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Antibiogram Profile of Bacteria Isolated from Wounds of Patients Attending Federal Medical Centre, Yenagoa

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ABSTRACT
The study investigated the antiobiogram profile of bacteria isolated from wounds of patients and examined antibiotics sensitivity profile against bacterial agents associated with wounds infections at Federal Medical Centre (FMC) Yenago. A total of 200 wound swabs samples were randomly collected from 96(48%) males and 104(52%) females within the ages of 20 -70years at both in and out-patients departments of Federal Medical Centre, Yenagoa. Samples were processed, cultured and isolates identified following standard operating protocols in the microbiology laboratory. The prevalence of subjects with positive culture was 172 (86%) of which 24 (13.96%) was poly microbial growth. Staphylococcus aureus had with 52 (26%) was the top pathogen followed by Pseudomonas aeruginosa, Klebsiella pneumonia, Proteus spp, and E. coli at prevalence of 40 (20%), 24 (12%), 20 (10%) and 12 (6%) respectively. Overall female subjects had 80 (76.90%) positive culture with 8 (10.00%) being polymicrobial growth while in the male subjects92 (95.80%) had positive culture and 20(21.74%) of the positive as polymicrobial growth. Sensitivity of allisolates tothethird generation cephalosporins (ceftaxidime and ceftrizone) and floroquinolones (ofloxacin and ciprofloxacin) tested however makesthem the drug of choice in the empiricmanagement of infected wounds. The incidence of different types of wound infections was found to be the highest in surgical wound infection, Burns, leg ulcer (100% each) followed by diabetic foot ulcer (81.8%), road traffic accident (80%) and soft tissue infection (71.4%).This study revealed a high prevalence in wound with staphylococcus aureus and Pseudomonas aeruginosa as the top bacteria of the five genera isolated. All isolate a sensitive to the third generation cephalosporins tested and may be drug of choice in the empiric management of wound infection in our hospital.

Keywords: Antibiogram, antibiotics, bacteria, wound infections, antibiotic sensitivity profile

I. INTRODUCTION

1.1Background Issues

Wound is any break or opening in the skin which is most often caused by injuries or accidents. When the skin is open, germs can enter the body and cause infection because the skin is known to protect the body from germs (Smith et al., 2017).vanKoppenand Hartmann (2015) were of the opinion that a wound can indicate a mild or serious disease to a tissue or organ (like the skin), and it can also spread to adjacent tissues and anatomical systems (e.g., subcutaneous tissue, muscles, tendons, nerves, vessels, and even to the bone).Wounds can be classified as accidental, pathological, or post-operative, and they offer a wet, warm, and nutrient-rich environment that is favorable for microbial adhesion, colonization, and proliferation, which impairs the host tissue (Patil et al., 2016). Due to the body's first line of defense, several bacterial species are a typical part of the flora on human skin and in the gastrointestinal system, nasopharynx, and other body regions. These bacteria have limited ability to spread disease. Despite the skin barrier, bacterial infections can enter the body through any break in the skin surface, including those caused by trauma, accidents, surgeries, or burns (Mohammed et al., 2017).

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The skin remains the human body organ which is most susceptible to damage, injury, scrapes, and burns. The human body's ability to provide protection from the outside environment is compromised by the damage to the epithelium and connective tissues. For instance, Taiwo et al. (2002) estimate that fifty percent (50%) of wounds that are contaminated with bacteria go on to become infected. Additionally, wound infections raise the burden of the disease by lengthening hospital stays, raising treatment costs, and occasionally even resulting in mortality, especially when they are accompanied by septicaemia and tetanus (Sule et al., 2002).Between 3 and 11% of hospital-acquired infections at various healthcare facilities are caused by wound infection (WI), a prominent cause of nosocomial infections in surgical practice.Wound infection accounts for 60% of burn patient mortality and 300,000 deaths globally each year, despite significant advancements in infection prevention and wound healing (Li et al., 2017).

According to Mama et al., (2014), infections poses a significant barrier to wound recovery and negatively affect both the wound's healing rate and the patient's wellbeing. This is because wounds that are infected are likely to be more painful, sensitive, causing odorous, which will make the patient to feel more uneasy and uncomfortable (Kotz et al., 2009). The problem of wound infections has taken on a new dimension as a result of the present rise of multi-drug resistance bacteria pathogens. Any wound has some chance of becoming infected since wound colonization is frequently polymicrobial and involves a variety of bacteria that may be pathogenic (Dai et al., 2010).

