a growth rate of 3.2% from 2006 census. It is an urban area and therefore, no major farming activities take place. Yoruba and other tribes dominate the area. The residents are engaged in various economic activities such as trading, transportation business, civil service and education.

The symbol of tradition is evident in Akure South Local Government Area. The official resident of the Oba Adesida is situated in the area. There are twelve (12) primary Health care centres in the area, fifty-nine (59) registered private health facilities, two (2) public secondary health care facilities and no tertiary health facilities in the area. There are four mission (private) hospitals that provide secondary health care for the people. The surrounding Local Government areas have public secondary health centres.

Study design

This study was a descriptive cross sectional survey.

Study population and study subjects

All consenting primary health centers' facilities in Akure metropolis of Akure South Local Government area were included in the survey regardless of size and location.

Sample size determination

A total of six (6) primary health centres in Akure metropolis were evaluated/visited:

1. Primary health centre, Aule;
2. Primary health centre, Ayedun;
3. Primary health centre, Isolo;
4. Primary health centre, Arakale;
5. Primary health centre, Oba-ile and
6. Primary health centre, Orita-Obele.

They were analyzed using questionnaire and physical surveillance of the hospitals to ascertain their hygienic status. A total of one hundred and twenty (120) questionnaires (twenty in each health centre) were administered to staff of the health centres as check list to assess their facilities.

Data collection

This was done using two (2) different instruments. The first survey instrument was physical surveillance of the health centre environment to evaluate the hygienic status of the basic primary health centre. The second instrument was a structured questionnaire administered to staff of the basic primary health centres to assess their health facilities available to the health centres and the public to maintain a hygienic status.

Ethical consideration

Consent: Approval for the study was obtained from the Ondo State Hospital Management Board. Respondents were told of their right to decline the questionnaire without any consequences but appealed to not to decline it.

Confidentiality: Data collected was used only for research purpose and kept confidential on a password protected computer. Names and addresses were not included in the data collection questionnaires and thus data collected cannot be linked with any person.

Beneficence: Data obtained in this study can be useful in policy making and to identify appropriate areas requiring attention to improve health care service delivery in Ondo State.

Limitation of the study

The following were limitations to this study:

Information on monthly average internally generated revenue of the basic primary health centre was not used. Quality of the monthly take-home of the staff, especially the cleaners and health attendants was not included in the questionnaires because these staff is likely not to be contented with such. Information on the monitoring of the hygienic status was included as the basic primary health centres are likely to be cleaner within such period of visitation of the monitoring team.

RESULTS

The availability of the facilities assessed is shown in table 1. The result of the availability of the facilities in the basic primary health centres selected in Akure metropolis showed that they all have toilets in their wards; they all equally have beddings (bed sheets and pillow cases) materials in their wards, the wards were well tiled and the doors have good handles. However, only Aule, Ayedun and Oba-Ile basic primary health centres have bore-holes for water supply. Of these three basic primary health centres, only Aule and Oba-Ile basic primary health centres have tap water system while only Oba-Ile basic primary health centre had washing hand basins situated in strategic locations. All the basic primary health centres selected for this study have well water.

Table 1: The availability of facilities assessed in this research

Centre	Toilets	Bed sheets / pillows	Tiled Floor	Door handles	Bore hole	Taps	Washing hand basin	Well water
Arakale	+	+	+	+	-	-	-	+
Aule	+	+	+	+	+	+	-	+
Ayedun	+	+	+	+	+	-	-	+
Isolo	+	+	+	+	-	-	-	+
Oba-Ile	+	+	+	+	+	+	+	+
Orita-Obele	+	+	+	+	-	+	-	+

Keys: + = Present; - = Absent

The condition of the facilities assessed in the basic primary health centres showed that Isolo basic primary health centre had bad toilets and bed sheets. The bore hole in Ayedun was bad, only the tap water system in Oba-Ile health centre was in good working condition. Their floor was very neat while their well was fine and well situated as seen in Table 2

Table 2: Conditions of the facilities assessed in basic health centres

Centre	Toilets	Bed sheets	Floor	Door handles	Bore hole	Taps	Washing hand basin	Well water
Arakale	G	A	N	G	-	-	-	G
Aule	G	N	N	G	G	B	-	G
Ayedun	G	N	N	G	B	-	-	G
Isolo	B	B	A	G	-	-	-	G
Oba-Ile	G	N	N	G	G	G	G	G
Orita-Obele	G	N	A	G	-	B	-	G

Keys: A= Averagely neat/ok; B= Bad; G= Good; N= Neat; - = Not present.

