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By

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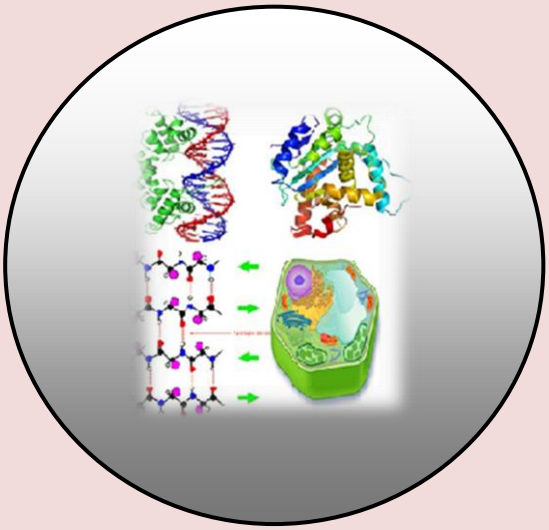

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# Investigation of Occurrences and Prevalence of Nosocomial Infections in Federal Medical Center (F.M.C.), Birnin Kebbi, Kebbi State, Nigeria

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## ABSTRACT

***A study on nosocomial infection was important due to rampant reported cases of it in our health care centers. Therefore, it becomes imperative to carry out research study on occurrence of Nosocomial infection in FMC Birnin Kebbi state Nigeria with a view towards investigating the types and prevalence of microbial infection, common Nososcomial infection and susceptibility of administered drugs on isolates. About 600 patients were admitted during a period of one year, whereby 13 of them were found to have nosocomial infection through clinical diagnosis indicating post-operative sepsis, surgical site infection, sepsis, foot ulcer, implant infection and urosepsis. The nature of specimen collection for isolate analysis was mainly from wound swap (92.3 %) from male and female adult patients except urethra catheter (7.7 %) from urosepsis patient. Some of the isolates are peculiar to a particular type of clinical diagnosis while few did not show any peculiarity.***

***The commonest isolated organism was Staph aureus (46.6 %) representing the only gram positive bacteria, while E. coli ranked next as most common isolated organism from wounds; gram negative bacteria of 53.4% were responsible for nosocomial infection at FMC Birnin Kebbi. Antimicrobial susceptibility and resistance pattern of the 7 isolated organisms where found to show sensitivity pattern to clindamicine, cyprofloxacine, gentamicicne and erythromycin, but shows resistant to amoxicillin. Statistical frequency of drugs used for the treatment of diagnosed wounds shows that ciprofloxacin and gentamycine are the two most common susceptible antibacterial for treatment of different types of wound, accounting for 24 % success rate. This is followed by miropinem (17.2 %), erythromicine (13.7 %), ceptazidine and cefuroxime (10.3 %), tygecycline (6.9 %), while other drugs had 3.4 % marginal success. The study shows that there was no particular isolate responsible for diagnosed nosocomial infections except where there were rare cases and there was no particular trend of antibacterial drugs for a particular type of nosocomial infection; therefore, the sensitivity pattern did not show a particular trend.***

***Keywords: Nosocomial, Wound swap, Pathogens, Isolates, Urosepsis and Susceptibility.***

## INTRODUCTION

A hospital acquired infection may be described as "any clinically recognizable microbiological disease that affects the patient as a consequence of his being admitted to hospital or attending for treatment, or the hospital staff as a consequence of their work, whether or not the symptoms of the disease appear while the affected person is in the hospital". Such infections may be caused by micro-organisms acquired from another person in the hospital (cross-infection), acquired from an inanimate object or substance that had not been recently contaminated from a human source (environmental infection), or carried by the patient before the appearance of the hospital-acquired disease (self-infection). It is reasonable to regard the self-infection of a patient, whether the causative organism was carried by the patient before admission to hospital or acquired subsequently, as hospital-acquired if the development of disease can be attributed to a procedure performed in hospital (Garner, 1996). A wound is a breakdown in the protective function of the skin; the loss of continuity of epithelium, with or without loss of underlying connective tissue. Wounds can be accidental, pathological or post-operative. An infection of this breach in continuity constitutes wound infection. Wound infection is thus the presence of pus in a lesion as well as the general or local features of sepsis such as pyrexia, pain and indurations. Infection is believed to occur when virulence factors expressed by one or more microorganisms in a wound out-compete the host natural immune system (Englesbe et al., 2010). Studies on wound infection have largely focused on surgical site infections (Mangran et al., 1999; Mawalla et al., 2011). This might be because other types of wound infection are not problematic in the developed world where most of these studies have been done. However, in developing and resource-poor countries, other types of wound infection in addition to surgical site infection are still important causes of morbidity and mortality (Jenks et al., 2014.). Where studies have been done on wound infections generally, regional and local variations have been observed in terms of the causative micro-organisms (Aillegranzi et al., 2006). This means that physicians need to know the prevalent organisms and the resistance patterns existing in their localities. Surgical site infections are attributable to a variety of factors which can be classified into patient-related, procedure-related and others. Other risk factors include the volume of surgeries performed in the department, the season, the working environment in the operation room, and the indications for surgery (Alexander, 1994; Sands et al., 1996; Gaynes et al., 2001; Fadeyi et al., 2008). The World Health Organization (WHO) and other studies indicated that periodic surveillance and feedback for surgeons on SSIs rate and associated factors can decrease up to 50 % of cases (Wariso and Nwachukwu, 2003).

