

ASSESSMENT OF NOSOCOMIAL INFECTION IN PUBLIC HEALTH INSTITUTION IN GOMBE METROPOLIS, GOMBE STATE, NIGERIA

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Abstract

This study assessed nosocomial infection in public health institutions in Gombe metropolis, Gombe State, Nigeria. Gombe metropolis remain the hub of healthcare facilities and services of the entire Gombe State. The state experiences a lot of challenges that greatly affect the health sector and influence the healthcare system through outbreak of epidemic and endemic diseases. The study used questionnaire and in-depth interview (IDI) in collecting primary data, where 108 copies of questionnaire were administered and 103 were retrieved for analysis. The data was analyzed using SPSS Software version 2. Descriptive statistics was used to present the data in form of tables, charts and bar graphs. The study revealed that Surgical Site Infection (SSI) was the most commonly experienced nosocomial infection (NI), followed by malaria and the least experienced Nosocomial Infection was urinary tract infection (UTI) while hospital acquired pneumonia and diarrhoea are at their moderate level. Moreover, the study reveals almost all of the respondents are of the view that nosocomial infections can be contracted in healthcare facilities especially secondary and tertiary hospitals that admitted patients for number of days. Therefore, the study concluded that healthcare facilities have been neglected in terms of provision of basic consumable such as hand gloves, face mask, apron and gowns and also healthcare workers require frequent training on nosocomial infection. Thus, the study recommended that the management of healthcare facilities should provide basic consumables to healthcare workers for effective service delivery, A Scheme should be design for healthcare workers that will mandate frequent training on infection prevention and control and should be finance by either government or private organizations.

Keywords: Nosocomial, Infection, Public, Health and Institutions

Introduction

Infection refers to the intrusion of microorganisms into host tissues with capability of breeding and multiplying the organism accompanied by means of signs of illness such as fever and inflammation (Department for Health and Ageing, Australia [DHAA], 2017). Whereas Nosocomial infection (NI) can be defined as an infection acquired in a hospital by a patient admitted for a reason other than that infection. On the other hand, can be seen as an infection contracted by a patient in a medical institution or different health care facility in which the infection was once no longer current or incubating at the time of admission (World Health Organization [W.H.O], 2002).

WHO (2015); Crank and Bartram (2018) and Joshi et al. (2019) reiterated that safe and adequately hygienic environmental conditions in hospitals with sufficient water, sanitation, good waste

management practices as well as observing standard precautions are very vital in protecting and improving health situations in healthcare facilities against infections. Rainey and Weinger (2016) posit that dearth of clean water, functional toilets and hand washing facilities in healthcare settings poses serious threat to health risk of patients, healthcare workers and the surrounding communities. They went further to justify that the global menace of hospital acquired infection has been the consequence of lack of key hygienic comportment and sanitation as well as commitments by governments, international and local organizations in combating infections in healthcare facilities.

Similarly, Akbari, Fattahi and Fazeli (2018) found that contamination of hospital environment; healthcare workers and equipment play a major role in dispersion of nosocomial pathogens in the healthcare facilities. Ahmed et al. (2019) reiterated that direct or indirect contact of health personnel with contaminated surfaces and apparatus transmit majority of nosocomial infection pathogens in hospitals. On the other hand, Facciola et al. (2019) reiterated that the proximity of patient to hospital frequent touching of surfaces such as bed bars and header, bedside tables, taps and door knobs as well as linen, personnel coats and health personnel hands are considered as major routes in transmission of nosocomial pathogens.

Health care settings are environments where both infected persons and persons at risk of infection congregate. Patients with infections or carriers of pathogenic microorganisms admitted in hospitals are potential sources of infection for patients and staff (Ducel et al., 2002). Crowded conditions within the hospital, frequent transfers of patients from one unit to another, and concentration of patients that are highly susceptible to infection in one area (e.g. newborn infants, burn patients, and intensive care) all contribute to the development of Nosocomial infections. Microbial flora may contaminate objects, devices, and materials which subsequently contact susceptible body sites of patients and that will amount to severe illness or even death. In addition, new infections associated with bacteria such as waterborne bacteria or viruses and parasites continue to be identified and are of serious health threat to humanity (WHO, 2002).