Other assessment of the equipment for hygienic purpose in the basic primary health centres showed that there was no hand washing basins in the toilets of five health centres except that of Aulewhose own was in bad condition and not in use. Isolo health centre lack hand towel for hand cleaning. All the basic primary health centres however had hand sterilizer for staff after work. They all have good foot-mats at their entrance to reduce the carriage of dirty materials by shoes into the wards.

The assessment of the environmental hygiene level of the basic health centres using questionnaire for the staff of the centres showed that of the twenty questionnaire distributed in each centre, a total of 65% of the staff in each of the basic health centre were females and 35% were males. They all had secondary and tertiary education and have been working in the basic health centres for more than five (5) years. They all agreed that the wards were cleaned once daily using antiseptic mopping. They all use hand sanitizers without hand washing sink and the available disposable hand towels were for the staff only. The questionnaire also showed that the Arakale and Isolo basic health centres records more than 50 patients visiting the centres for one treatment or the other and admits less than twenty patients daily, while the other 4 basic health centres had less than 30 patients daily and admits less than 10 patients daily. Table 3 shows the scores for the questionnaire given to the staff of the basic health centres and the total score for each health centre respectively. A copy of the questionnaire is also attached to the appendix I.

Table 3: Scores / rating of the questionnaire distributed to staff of basic health centres.

S/N	Point considered	Arakale	Aule	Ayedun	Isolo	Oba-Ile	Orita-O
1	Staff strength	4	3	3	4	3	3
2	Cleaning method employed	2	3	3	1	4	3
3	Cleaning of wards daily	2	3	3	2	3	3
4	Washing of beddings	3	4	4	3	4	3
5	Modern washing of beddings	2	2	2	2	2	2
6	Water supply	3	3	3	3	4	3
7	Waste disposal	3	3	3	3	3	3
8	Hand washing sink	2	3	2	2	3	2
9	Disposable hand towels	1	2	1	1	2	2
10	Washing of toilets	2	2	2	2	2	2
11	Cleaning agent used	3	3	3	3	3	3
12	No. of visitors to centre	4	3	3	4	3	3
13	No. of patients admitted	4	3	2	4	2	3
14	Overall hygiene strength	2	3	3	2	3	3
15	**Total score/70**	**34**	**37**	**35**	**34**	**39**	**36**

Keys: Very adequate/very high= 5; Adequate/high= 4; Average= 3; Inadequate/few/low/poor= 2; Very poor/low/few= 1

Table 4 shows the waste management mechanism and the environmental cleaning method put in place by each of the health centre to curtail the spread of communicable diseases via wastes. Most of the centres do not have bushes around them. However, Oba-Ile and Orita-Obele that have both control it with the use of mower and manually respectively. Only Oba-Ile health centre spray insecticide occasionally to control insects especially on their flower. They also treat their gutter with germicide to control communicable diseases as well as burn their generated waste in an incinerator every week.

Table 4: Environmental and waste management assessment of basic health centres.