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. The economic costs are considerable (Danchawijits et al., 1995). The increased length of stay for infected patients is the greatest contributor to cost (Raymond and Aujard, 2000). Scheel and Stormark (1999) showed that the overall increase in the duration of hospitalization for patients with surgical wound infections was 8.2 days, ranging from 3 days for gynaecology to 9.9 for general surgery and 19.8 for orthopaedic surgery. Prolonged stay not only increases direct costs to patients or payers but also indirect costs due to lost work. The increased use of drugs, the need for isolation, and the use of additional laboratory and other diagnostic studies also contribute to costs.

Patients with infections or carriers of pathogenic microorganisms admitted to hospital are potential sources of infection for patients and staff. Patients who become infected in the hospital are a further source of infection. Crowded conditions within the hospital, frequent transfers of patients from one unit to another, and concentration of patients highly susceptible to infection in one area (newborn infants, burn patients, 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. In addition, new infections associated with bacteria such as waterborne bacteria (typical mycobacteria) and/or viruses and parasites continue to be identified (WHO, 2002).
The rampant reports of nosocomial necessitates this study whereby it intends to investigate the cause of nosocomial infections, the types its prevalence, common pathogens responsible for the infections and the susceptibility of the microbes to drugs.

## MATERIAL AND METHODS

The place of study for the research is Federal Medical Center Birnin Kebbi, Kebbi State, Nigeria.
Data for the study was collected from the hospital Medical Laboratory, from records of recorded cases of patients identified with nosocomial infections.

## RESULTS AND INTERPRETATION

A total of over 600 patients were admitted within a period of October 2018 to October 2019 (1 year) out of these numbers about 80 patients went through surgical operations whereby hospital acquired infections (HAIs) cases of the 80 patients show that only 13 of them including male and female with different causative factors were associated with different pathogens manifested in them. In all the cases recovered from the hospital (FMC); all the patients involved with nosocomial infection are mainly adult of ages between 35-55 years. The details of the nature of specimen collected, clinical diagnosis, wards of the patients, isolates or pathogens involved, and their sensitivity pattern were presented in Table 1.

### Clinical diagnosis

The 13 patients found with nosocomial infection have different form of clinical diagnosis. The patients were diagnosed with different infections sources of nosocomial these include post-operative sepsis, surgical site infection, sepsis, foot ulcer, implant infection and urosepsis. Statistical details of the clinical diagnosis in relation to the number of patients involved, percentage of the number of patients involved and frequency of male and female diagnosed of nosocomial infection from the Federal Medical Center, Birnin Kebbi was presented in Table 2.
Analysis of Table 2 shows that the most diagnosed nosocomial infection were sepsis and foot ulcer, with four patients accounting for 30.7 % each. The sex of patients for both sepsis and foot ulcer are mostly involved found in male patients and rarely with female patients with ratio 3:1 respectively.
However, patients with surgical site infection were two cases, constituting 15.3 % found in both male and female. The other clinical cases such as post operation sepsis, implant infection and urosepsis; all recorded one patient each (7.6 %) with patients involved are all male.

Therefore, it was deduced that male were more susceptible to nosocomial infection than females in Federal Medical Center, Birnin Kebbi. The overall percentage of male patients recorded is 76.9 % compared to 23.1 % of females documented to have acquired hospital infections.