There are five hundred and forty-six (546) Public health care facilities in Gombe State, which comprise Federal Teaching Hospital Gombe, State Specialist Hospital Gombe, Zainab Bulkachuwa Women and Children Hospital Gombe and twenty-three General hospitals and cottages as well as five hundred and twenty primary healthcare facilities, providing services for the teeming population of the state (Gombe State Ministry of Health, 2019) although the health facilities that were used for the study are State Specialist Hospital Gombe and Zainab Bulkachuwa Women and Children Hospital Gombe. The influx of patients and contamination of health care facilities in Gombe metropolis is alarming, hence the reason for conducting this research.

The objectives of the study are to:

- i. examine the common nosocomial infections in the study area;
- ii. assess the knowledge of healthcare workers on nosocomial infections in the study area

Significance of the Study

The level at which infectious diseases are emanating and spreading in health institutions globally is alarming, that leads to complicated health conditions of patients, increasing the burden of medical bills of patients on family and relatives and also metamorphoses of health conditions into complex diseases and illnesses. The situation is the same in Nigeria and across Africa, thus Gombe

metropolis is not exempted as it is the state capital and also the commercial centre of Gombe state, Nigeria. The state receives a lot of challenges more especially in the health sector where both health workers and health facilities are inadequate or insufficient. Infection prevention and control (IPC) is a universally relevant component of all health systems and affects the health and safety of both people who use the services and those who provide them (WHO, 2016). Hospital Acquired Infections (HAIs) have a significant impact on morbidity, mortality and quality of life and the present economic burden at the societal level.

Conceptual Issues and Literature Review

Concept of Infection

The term infection means the ability of a microorganism to enter, survive and reproduce in the host as well as causing body malfunctioning or sickness (Kumar et al. 2012). Infectious diseases are among the top five leading causes of death worldwide. In science, it has been well established that the environment plays a crucial role in the emergence and spread of infectious diseases. However, the relationships among human exposures to environmental pollution; rapid environmental change; and the emergence, spread, and persistence of infectious diseases are not yet well understood (National Academies of Science, Engineering and Medicine [NASEM], 2019). Moreover, Factors that influence the spread of infectious diseases include climate change, environmental pollution, poor water quality and sanitation, food insecurity, environmental degradation, biodiversity loss, natural and anthropogenic caused disasters, and poor governance (NASEM, 2019). Donker, Wallinga and Grundmann (2010) reiterated that pathogens that typically cause hospital-acquired infections have an opportunistic nature; infection occurs when a microorganism (bacterium, a protozoan, a virus or a fungus) invades a susceptible host and weakens the body system of a human being or animal. Also that the bulk of hospital-acquired infections are caused by bacteria which is the most prevailing microorganism in a hospital environment (Report of Comptroller and Auditor General, National Healthcare System, England, 2000).

Concept of Nosocomial infection

The concept of Nosocomial infection has been addressed with different terminologies such as Hospital Acquired Infections, Hospital Associated Infections, Healthcare-Associated Infections (HAIs) Warraich, Mahmood and Zaidi (2010); Ciccolini et al (2013); Angus et al (2016); Reddy, John, Devi and Kumar, (2015). Although the word Nosocomial is derived from a Greek word *Nosocomium* meaning hospital or place of curing ailments. Therefore, this study restricts itself to the term Nosocomial infections to avoid ambiguity or equivocation.