Centre	Clearing of bushes	Insect control	Mosquito nets in wards	Available incinerator	Destruction of wastes	Use of germicide in gutters
Arakale	No bush	No	No	No	Empty in waste van	No
Aule	No bush	No	Ye	Yes	Yes	Yes
Ayedun	No bush	No	No	No	Empty in waste van	Yes
Isolo	No bush	No	No	No	Empty in waste van	No
Oba-Ile	Uses mower	Spray insecticide	Yes	Yes	Yes	Yes
Orita-Obele	Manually	No	No	Yes	Empty in waste van	No

Discussion

The results obtained from this work have shown that many of the facilities in our basic health centres need attention to reduce nosocomial infections. According to Plowman, (2009), the major

reason for high bacterial load of pillows and beddings (Omoya and Afolabi, 2016) in the hospitals is basically due to the fact that patients under critical conditions may not be able to bath for days and most hospitals in developing countries may not have enough of these beddings for daily change. Hence there is need for proper cleaning methods such as surface sterilization of all the facilities in these basic health centres should be adopted for reducing the microbial loads.

The absence of flowing tap water and bore holes could hinder high level of hygiene standard as seen in the results of these assessments,from these basic health centres. The basic primary health centres without tap water or bore hole are likely to have high bacterial load isolated from them and promote the spread of nosocomial infections (Adeojo*et al.,* 2012) because well water been used could have been contaminated. Therefore, the level of hygiene maintenance in these health centres is directly related to the availability of water for laundry purpose in such centre.

The condition of the facilities assessed in the basic primary health centres showed that Isolo basic primary health centre had bad toilets and bed sheets. The bore hole in Ayedun was bad, only the tap water system in Oba-Ile health centre was in good working condition. According to Omeleke (2010), the lack of maintenance of the available facilities in our health centres have contributed to the increased nosocomial infections often acquired from these health centres. Equally, the fact that the low income earners in the society are the major patronage of these health centres make their hygiene level low as they are often involve in overcrowding and use of dirty well water for cooking and cleaning (Prescott *et al*., 2011).

Many factors contribute to the frequency ofnosocomial infections: hospitalized patients areoften immune-compromised, they undergo invasiveexaminations and treatments, and patient care practicesand the hospital environment may facilitate thetransmission of microorganisms among patients. Cowman *et al*., (2012) stated that most of the health centres in Africa have only doors without nets to prevent mosquito and this often lead to re-infection of patients in wards with malaria. Theselective pressure of intense antibiotic use promotesantibiotic resistance (Monali*et al*., 2016), andwhile progress in the preventionof nosocomial infections has been made, changesin medical practice continually present new opportunitiesfor development of infection. The information obtained from the questionnaire given to the staff of these basic health centres have shown the relationship between the questionnaire and the physical surveillance assessment done.

According to Prescott *et al*. (2011), the number of patients visiting a hospital is a pointer to the number of visitors that will visit such hospital. Mansouri*et al*. (2015), stated that this point is well abused in developing countries were a patient has multiple visitors coming daily when they are on hospital admission. Due to this reason, Tikhomirov (2007), concluded that the floor, door handle as well as the chairs which these visitors have direct contact with cannot be devoid of bacteria, especially pathogenic ones.

The absence of flowing tap water and bore holes could hinder high level of hygiene standard as seen in the results of bacterial isolations from these basic health centres. The basic primary health centres without tap water or bore hole had high bacterial load isolated from their wards, beddings and toilets respectively. Therefore, the level of hygiene maintenance in these health centres is directly related to the availability of water for laundry purpose in such centre.

The regular treatment of the drainage system of hospitals with germicides as well as use of mosquito nets in wards have been noted to help reduce nosocomial infection from series of studies (Mayon-White, 2008; Mansouri*et al*., 2015 and Monali*et al*., 2016) this habit was only seen to be practiced by one health centre (Obal-Ile) out of the six health centres studied. This probably was made possible by the contributory effort of the elites in the estate in which the health centre was situated.

Therefore, there is need for adequate water supply to these health centres and constant ward hygiene in these health centres to reduce the risk of nosocomial infections for both the patients who are already admitted for different infection and for the visitors who previously may be free of certain infection before coming to the health centres. Equally, though the mitigation measures seen in these health centres are good, they should be improved upon.

REFERENCES

Baker, J.F., Breach, M.R. and Chris, P. (2006). Medical Laboratory Science. Chris Publisher, United Kingdom, 487pp.

Benenson A. S. (2005).*Control of communicable diseasesmanual*, 16th edition. Washington, American Public Health Association.