**Table 1. Nosocomial data showing nature of specimen, clinical diagnosis, isolate and sensitivity pattern from FMC, Birnin Kebbi.**

| S/N | Sex | Nature of the specimen | Clinical diagnosis | Ward | *Isolate* | Sensitivity pattern |
|---|---|---|---|---|---|---|
| 1 | M | Wound swap | Post-operative sepsis | SOPD | *Staphylococcus aureus* | S- DA/CIP/GENT/E/<br>R- AUG/CFM |
| 2 | M | Wound swap | Surgical site infection | MSW | *Escherichial coli* | ESBLS Negative<br>R- CTX/CAZ/OFL/AUG |
| 3 | F | Wound swap | Sepsis | POPD | *Staphylococcus aureus* | S- GENT/OFX<br>R- CEF/ERYTM |
| 4 | M | Wound swap | Foot ulcer | SOPD | *Staphylococcus aureus* | S- GENT/ERYTM<br>R- OFX/CIP |
| 5 | M | Wound swap | Leg ulcer | SOPD | *Staphylococcus aureus* | S- MIP/GENT/AUG<br>R- FOX |
| 6 | F | Wound swap | Foot ulcer | SOPD | *Pseudomona eloginosa* | s- CIP/CEP<br>R- CEFZ/CEF/IMP/AZN |
| 7 | F | Wound swap | Surgical site infection | SOPD | *Staphylococcus aureus* and *Klebsella Pneumonia* | S- MIP/CXM<br>R- AUG/E/CIP<br>S- CIP/ATM/MIP/CAZ<br>R- AUG |
| 8 | M | Wound swap | Foot ulcer | SOPP | *E. colli* | S-LDM/GENT/ERYTM/CEF<br>R- CIP/CEFX |
| 9 | M | Wound swap | Implant infection | SOPP | *E. colli* | S-TIG<br>R- CEF/CFM/CIP |
| 10 | M | Wound swap | Sepsis | POPD | *Staphylococcus aureus* | S-CIP/DA/GENT<br>R-E/FOX |
| 11 | M | Wound swap | Sepsis | GOPD | *Citrobacter* | S- CIP/G/AUG/CXM/CAZ<br>R- No Data |
| 12 | M | Urine urethral catheter | Urosepsis | GOPD | *Klebseller onytoca* | S- GENT/MPM<br>R- NFN/CEFX/CEF/CIP |
| 13 | M | Wound swap | Sepsis | SOPD | Enterobacter spp. strain 1<br><br>and strain 2 | S- TGC/ERT/MIP/ATM/FEP/OFX/CAZ<br>R- COL/AUG/AZT/CXM<br>S- TGC/IM/<br>R- AMC/AZT/CXM/OFX/ATM/FEP/CAZ |

**Table 2. Clinical diagnosis, percentage of occurrence and percentage of sex.**

| Clinical diagnosis | No. of patient | Percentage (%) | Male | Female |
|---|---|---|---|---|
| Post-operative sepsis | 1 | 7.6 | 1 | - |
| Surgical site infection | 2 | 15.3 | 1 | 1 |
| Sepsis | 4 | 30.7 | 3 | 1 |
| Foot ulcer | 4 | 30.7 | 3 | 1 |
| Implant infection | 1 | 7.6 | 1 | - |
| Urosepsis | 1 | 7.6 | 1 | - |
| Sex percentage | | | 76.9 % | 23.1 % |

**Sample specimen**

Report collected shows that samples of the affected wound parts were collected for culture and sensitivity at the FMC Hospital Laboratory by observing international standard laboratory procedures. Wound swap was the major form of sample specimen collected from sepsis, foot ulcer, and implant infections; only urine urethral cartheter was collected for diagnosed urosepsis infection. Therefore wound swap specimen collection accounts for 92.3 % while urine urethra cartheter constitutes only 7.7 % (Table 3).