Joshi et al. (2019) defined Nosocomial Infections as those infections that are contracted by a patient within 48-72 hours or 3 days of admission in a healthcare facility or medical care unit. While Inweregbu, Dave and Pittard (2005); Sinsinwar and Chauhan (2019) considered Nosocomial Infections as those infections affecting patients within two days of hospitalization or 3 days of discharge or 30 days of an operation. Also, Donkor (2019) in a study confirmed that Nosocomial or healthcare-associated infections are regarded as the most frequent adverse event that threaten patients' safety and have serious economic and social consequences across the globe.

Study Area and Methodology

Gombe metropolis is located between Latitudes 10°15'N - 10° 19'N and Longitudes 11° 07'E - 11° 15'E. It is bounded by Kwami L.G.A to the North, Akko L.G.A to the Southwest and Yamaltu Deba L.G.A to the East (Abashiya et al, 2017). It comprises 11 political wards and some parts of Akko

Local Government Area and it has an area of about 52sqkm (Amos, 2015), (Figure 1). The public health institutions in Gombe metropolis are dispersed within

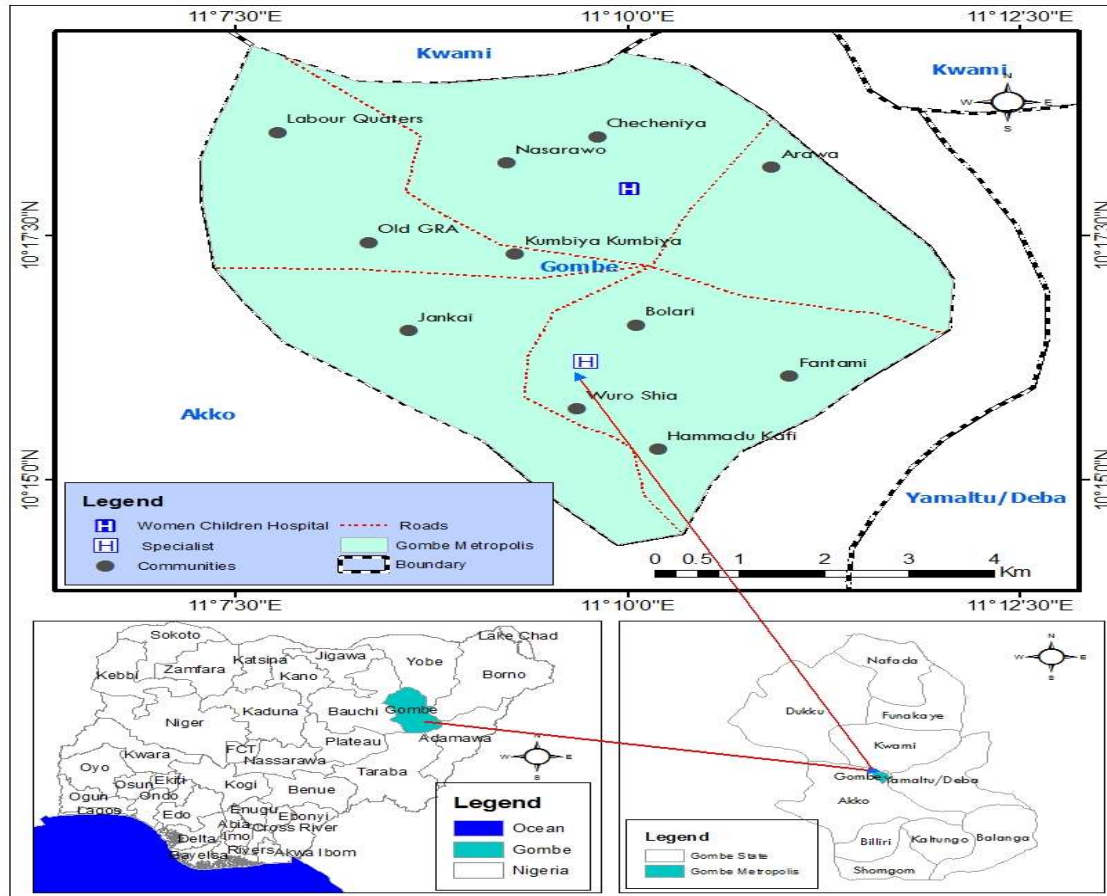


Figure 1: Gombe State Showing the Study Area

Source: Adapted from Administrative Map of Nigeria (2021)