Furthermore, poor healing procedure can result in significant harm, including skin loss and the start of an infection, which can injure nearby tissues as well as systemic ones. The installation of an infection, most frequently in the event of chronic wounds, is the most frequent and unavoidable barrier to wound healing (Sorg et al., 2017). Although bacteria are a normal component of wounds and the intact skin microbiota, a critical level of bacteria present and the development of a biofilm may hamper wound healing. Due to these factors, bacterial and fungal infections are still regarded as one of the most widespread and unpleasant conditions that significantly increase mortality and morbidity, despite recent advancements in the care of wounds (Negut, Grumezescu, &Grumezescu, 2018). Studies on the use of antibiotics in the treatment of infected wounds has also taken a new turn. Evert (2018) asserted that high doses of antibiotics, can occasionally cause systemic toxicity and over the past few years, the production of new antibiotics has diminished, and just a few businesses are still engaged in this field. Additionally, due to the abuse and improper use of antibiotics, among other things, the number of antibiotic-resistant bacteria has significantly increased (Das et al., 2016). It is worth noting that long-term therapy is frequently used to treat chronic wounds, such as diabetic foot, venous ulcers, and pressure ulcers while antibacterial potential of unconventional, non-antibiotic treatments is receiving fresh attention in light of the present issues posed by these illnesses.This study there intends to examine the profile of bacteria isolates from wound infection while also considering its sensitivity to antibiotics.

1.2 Aim and Objectives of the Study

The aim of this study is to examine the antibiogram profile of bacteria isolated from words of patients attending Federal Medical Centre, Yenagoa. The specific objectives are to:

i. investigatesthe prevalent bacterial agents associated with wound infections at Federal Medical Centre (FMC) Yenagoa,
ii. examine the antibiotics sensitivity profile against bacterial agents associated with wounds infections at Federal Medical Centre (FMC) Yenago

II. REVIEW OF RELATED LITERATURE

2.1 Bacterial agents responsible for wounds infection

Wound infection often occurs when one or more species of microbes successfully invade and spread throughout the body's sterile tissues, occasionally leading to pus formation. Collier (2004) noted that wounds often develop as a result of many factors, especially because the host protective layer of the skin is broken and thereby disrupt the protective functions of the skin layer.

Prolific studies have been carried out to identify the bacterial agents responsible for wounds infection. For instance, Taiwo et al., (2002) in their study identified commonly found bacteria in infected wounds to include Gram poisitive Cocci such as S. aureus, Streptococcus spp, and Gram-negativebacilli which are mostly Acinetobacter, enterobacter, E. coli, Proteus spp, Ps. aeruginosa and anaerobic bacteria such as Propionibacterium spp. and Klebsiella spp. On acute soft tissue infections, Bowler et al., (2001) work showed that S.aureus is the single causative bacterium accounting for 25 to 30% of cataneous abscesses.

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In wounds caused by bite, studies revealed that dog bites remain the cause of wounds related to bites. In the study of Stevens et al., (2005), it was discovered that the common bacteria involved in dog bits would include: Staphylococcus species, Streptococcus species, Eikenella species, Pasteurella species, Proteus species, Klebsiella species, Haemophilus species, Enterobacter species, DF-2 or Capnocytophagacanimorsus, Bacteroides species, Moraxella species, Corynebacterium species, Neisseria species, Fusobacterium species, Prevotellaspecies and Porphyromonas species. For that of cat bite, the common bacteria found include Pasteurella species, Actinomyces species, Propionibacterium species, Bacteroides species, Fusobacterium species, Clostridium species, Wolinella species, Peptostreptococcus species, Staphylococcus species and Streptococcus species. Bacteria found in swine bites include Pasteurella aerogenes, Pasteurella multocida, Bacteroides species, Proteus species, Actinobacillus suis, Streptococcus species, Flavobacterium species and Mycoplasma species. Common bacteria involved in rodent bite wound infections (rat-bite fever) are the Streptobacillus moniliformis and Spirillumminus. The work Abrahamian (2000) that the most bacteria involved in primate bite wound infections are Bacteroides species, Fusobacterium species, Eikenellacorrodens, Streptococcus species, Enterococcus species, Staphylococcus species, Enterobacteriaceae and Simian herpes virus.Common bacteria involved in large reptile (crocodiles, alligators) bite wound infections include the following: Aeromonas hydrophila, Pseudomonas pseudomallei, Pseudomonas aeruginosa, Proteus species, Enterococcus species and Clostridium species.