**Table 3. Clinical diagnosis, nature of specimen and recovered isolates.**

| S/N | Clinical diagnosis | Nature of specimen | Type of associated isolate |
|---|---|---|---|
| 1 | Post-operative sepsis | Wound swap | *Staph. aureus* |
| 2 | Surgical site infection | Wound swap | *E. coli, Staph. aureus and Klebsella pneumonia* |
| 3 | Sepsis | Wound swap | *Staph. aureus, Citobacter, Enterobacter* spp. 1 and 2 |
| 4 | Foot ulcer | Wound swap | *Staph. aureus, E. coli, Pseudomonas aurogenosa* |
| 5 | Implant infection | Wound swap | *E. coli,* |
| 6 | Urosepsis | Urethra catheter | *Klepsella oxytoca* |
| Specimen occurrence % = Wound swap- 92.3 %, Urethra catheter- 7.7 % | | | |

**Isolate of Organisms**

Different types of bacteria were isolated with different forms of diagnosis, the isolated bacteria identified are *Staphylococcus aureus*, *E. coli, Pseudomonas aeruginosa*, *klebsiella pneumonia*, *Citrobacter*, *Klebsiella oxytoca* and *Enterobacter* spp. of strains 1 and 2. The details of the clinical diagnosis, the nature of the specimen and types of associated isolates are presented in Table 3. From the Table 3 post operation sepsis case with wound swap was infected with *Staph. aureus*, surgical site infection with wound swap, was found to be infected with *E. coli* in a patient while the second patient was infected with both *Staph. aureus* and *Klebsiella pneumonia* (Table 1). In the case of sepsis, it has 30.7 % dominated cases, with mainly wound swap as type of sample collected. It was infected with bacteria isolates such as *Staph. aureus*, *Citrobacter*, *Enterobacter* spp. of strains 1and 2 (Table 3).

The patient diagnosed with sepsis had singular type of isolates (Table 3). Foot ulcer also recorded very high percentage of diagnosis, nature of sample collected was mainly wound swap; isolated bacteria recovered include *Staph. aureus, Pseudomonas aeruginosa* and *E. coli* (Table 3). Out of the four patients infected two of them were infected by *Staph. aureus* while from the other two, one of them had *Pseudomonas aeroginosa* bacteria and the fourth patient was infected with both *E. coli* and *Staph. aureus* (See Table 1). The patient diagnosed with implant infection had wound swap collected for culture and sensitivity of *E. coli* bacteria only. However, patient diagnosed with urosepsis had urine urethra catheter as its nature of specimen collected. This is entirely at variance with wound swap collection commonly used for other mentioned clinical diagnosis. The patient with urosepsis had only *klebsiella oxytoca* as bacteria isolate for culture and sensitivity analysis (Tables 1 and 3).

**Table 4. Number of occurrence and percentages of isolated organisms.**

| S/N | Bacterial type | No. of occurrence | % of occurrence |
|---|---|---|---|
| 1 | *Staphylococcus aureus* | 6 | 46.6 |
| 2 | *Escherichia coli* | 3 | 23 |
| 3 | *Pseudomonia aeruginosa* | 1 | 7.7 |
| 4 | *Klebsell pneumonia* | 1 | 7.7 |
| 5 | *Citrobacter* | 1 | 7.7 |
| 6 | *Klebsella oxytoca* | 1 | 7.7 |
| 7 | *Enterobacter* spp. 1 and 2 | 1 | 7.7 |

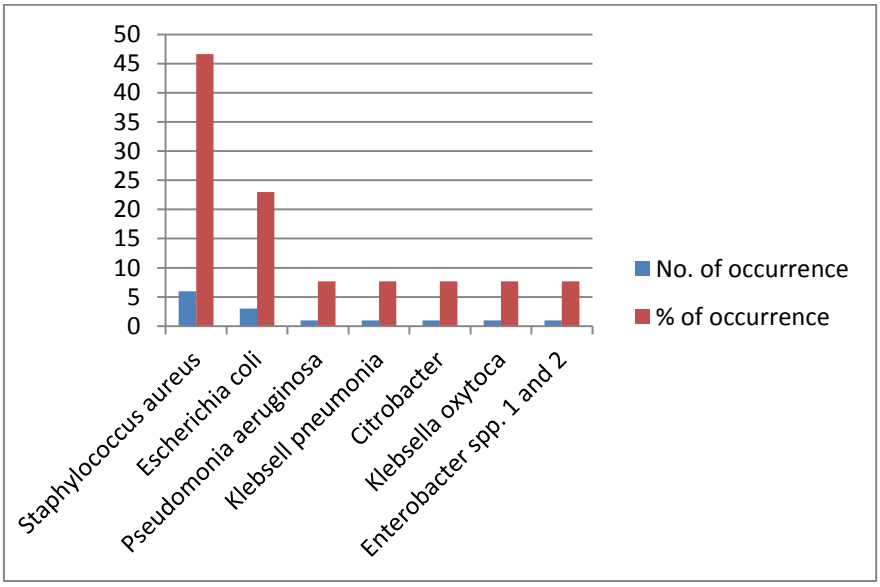


**Figure 1. Number and percentage of occurrence of infectious bacteria in Patients.**

The different types of isolated bacteria from the diagnosed cases of nosocomial infections show that *Staphylococcus auraus* has highest frequency of occurrence in patients. The bacterium was isolated in different types of wounds such as post-operative sepsis, sepsis, foot ulcer, and bile chronic leg ulcer. *Staphylococcus aureus* percentage of occurrence in patients was found to be predominant, accounting for about 46.6 % compared to other infectious bacteria responsible for hospital acquired infections (HIAs).