Gombe metropolis has a tropical continental type of climate, classified as Koppen's Aw. It is characterized by strong rainfall seasonality with distinct wet and dry season (Oladipo, 1995). The rainfall is concentrated between the months of May and September with a single maximum in August (Amos et al., 2015). The relief of the Metropolis ranges between 650m in the western part to 370m in the eastern parts. Subsequent dissection and stream incision in the area have carved a landscape consisting of flat topped to conical hills, a granitic residuals and pediment landscape (Mbaya, Ayuba & Abdullahi, 2012). Gombe metropolis has a population of 261,536 (National Population Commission, 2009) and when projected to 2021, the population is 762, 629. The state capital comprises diverse ethnic groups and tribes from within and outside the state which include Tera, Fulani, Bolewa, Waja, Tangale with some fractions of other tribe like Jukun, Cham, Shongom among others

Materials and Method

Materials used for the study

- i. Sterile swab sticks
- ii. Hand gloves
- iii. Facemask

- iv. Permanent maker
- v. Writing materials
- vi. Peptone water
- vii. Foil paper
- viii. Petri dish
- ix. Chrome agar
- x. Water

The Primary data for the study was sourced through administration of questionnaire to healthcare workers, in-depth interview and swab samples from the surfaces within the healthcare facilities. The Secondary data was sourced from the surveillance units of the public health institutions in study area, i.e. the State Ministry of Health records, where the targeted health institutions were identified. Relevant materials such as textbooks, journals, Newspapers, published and unpublished research works among others were used for literature review.

Sample size and sampling techniques

The sampling frame for this study encompasses the entire patients and healthcare workers in public health institutions in Gombe metropolis. To determine the sample size, Krejcie and Morgan (1970) table was used to obtain the suitable number of respondents required for the study.

The study employed purposive sampling technique (this is due to the fact that the respondents have unique features which were considered during the study) in selecting the wards/Units in the healthcare facilities and also disproportionate sampling was used in determining the required number of questionnaire administered to respondents that are willing and capable of providing the necessary information required for the research as well as convenient sampling technique was used in administering the questionnaire to the health workers and also 30 swab samples were taken from different surfaces within the units selected in the healthcare facilities for the study.

The research exempted the Outpatient Department (OPD), Accident and Emergency (E&A), theatre room, laboratory and purposively selected the following units Amenity, Pediatric, Surgical Male & Female Wards, Maternity (post-delivery), Obstetric and Gyneacology because patients are usually not admitted for more than 48 hours in the former. To establish occurrence of NI in a facility, a patient has to be admitted beyond the aforementioned hours which is a major yardstick in the study.

Moreover, the required sample size for the study was obtained from the Krejcie and Morgan (1970) table of determining sample size. According to the table, population of 154 healthcare workers, require a number of 108 healthcare workers as sample size. The average population of admitted patients is 300 and the average population of healthcare workers is 154 which were obtained during reconnaissance survey from administrative office of the healthcare facilities. The study considers both patients and the health personnel population although only the healthcare workers' population was used while determining the sample size due to the fact that they are the ones to provide the required information for the study. Therefore, the data was analysed using descriptive statistics through Statistical Package for Social Science (SPSS) Software. Results were presented in tables, charts, and pictorial form.

Results and Discussions

This section presents the results of the responses obtained from sampled respondents through administration of questionnaire and indepth interview. It begins with the socio-economic

characteristics of the respondents and ends with examinations of issues relating to nosocomial infections.

Age and sex of respondents

Figure 2 shows the distribution of the respondents by age. The age group between 21-30years has the highest proportion (53.4%) followed by the age group 31-40 with (33%) and 51-60years has the least proportion in the distribution. In all (86.4%) of the respondents fall within the ages of 21-40years which is a clear indication of youthful participants.