Cheesebrough, M. (2010). Distric Laboratory Practice in Tropical Countries. 2nd Edition, Cambridge University Press, United Kingdom. 480pp.

Coella R. (2003). The cost of infection in surgicalpatients: a case study. *J Hosp Infect*, 25:239–250.

Cowman, A. F., Berry, D. and Baum J. (2012). The cellular and molecular basis for malaria parasite invasion of the human red blood cell. Journal of cell Biology, 198(6):961-971.

Danchaivijitr S, Tangtrakool T, Chokloikaew S. (2005). Thesecond Thai national prevalence study on nosocomialinfections 1992. *J Med Assoc Thai*, 1, 78Suppl 2:S67–S72.

Ducel G. (2005). Les nouveaux risquesinfectieux.*Futuribles*, 203:5–32.

Ducel, G. (2010).*Guide pratique pour la luttecontrel'infectionhospitalière*. WHO/BAC/79.1.

Emmerson A. M. (2006). The second national prevalencesurvey of infection in hospitals overviewof the results. *J Hosp Infect*, 32:175–190

Fawole, M.A. and Oso,B.A. (2004). Laboratory Manual of Microbiology, Spectrum Books Limited, Ibadan, Nigeria. 127pp.

Garner, J. S. (2008).CDC definitions for nosocomial infections. *Am J Infect Control*, 16:128–140.

Gastmeier P. (2008). Prevalence of nosocomial infectionsin representative German hospitals. *J HospInfect*, **38**:37–49.

Gikas, A. (2009). Repeated multi-centre prevalencesurveys of hospital-acquired infection in Greekhospitals. *J Hosp Infect*, **41**:11–18.

Kim J. M. (2010). Multicentre surveillance study fornosocomial infections in major hospitals inKorea. *Am J Infect Control*, **28**:454–458.

Mayon-White R. T. (2008). An international surveyof the prevalence of hospital-acquired infection.*J Hosp Infect*, 11 (Supplement A):43–48.

Monali P. M.; Rachita, S. R. and Padhy, N. (2016). Prevalence of multidrug resistant uropathogenic bacteria in pediatric patients of a tertiary care hospital in eastern India, *Journal of Infection and Public Health*, 308-314

Mansouri, M; Afshar, D.; Hemati-Harsini, M. and Amir, H. (2015). Prevalence and Microbial Resistance of Uropathogenic Bacteria Isolated from Neonatal and Pediatric Patients in Western of Iran, *British Microbiology Research Journal* **10**(6):1-8.

Oladipupo, O. M. (2013). An assessment of quality of health care delivery in private health facilities in Ibadan South East Local Government Area, Oyo State, Nigeria. Unpublished Master thesis, ObafemiAwolowo University, Ile-Ife, Nigeria, Pp 65.

Omeleke, I. I. (2010).Administration of health and welfare services in Nigeria: Policies and Issues, pp 51-55

Omoya, F. O. and Afolabi, Temitope (2016). Antibiotic sensitivity assay on pathogenic microorganisms isolated from selected areas in some primary health centres in Akure Metropolis, Nigeria. *International Journal of Public Health and Epidemiology*, **5**(8): 292-300.

Ondo State Hospital Management Board Report (2010). Hospital Development in Ondo State; the journey so far. Pp19-36.

Orrett, F. A., Brooks, P. J. and Richardson, E. G. (2008). Nosocomialinfections in a rural regional hospital in a developingcountry: infection rates by site, service, cost,and infection control practices. *Infect Control HospEpidemiol*, **19**:136–140.

Pittet .D, Taraara, D., Wenzel R. P. (2004). Nosocomial bloodstreaminfections in critically ill patients. Excesslength of stay, extra costs, and attributable mortality.*JAMA*, 271:1598–1601.

Kirkland K. B. (2000). The impact of surgical-site infections in the attributable mortality, excesslength of hospitalization and extra costs. *InfectContrHosp Epidemiol*,**20**:725-730.