Infection in burn wound is still considered as the most important cause of disability and mortality in all ages and in both developed and developing countries (Pasalar et al., 2013). Manson et al., (1992) Pseudomonas aeruginosa is the dominant isolate from burn wound infection. For chronic ulceric wound, Gram negative organims including Entercoccus faecalis, Enterobacter cloacae and Proteus mirabills have been observed at notable frequencies (Shanmugam & Susan, 2013). While lastly, for leg and decutius ulcer infections, the more frequent bacteria are Staphylococcus aureus, Pseudomonas aeruginosa, Enterococcus faecalis, Klebsiella pneumoniae, and Escherichia coli (Rodriguez et al., 2014).

2.2 Antibiotic Sensitivity Profile

The emergence is determined by a complex interaction of environment, epidemiological, clinical and behavioural factors.The -lactam antibiotics are the most well-known antibiotics that kill bacteria by preventing the essential transpeptidations that result in mechanically strong peptidoglycan by the covalent cross-linking of peptide strands (Walsh, 2003). These antibiotics, including penicillins and cephalosporins, have a component known as a "lactam ring" that binds to the peptidoglycan cross-linking enzymes. These antibiotics stop the production of cell walls by interfering with the tetrapeptidases' ability to cross-link. These antibiotics have little effect on fungi and archaea, whose cell walls do not contain peptidoglycan (Black, 2005). By weight, -lactams make up almost two thirds of all antibiotics administered to people (Lachmayr et al., 2009). Peptides called polymyxins are effective against a variety of Gram-negative bacteria (Landman, et al., 2008). Streptococci that are resistant to penicillin can be treated with gentamicin, penicillin, or ampicillins. Additionally, gentamicin or tobramycin, particularly when combined with carbenicillin or ticarcillin, can control Pseudomonas infections, particularly in burn patients. Aminoglycosides can also control Klebsiella infections when combined with cephalosporins. The tetracyclines, chloramphenicol, macrolides, and lincosamides are other antibacterial substances that have an impact on protein synthesis (Black, 2005).

From among the rifamycins produced by Streptomyces mediterranei, only the semi synthetic rifampin is currently used. It blocks RNA transcription. Although, it is bactericidal and has a wide spectrum of activity, it is approved in the United States only for treating tuberculosis and eliminating meningococci from the nasopharynx of carriers. It is unusual among antibiotics in its 72 abilities to interact with other drugs, and possibilities of such interactions should be considered before the drug is given (Black, 2005). The Quinolones are a new group of synthetic bactericidal analogs of nalidixic acid. They are effective against many Gram-positive and Gram-negative bacteria. Quinolones' mode of action is to inhibit bacterial DNA synthesis by blocking DNA gyrase, the enzyme that unwinds the DNA double helix preparation to its replication. Norfloxacin, Ciprofloxacin (Cipro), and enoxacin are examples of this group of antibiotics. On the other hand, a sizable group of purely synthetic bacteriostatic medications known as sulfonamides or sulfa drugs. They do this by preventing the production of folic

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acid, which is necessary to produce the nitrogenous bases of DNA (Black, 2005). The structural metabolic component PABA (para-aminobenzoic acid), which bacteria use to make the coenzyme tetrahydrofolic acid, which is involved in the synthesis of purines and certain amino acids, is remarkably similar to sulfa medications in practice.

Due to its strong affinity for the PABA site on the enzyme, sulfonamide molecules can outcompete PABA in a chemical competition for those sites. This finally results in a shortage of tetrahydrofolic acid needed to produce purines, which invariably halts the synthesis of nucleic acids and inhibits bacterial cells from proliferating (Talaro and Talaro, 2002). Broad-spectrum antibiotics having a bacteriostatic mode of action based on suppression of folic acid metabolism are known as sulfonamides (Olliver et al., 2010). Because antibiotics are less toxic and more focused in their activities than sulfonamides, they have now largely supplanted sulfonamides.Sulfonamides have commonly caused kidney injury since their introduction to medicine in the 1930s. The kidneys are rarely harmed by the newer versions of these medications, but they can cause nausea and skin rashes. Prior to colon resection, certain sulfonamides are still used to decrease intestinal micro flora. Unfortunately, both medications can produce nausea and skin rashes and are toxic to bone marrow (Black, 2005). Isoniazid is an antimetabolite for the vitamins pyridoxal and nicotinamide (also known as niacin) (vitamin B6). It attaches to the enzyme that transforms the vitamins into helpful molecules and deactivates it.

III. MATERIALS AND METHODS

3.1Study Design

The study was a prospective longitudinal cohort type.

3.2 Study Setting or Location

Federal Medical Centre (FMC) Yenagoa, Nigeria.