*Escherichia coli* also account for about 23 % as causative bacteria in diagnosed patients. It was commonly associated with wound swap collected from surgical site infection, foot ulcer, and implant infection. *E. coli* ranked next to *Staphylococcus aureus* as most infecting bacteria resulting to nosocomial infections in FMC, Birnin Kebbi (Table 4, Fig. 1). Other bacteria such as *Pseudomonas aeruginosa*, *klebsiella pneumonia, Enterobacter* spp of strains 1 and 2, *Klebsiella oxytoca* and *Citrobacter* are the least occurring pathogens that infected nosocomial patients at FMC. The level of occurrence of the pathogens is 7.7% each and the bacteria were isolated from different wound types such as ulcer (*Pseudomonas aeruginosa*), sepsis (*Enterobacter* spp. strains 1 and 2), surgical site infection (*Klebsella pneumonia*), sepsis (*Citrobacter*) and urosepsis (*Klebsiella oxytoca*) (Table 1).

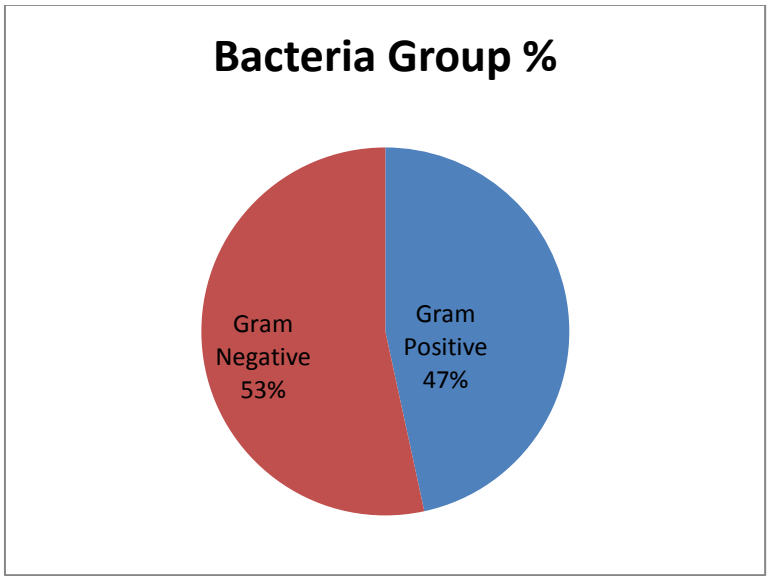


**Figure 2. Relative percentages of gram negative and gram positive Bacteria.**

**Bacteria group**

Gram negative bacteria including *E. coli, Pseudomonas aeruginosa, Citrobacter, Klebsiella pneumonia, Klebsiella oxytoca* and *Enterobacter* spp 1 and 2 were responsible for 53.4 % of the wound infections reported at F.M.C Birnin kebbi. This is in tandem with the outcome of studies carried out by Vincent *et al*. (2009). However, *Staph. aureus* was the only gram positive organism isolated (Figure 2). Out of the individual isolated bacteria *Staph. aureus* (gram positive) is the dominant bacteria accounting for 46.6 % of the wound infections as deduced in this study is in agreement with EPIC II study in African ICUS carried out by Vincent *et al*. (2009). This is followed by a gram negative isolate of *E. coli* representing 23 % of bacteria isolates from the wound swap. All other isolated organisms of gram negative are negligible and they only account for 7 % each of the wound infections (Figure 2).

In the case of surgical site infections, sepsis, and foot ulcers, there was no particular isolated organism that is peculiar to them. However, in other clinical diagnosis such as post-operative sepsis, implant infections and urosepsis, they were associated with peculiar isolated organisms such as *Staph. aureus, E. coli and Klebsiella oxytoca* respectively (Table 3). However, the peculiarity of isolated organism in post-operative sepsis, implant infection and urosepsis might not be unconnected with singular case reported of them.