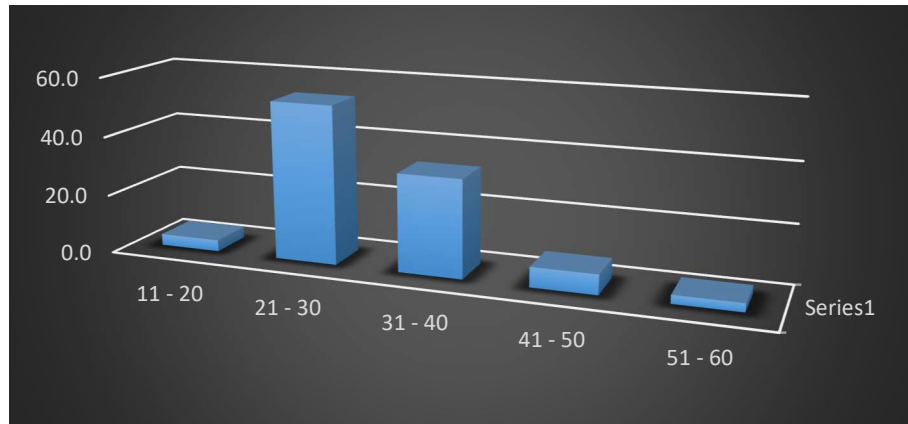


Figure 2 Age of the respondent

Source: Field Survey, 2021

The finding of the research is in harmony with the findings of Balarabe et al. (2015) in Zaria. The study focused on the knowledge of healthcare workers on nosocomial infections revealing that majority of the respondents are between the age of 20-29years, thus representing (77.2%) of the respondents. In the same vein Alrubaiee et al. (2017) conducted a study in Sana'a city, Yemen which focused on Knowledge and practices of nurses regarding nosocomial infection control measures in private hospitals. The research pointed out that the greater percentage of the respondents are between the age of 25-30years.

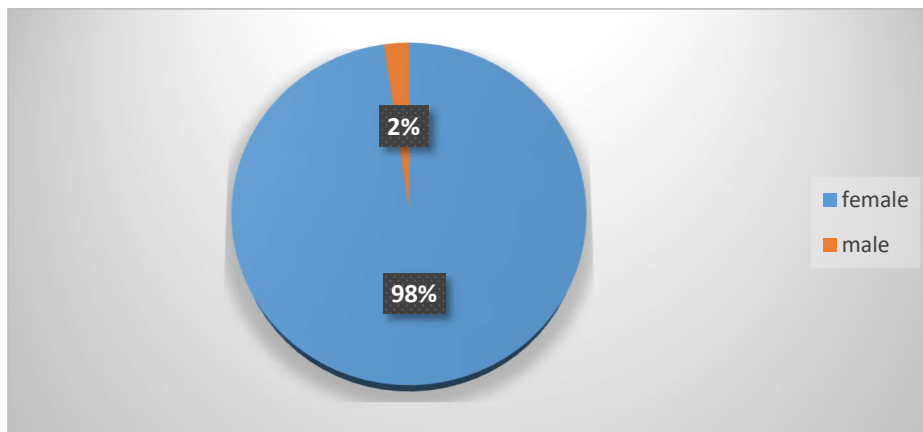
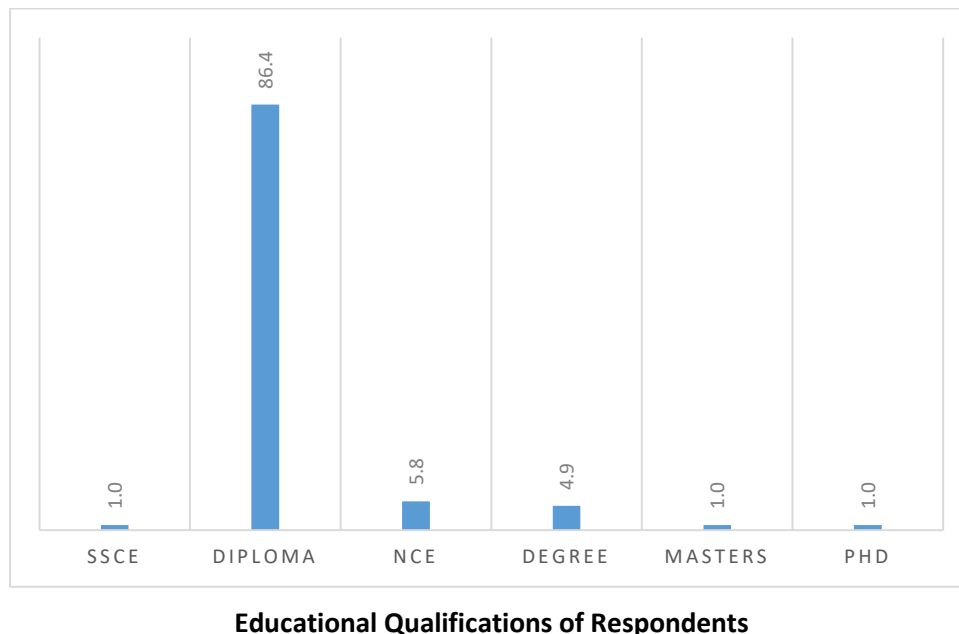