3.3 Sample

Sample were randomly selected using subjects with various types of chronic ulcer or suspected wound infection of more than six weeks. Two hundred (200) wound swabs was collected from (1) 30 subjects with road traffic accident injury (RTA) (2) 46 subjects with Diabetic foot ulcer (3)37 subjects with Post-Surgical wound (4)17 subjects with Burns (5)18 subjects with chronic leg ulcer (CLU) and (6)52 subjects with soft tissue infections were used in this study.

3.4 Ethical Consideration

Ethical approval was sought out from the Federal Medical Centre (FMC) Yenagoa Ethical Committee. The participants were briefed on the objectives and procedure of the study and they were reassured of confidentiality. A signed informed consent was obtained from each of the participants in the study.

3.5 Sample Processing

All subjects with wound had their wound swabs collected aseptically and transported to the laboratory inside Stuarts transport medium. Swabs were inoculated unto blood and MacConkey agar plates which were incubated aerobically and chocolate agar which was incubated inside candle extinction jar, all at 37^{o} C for 24 hour. The isolates were identified based on colonial morphology (size, shape, colour, texture and degree of opacity macroscopically), Gram staining, and biochemical characterization according to method by Cheesbrough (2000).Bacterium was inoculated into glucose phosphate broth and incubated for at least 48 hours. 0.6 ml of alpha-naphthol was added to the test broth and shaken. 0.2 ml of 40% KOH was added to the broth and shaken. The tube was allowed to stand for 15 minutes and observed. Appearance of red color was taken as a positive test. The negative tubes were held for one hour, since maximum color development occurs within one hour after addition of reagents. Afterwards, the bacterial colonies were picked up from a straight wire and inoculated into slope of Simmon's citrate agar and incubated overnight at 37^{o}C. A glass slide was gently placed over the cover slip and held it upside down. It should be in such a manner that bacterial suspension should be hanging between the cover slip and glass slide. It was examine under the microscope, first under 10x, then under 40x. Furthermore, 2ml of hydrogen peroxide was poured into a test tube. A sterile wooden stick was used to remove colonies of the test organism and immersed in the hydrogen peroxide solution. Formation of bubble was looked for immediately. The indole test was conducted using Cheesbrough (2000) method. Hence, the organism was inoculated in a bijou bottle containing 30ml of sterile typtone water. It was inoculated at 37^{0}C for 48h. 0. 5ml of kovac's reagent was added and mixed properly. Furthermore, 2 drops of oxidase reagent was placed on a piece of filter paper in a clean Petri-dish for the oxidase test. A piece of stick was used to remove a colony of the test organism and smeared it on the filter paper. Formation of a blue purple color within a second was checked. Lastly, the antibiotics sensitivity test using the modified

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Kirby-Bauer disc-diffusion method (Bauer et al., 1966). This was carried out using commonly available antibiotics like gentamycin, Nalidixic acid, Ofloxacin, Ceftaxidine Cefixime, Cefuroxime, Ciprofloxacin among others.Susceptibility of isolates to antibiotics was tested using the disk diffusion method against commonly used antibiotics according to Cheesbrough (2000).

3.6 Data Analysis

Data obtained from the study was analyzed using descriptive statistical technique with the aid of a commercial statistical software (Statistical Package for Social Sciences version 22) and results were presented in tables.

IV. RESULTS

4.1 Prevalence bacterial agent in wounds infection

a. Prevalent bacterial agent associated with wounds infection

Results presented in Table1 on the prevalent bacteria in wound infection showed that Staphylococcus aureus had 26% while Pseudomonas aeruginosa is 20% Klebsiella pneumoniais 12%,Proteus spp.10%, and E. coli had prevalence of12% respectively. The incidenceof mixed growth was24 (12%). The prevalence of subjects with positive culture was 172 (86%) of which 24 (13.96%) was poly microbial growth as shown in Table 1.