**Antibacterial Susceptibility**

Each type of wound has its own peculiarity of treatment in terms of susceptibility and resistance pattern of the isolated organism. Antimicrobial susceptibility and resistance patterns of the seven isolated organisms were analyzed according to the samples collected from different clinical diagnosis. *Staph. aureus* was the only isolate from wound swap collected from post-operative sepsis, the isolated organism shows sensitive pattern to Clindamicine, Ciprofloxacine, Gentamicine, and Erythromicine, but shows resistance to Augumentine and Cefuroxime.

*Staph. aureus* was the peculiar isolate recovered from wound swap of sepsis. The isolate was sensitive to Gentimycine, and Oflaxacine but shows resistance pattern to Cefixime and Erythromycine. However, the *Staph. aureous* isolated from wound swap of foot ulcer shows sensitivity pattern to Gentamycine and Erythromycine but resistance to Ofloxacine, and Ciprofloxacine. The *Staph. aureus* was also a peculiar isolate in wound swap of bile chronic leg ulcer, the sensitivity pattern is quite different from other *Staph. aureus* sensitivity and resistivity pattern. The *Staph. aureus* in the leg ulcer shows sensitivity to Miropinine, Gentimycine, Augumentine and Cefuroxime, while only resistant to Cefoxitine. The only peculiar isolate associated with wound swap from another sepsis is *Staph. aureus*, the isolate shows sensitivity pattern to Ciprofloxacin, Clindamycin and Gentamycine but only resistant to Erythromycine and Cefoxitime.

*Escherichia. coli* was a peculiar isolate from wound swap of implant infection, the isolate was found sensitive to Tigycycline and resistant to Cefuroxime, Ceptazidine, Ceftriaxone and Ciprofloxacine. Surgical site infection shows *E. coli* as the only peculiar isolate from wound swap, the *E. coli* was tested for extended spectrum beta lactamase (ESBLS) which was found negative, it was however resistant to Cephotaxime, Ceptazidime, Ofloxacine and Augumentine.

A peculiar isolate from wound swap of another sepsis wound is *Citrobacter*, the isolate shows sensitivity pattern only to Ciprofloxacin, Gentimycine, Cefuroxim, and Ceftazideme without any sign of resistivity pattern. In the case of wound swap collected from leg ulcer of a patient shows an isolate of *Pseudomonal aeriginosa*. The *P. aeriginosa* shows sensitivity pattern to Ciprofloxacin and Cefepime but strong resistivity pattern to Ceftazidine, Cefixime, Imipinem and Azithtromicine.

A patient in surgical outpatient department ward (SOPD), diagnosed of sepsis had wound swap collected for determination of isolates which was found to be *Enterobacter* spp. strains 1 and 2. The *Enterobacter* spp. strain 1 shows sensitivity pattern to Tygecycline, Erythromycin, Miropinine, Aztreonam, Cefepime, Ofloxacine and Ceftazidime. However, the strain 2 shows resistance to Colistin, Augumentine, Azithromicine and Cefuroxime. The *Entrobacter* spp. of strain 2 from the same patient shows sensitivity to Tygecycline, and Imipenem. However, the *Enterobacter* strain 2 shows a wide range resistivity pattern to Augumentine, Azitromicine, Cefuroxime, Ofloxacine, Aztreonam, Cefepime and Ceptazidime.

The only recorded case of uropsis was investigated through collection of urethra catheter for isolate analysis. The isolated organism of *Klebsiella oxytoca* was further analyzed for extended spectrum beta lactamase (ESBLS), the isolate shows sensitivity pattern to Gentamycine and Miropinine but showed resistivity pattern to Nitrofurantoin, Cefixime, Ceftriaxone and Ciprofloxacine.

Two patients were differently diagnosed for surgical site infection and right foot ulcer, they were found not to have a peculiar isolate associated with them. The patient with surgical site infection was found to have two isolated organisms from wound swap which were sensitive to Miropinin, and Cefuroxime, but show resistivity pattern to Augumentine, Erythromycine and Ciprofloxacin. The second patient diagnosed of right foot ulcer, whereby, analyzed wound swap contained *E. coli* and *Staph. aureus.* The isolates were susceptible to Ciprofloxacine, Aztreonam, Miropinim and Ceptazidime. However, the isolates only show resistivity pattern to Augumentine.