Figure 3 sex of the respondent

Source: Author's Field Survey, 2021

Figure 3 shows the percentage of males and females in the distribution, (98%) of the respondents are female while 2% are male. This implies that there are more female healthcare workers than their males' counterparts in the facility, moreover, this is also an indication that the population of women is increasing in the medical profession, more especially in Northern Nigeria. Hitherto women are not given the opportunity to further their studies, not to talk of belonging to a profession that has do with interacting with men oftentimes. The findings of the research are in agreement with the findings of Mudassar, et al. (2019) and Balarabe et al. (2015) which revealed that 95.8% and 96.3% of the research participants are females.



Source: Author's fieldwork, (2021)

Figure 4 reveals that 86.4% of the respondents obtained diploma certificate, (5.8%) obtained Nigeria Certificate in Education and the least proportion in the distribution are those that obtained M.sc and Ph.D Certificates. The findings of this study corroborate with the study of Jemal (2018) on the Knowledge and Practices of Hand Washing among Health Professionals in Dubti Referral Hospital, Dubti, Afar, North-Eastern, Ethiopia. which discovered that (50%) of the respondents obtained diploma in nursing science. Alrubaiee et al. (2017) also obtained similar result where 60% of the respondents have diploma in nursing while 40% have B.Sc degree in nursing, thus, the latter figure is contrary to what was obtained in the current study which shows that only (4.9%) of the respondents obtained B.sc in nursing science.

Specialization of the respondents

Figure 5 reveals the cadre of the respondents, 69% are nurses, 24% are midwives and 7% other are doctors and medical laboratory scientist. This finding corresponds with the findings of Yawson and Hesse, (2012) in Ghana which reveals that 54% of the respondents are nurses by profession while 46% are doctors by profession. This implies that nurses have the highest proportion of respondents in the distribution and this may be as result of the fact that nurses spend more hours with patients than any other specialization in the health profession.