Plowman R. (2009). *The socio-economic burden of hospital-acquired infection*. London, Public Health LaboratoryService and the London School of Hygiene and Tropical Medicine.

Pollack, M. and Andrew, J.T. (2010). "Rising Threats of Infections Unfazed by Antibiotics". New York Times; February 27. 42pp.

Ponce-de-Leon S. (2011). The needs of developing countriesand the resources required. *J Hosp Infect*, **18** (Supplement):376–381.

Prescott, L.M., Harley, J.P. and Klein, D.A. (2011). General Microbiology, 8th Edition, McGraw Hill, New York, USA. 1098pp.

Raymond J, Aujard Y, (2010). European Study Group.Nosocomial Infections in Pediatric Patients: An European Multicenter Prospective Study. *InfectControl HospEpidemiol*, **21**:260–263.

Resources, I. N. (2000).*Proceedings of the 3rd Decennial InternationalConference on Nosocomial Infections, PreventingNosocomial Infections. Progress in the 80's. Plans for the90's*, Atlanta, Georgia, July 31–August **3**:30(abstract 63).

Scheel, O. and Stormark, M. (2009). National prevalence surveyin hospital infections in Norway. *J Hosp Infect*, **41**:331–335.

Tikhomirov E. (2007). WHO Programme for the Controlof Hospital Infections. *Chemiotherapia*, 3:148–151.

United Nation Development Programme (2012). Report on human development index: 193-215

Valinteliene R, Jurkuvenas V, Jepsen OB. (2006). Prevalenceof hospital-acquired infection in a Lithuanianhospital. *J Hosp Infect*,**34**:321–329.

Vasque .J, Rossello .J, Arribas J. L. (2000). Prevalence ofnosocomial infections in Spain: EPINE study1990–1997. EPINE Working Group. *J Hosp Infect*, **43** Suppl:S105–S111.

appendix I.

Questionnaire

Basic Health Centres in Akure metropolis

Environmental Hygiene of Basic Health Centres and Influx of Patients and Visitors Assessment

QUESTIONAIRE

Please, tick box or underline where applicable

Sex / Gender: M ☐ F ☐

Age: Less than 20 years ☐ 20-30 years ☐ 30-Above ☐

Educational Status of Respondent: Primary / Secondary / Tertiary

Religion: Christianity / Islam / Others

Number of Years in the Health Centre: Less than 1year/ Less than 5years / More than 5 years.

Are the wards cleaned daily? Yes / No

The mode of cleaning employed: Antiseptic mopping / Just mopping / Sweeping

How often are the wards cleaned daily: Once / Twice /Three times daily

How often are the beddings (Pillows and bed sheets) washed: Daily/Twice a week/Once a week/After the discharge of an admitted Patient.

Mode of washing: By hand / By washing machine

Number of toilet in wards: One / Two / Three / More than three

Source of water supply: Well / Over head tanks / Borehole / Pipe borne water

Method of waste disposal in the wards: Use of waste basket / Dust bin / Covered trash can

Provision of hand sanitizers in wards: Yes / No

Provision of hand washing sink in wards: Yes / No

Provision of disposable hand towels in wards: Yes / No

How often are the toilets washed: Always / Twice daily / Daily / After use / Weekly

Do you clean the door handle? Yes / No

If yes, how often: Daily /Every other day/Weekly

The cleaning agent(s) employed: Liquid soap only /Liquid soap and Izal /Liquid soap and detol / Powdered soap and other disinfectants.

The estimated number of patients that visit your centre: Less than 10 daily / Less than 20 daily / Less than 30 daily / Less than 40 daily / Less than 50 daily / More than 50 daily /More than 100 daily.

Estimated number of patients admitted: Less than 10 daily / Less than 20 daily / Less than 30 daily / Less than 40 daily / Less than 50 daily / More than 50 daily /More than 100 daily.

Estimated number of visitors to the wards: Less than 10 daily / Less than 20 daily / Less than 30 daily / Less than 40 daily / Less than 50 daily / More than 50 daily /More than 100 daily.