**Table 5. Antibiotics susceptibility rate and percentage.**

| S/N | Antibiotics | Susceptibility Rate | Percentage (%) |
|---|---|---|---|
| 1 | Gentamicine | 8 | 19.5 |
| 2 | Ceprofloxacine | 5 | 12.1 |
| 3 | Erythromicine and Miropinine | 4 each | 9.7 each |
| 4 | Ceftazidime, Cefuroxime and Tygecyclin | 3 each | 7.3 each |
| 5 | Clindamicine, Cefipime, Aztreonmycine and Ofloxacin | 2 each | 4.8 each |
| 6 | Others (3) | 1 each | 2.4 each |

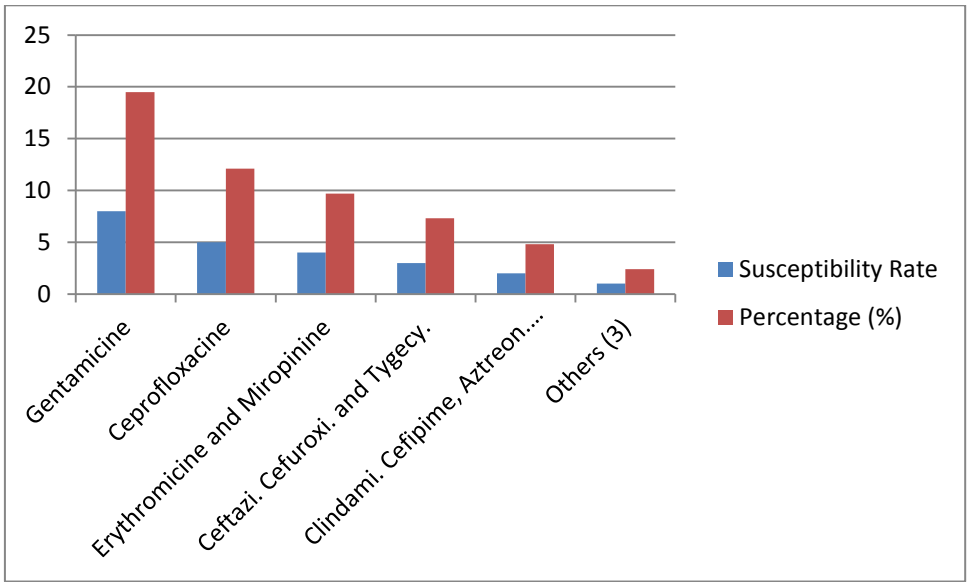


**Figure 3. Antibiotics susceptibility rate and percentage in isolates at FMC Birnin Kebbi.**

**Susceptibility and Resistivity percentage pattern**

Generally, there is no particular trending pattern of the susceptibility and resistivity pattern on the isolated organisms.

**Susceptibility percentage Pattern**

Statistical frequency of drugs used for the treatment of clinically diagnosed wounds show that Gentamicine is the most susceptible antibacterial for the treatment of different types of wound reported in this study (Table 4.1). The drug accounts for 19.5 % in the treatment of various wounds (Table 5 and Fig. 3). Ciprofloxacin is also effectively sensitive to the treatment of various wound types, it accounts for 12.1 % success rate (Fig. 3).

Erythromycine and Miropinine were also found to show moderate susceptibility pattern to different isolated organisms, they reflect 9.7 % success rate each in the treatment of various wounds (Table 5). Ceftazidime, Cefuroxime and Tygecycline were also susceptible to few wound treatments with 7.3 % success rate each (Fig. 3). Clindamycine and Cefipime were fairly sensitive to wound treatment, with success rate of 4.8 % in the management of wound treatment. Other drugs show very rare susceptibility pattern and each of them represent 2.4 % marginal success rate in the treatment of clinical diagnosed wounds at FMC Birnin kebbi (Table 5 and Fig. 2).

**Resistivity percentage pattern**

Table 1 shows different isolated organisms with various resistivity patterns in different diagnosed wounds. Table 6 summarizes the antibiotics and their frequency of resistivity pattern to different isolates in the treatment of different wound types. Augumentine is the antibiotic that shows very high resistivity pattern frequency (17.1 %) compared to other drugs. Ciprofloxacine and Ceptazidime also show relatively high resistivity percentage pattern (14.3 % each) during the treatment of various wound types. Some other antibiotics such as Erythromycine, azitromycine and Cefuroxime show mild resistance to isolates, representing 8.6 % each in terms of frequency of resistivity (Table 6 and Fig. 4). Cefixime and Cefoxitine show 5.7 % susceptibility rate to isolated organisms. Other antibiotics apart from those with high to mild resistivity patterns show negligible resistance to isolated organisms from different wound types. They account for 2.8 % resistivity pattern distribution (Tables 1, 6 and Fig. 4).