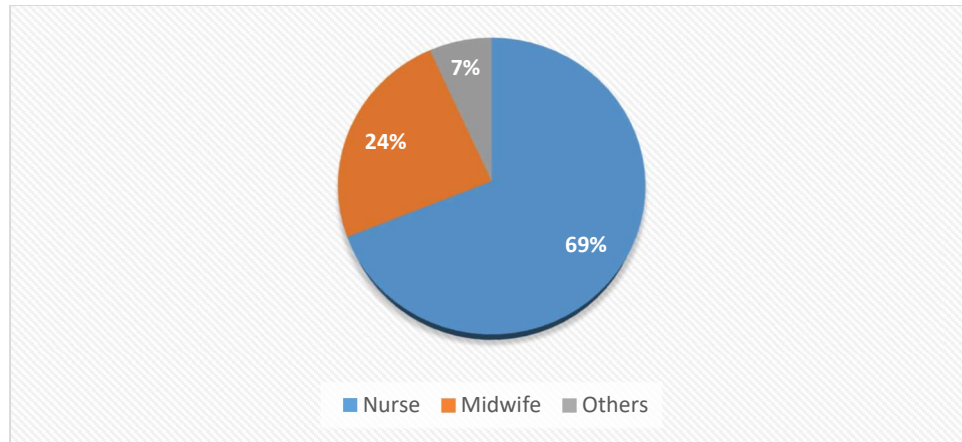


Figure 5 Specialization of the respondent

Source: Author's field survey, 2021

This implies that nurses are mostly required in substantial number in healthcare facility than any other specialization, because they are the cadre that spend substantial number of hours with patients and also have the sole responsibility of taking care of patients under admission in the hospital.

Years of experience in service

Table 1 presents the duration of years in service by the respondents. About 26.2% of the respondents have spent eight years in service while 24.3% have spent six years and the respondents that have least proportion in the table are those that spend more than ten years. The findings of the study correspond with the findings of Sorte et al (2015) in India which focused on nurses knowledge on prevention of nosocomial infection revealing that 38.33% of respondents spent 3-5years in service which is the greater percentage of the research participants and it is also in harmony with the findings of Salem (2019) in Kingdom of Saudi-Arabia, which shows that 68.3% of the respondents have less than five years' experience in service. This implies that most of the respondents have less than 10years experience in healthcare profession; thus, that may affect their ability and capability in handling complex cases which require highly skilled nurse.

Table 1: Presents number of years in service

Years	Frequency	Percentage
2years	11	10.7
4years	21	20.4
6years	25	24.3
8years	27	26.2
10years and above	19	18.4
Total	103	100

Source: Author's field work, (2021)

Common types of Nosocomial Infection in study area

Table 2 shows the commonly experienced nosocomial infection in the study area, the study reveals that 37.9% of the respondents stated that surgical site infection was the most commonly experienced NI, followed by malaria (19.4%) and the least experienced NI was urinary tract infection. Hospital acquired pneumonia and diarrhoea are at their moderate level. Thus, this

implies that the incidence is still increasing in the study area. This finding corroborates with the findings of Amita, et al. (2019) which indicated that Surgical Site Infection (SSI) is the most commonly experienced NI where it affect 66% of all operated patients that participated in the study. Similarly, Balarabe et al. (2015) in Zaria, Nigeria reveals that 40% of the sampled respondents stated that SSI is the most commonly observed NI during the study.

What I can say concerning the prevalence of NI is that it is high somehow because of the state medical budget, poor sanitary conditions or negligence of healthcare workers or carelessness, some people are careless with their health while some prefer to own certain things like assets rather than taking care of their health, place priority on other things rather their health (HNS ZBK Women and Children hospital, Gombe metropolis, 07/07/202).

Table 2: Types of nosocomial infection in study area

Infection	Frequency	Percentage
Surgical site infection	39	37.9
Hospital acquired pneumonia	17	16.5
Malaria	20	19.4
Urinary tract infection	8	7.8
Diarrhoea	19	18.4
Total	103	100

Source: Author's field work, 2021

Although, in contrast to the above finding, a study by Angus et al. (2016) in Delta, Nigeria, revealed that 61.4% of the respondents indicated that Urinary Tract Infection (UTI) is the commonest observed NI in the study. Thus, the commonly observed NI vary in space and time as discovered in the aforementioned literature.

Knowledge of healthcare workers on Nosocomial Infection in the study area

Jamal (2018) defined knowledge as the process of acquiring adequate understanding of a phenomena. Therefore, the ultimate goals of any profession is to effectively and successfully deliver it's expected mandates, thus services cannot be diligently and professionally carried out without good knowledge.