**Table 6. Antibiotics resistivity rate and percentage.**

| S/N | Antibiotics | Frequency | Percentage (%) |
|---|---|---|---|
| 1 | Augumentine | 6 | 17.1 |
| 2 | Ciprofloxacin and Ceptazidime | 5 each | 14.3 each |
| 3 | Erithromycin, Asithrimycine and Cefuroxime | 3 each | 8.6 each |
| 4 | Cefixime, Cefoxitine | 2 each | 5.7 each |
| 5 | Others (6) | 1 each | 2.8 each |

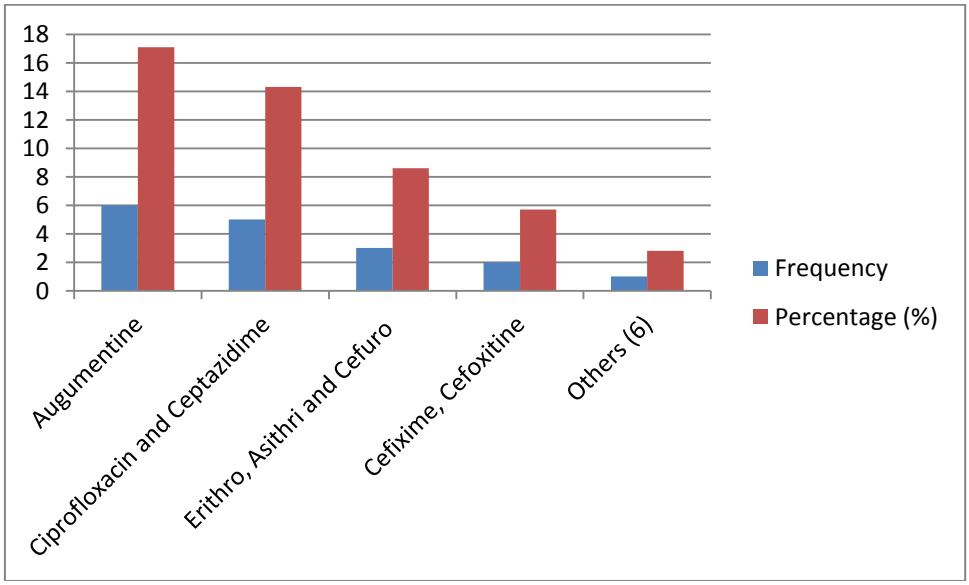


**Figure 4. Antibiotics resistivity frequency and percentage in isolates at FMC Birnin Kebbi.**

## CONCLUSION

Thirteen patients were clinical diagnosed for post-operative sepsis, surgical site infection, sepsis, ulcer, implant infection and urosepsis. The wound swap (92.3 %) was the common specimen collected for isolate identification while there was only a case of urethra catheter (7.7 %) specimen collected from urosepsis patient for isolate analysis. All patient affected by nosocomial are adult of male and female sex but male account for 76.9 % and female 23.1 %. Gram negative bacteria (53.4) especially *E. coli* was responsible for nosocomial infection compare to the only gram positive bacteria (*Staph aureus*) 46.6 % as causative bacteria nosocomial. Strong antimicrobial susceptibility pattern was found in ciprofloxacin and gentamicine with 24 % success rate, miropinem (17.2 %), erythromicine (13.7 %), ceftazidime and cefuroxime (10.3 %), tygecycline (6.9 %), and other drugs (3.4 %) success rate. The research shows that no particular isolate was responsible for diagnosed nosocomial infections and there was no particular trend of antibacterial drugs for a particular type of nosocomial infections.

It is recommended that further studies should be carried out to understand the particular sources of infection from post-surgical operations. Emphasis to be placed on sterilization of equipment use, handling of equipment, source of water use, nature of ventilation, and hygienic nature of doctors, nurses and auxiliary workers. Beddings should be clean at all times and changed frequently. It is believed that if all these factors are looked into they will tremendously reduce the occurrence of nosocomial infection at Federal Medical Center (FMC) Birnin Kebbi, Nigeria.

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