Awareness on acquiring nosocomial infection

Figure 6 reveals that 99% of respondents gave an assurance that nosocomial infections can be contracted in healthcare facilities especially secondary and tertiary hospitals that admit patients for days while (1%) still believe that infection cannot be acquired in healthcare facilities. This finding is similar to the findings of Alrubaiee, et al (2017) and Desta, et al. (2018) which shows that 87% and 84.7% respectively, of the respondents are well aware of NI. This implies that since the greater percentage of the respondents are aware of hospital acquired infection, it can be easy to address in term of prevention and control.

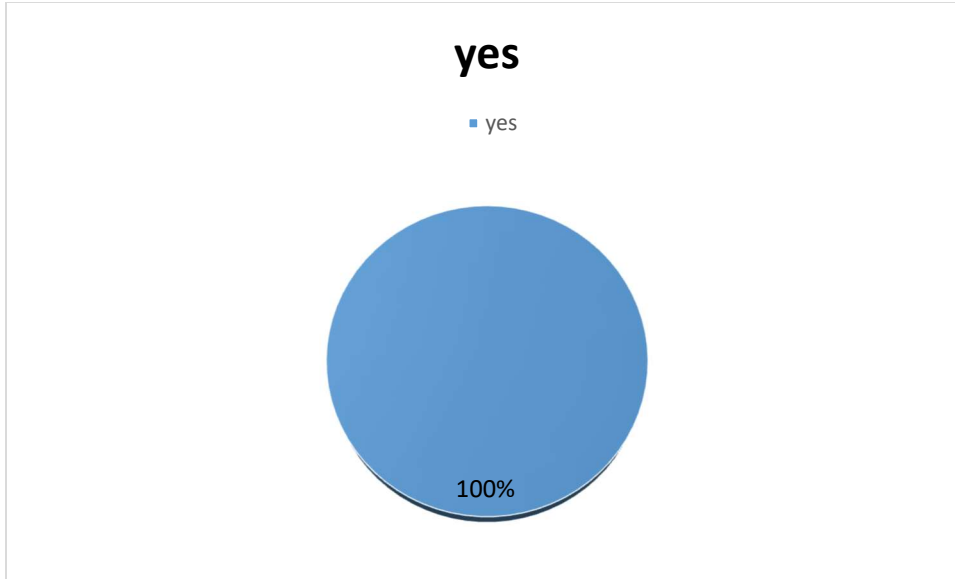


Figure 6 Distribution of respondents in terms of Awareness of Nosocomial Infection

Source: Author's field work, (2021)

Means of NI transmissions

Figure 7 shows that respondents unanimously agree that food, water, air, hospital's waste and healthcare personnel are mediums that patients as well as healthcare workers contract nosocomial infection over time. This implies that the aforementioned items are key factors that influence the incidence and prevalence of hospital acquired infection. Samuel et al. (2010) in a study on nosocomial infections and the controlling challenges in developing countries, reiterated that NI are mostly caused by endogenous (internal factors) and exogenous (external) factors and they refers to exogenous factors as food, water, healthcare workers and hospital environment.

According to the opinion of a respondent during in-depth interview discussion:

the causes are many, it can be from the food the patients eat, the water they drink or through personal contact with healthcare workers; it can be from patient to nurse or from nurse to patient (Head of Nursing Service, Zainab Bulkachuwa women and children hospital, Gombe metropolis, 07/07/2021)

Conclusion

The findings of this study vividly indicated that nosocomial infection is still a monster in healthcare facilities. The study concluded that healthcare workers have some level of knowledge on Nosocomial Infections but much needs to be done in terms of training and retraining of healthcare workers on updated techniques of handling infections in hospitals, through organizing seminars, conferences and symposiums as well as programmes that are capable of equipping them with substantial knowledge of infection prevention and control.

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