b. Prevalence of bacterial agent in different wound condition

Table 2 presents the prevalence of bacterial agent in different wound conditions; it was revealed that the occurrence of Staphylococcus aureus in 0(0.00%), 0(0.00%), 4(20.00%), 8(18.20%), 16 (40.00%) and 24 (42.90%) in burns, road traffic accident, leg ulcer, diabetic foot ulcer, surgical wound and soft tissue wound infections respectively. Pseudomonas aeruginosa also occurred in 8(40.00%), 0(0.00%), 8(40.00%), 8(18.20%), 8 (20.00%) and 8 (14.30%) respectively in burns, road traffic accident, leg ulcer, diabetic foot ulcer, surgical wound and soft tissue wound infections. The incidence of Klebsiella pneumonia showed 0(0.00%), 8(40.00%), 4(20.00%), 0(0.00%), 8 (20.00%) and 4 (7.10%) in burns, road traffic accident, leg ulcer, diabetic foot ulcer, surgical wound and soft tissue wound infections respectively while Proteus occurrence was 8(40.00%), 4(20.00%), 0(0.00%), 8(18.20%) and 0(0.00%) in burns, road traffic accident, leg ulcer, diabetic foot ulcer, surgical wound and soft tissue wound infections respectively.Furthermore, E. coli had 0(0.00 %) in burns, diabetic foot ulcer and soft tissue wound while the occurrence was 4(20.00%) in both road traffic accident and leg ulcer with surgical wound occurring in 4 (10.00%).Burns had Mixed bacteria growth rate of 4(20.00%),surgical wound had 4 (10.00%),soft tissue wound 4 (7.10%) and 12 (27.20%) was reported for diabetic foot ulcer while road traffic accident and leg ulcer did not record any growth. It was also shown in Table 2 that there were no bacterial isolated in wounds from burns, leg ulcer and surgical wound 0(0.00%) while road traffic accident had 4(20.00%),diabetic foot ulcer 8(18.20%) and 16 (28.60%)

c. Prevalence of bacteria in wounds based on gender

Table 3 showed that there was no occurrence 0(0.0%) of Staphylococcus aureus, Proteus spp., E. coli, Klebsiella spp. and mixed bacteria growth in females with burns injury while Pseudomonas aeruginosa occurred in 4 (100.0%).In males with burn injury, Staphylococcus aureus, E. coli, Klebsiella spp. had 0 (0.0%) occurrence while Proteus spp., mixed bacteria growth and Pseudomonas aeruginosa occurred in 8 (50.0%), 4 (25.0%) and 4 (25.0%) respectively. It was revealed that 4(50.0%) female subjects with road traffic accident had no bacteria growth while Proteus spp had 4 (50.0%) in 8 (100.0%). In males Klebsiella spp. occurred in 8 (66.6%) while mixed bacteria growth was 4 (33.3%). Female subjects with leg ulcer had Pseudomonas aeruginosa, Klebsiella pneumonia and E. coli occurring in 4 (33.3%) while in males, Staphylococcus aureus and Pseudomonas aeruginosa occurred in4 (50.0%) each. Female subjects with diabetic foot ulcer had occurrence of 4 (14.3%) in Staphylococcus aureus and Pseudomonas aeruginosa, while 8(28.5%) was the occurrence in each of Proteus spp. and mixed growth. In males Staphylococcus aureus, Pseudomonas aeruginosa and mixed growth had incidence of 4 (25.0%) each. Female subjects with surgical wound had occurrence of 8(40.00%) in Staphylococcus aureus and Klebsiella spp, while E. coli had 4(20.00%). In males Staphylococcus aureus and Pseudomonas aeruginosa had 8(40.00%) each while mixed growth had incidence of 4(20.00%). Female subjects with soft tissue wound had occurrence of 12(37.50%) in Staphylococcus aureus and 4(12.50%) in Klebsiella spp. In males Staphylococcus aureus and Pseudomonas aeruginosa had 12(50.00%) and 8(33.33%) respectively while mixed growth had incidence of 4 (16.67%). Overall, female subjects

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had 80(76.90%) positive culture with 8(10.00%) being polymicrobial growth while 24(23.10%) had no isolate. In the male subjects 92 (95.80%) had positive culture with 20(21.74%) of the positive as polymicrobial growth while 4(4.20%) had no isolate.

Table 1: Prevalentmicroorganisms in wound infection

ISOLATE	PREVALENCE (%)
Staphylococcus aureus	52 (26%)
Pseudomonas aeruginosa	40(20%)
Klebsiella pneumonia	24(12%)
Proteus spp.	20(10%)
E. coli	12 (6%)
Mixed growth	24 (12%)
No bacteria growth	28 (14%)
Total	**200 (100)**

Table 2: Prevalence of bacteria in different wound infection

	Wound type/Source Prevalence (%)					
Isolate	**Burns**	**Road traffic accident**	**Leg ulcer**	**Diabetic foot ulcer**	**Surgical wound**	**Softtissue wound**
Staphylococcus aureus	0(0.00)	0(0.00)	4(20.00)	8(18.20)	16 (40.00)	24 (42.90)
Pseudomonas aeruginosa	8(40.00)	0(0.00)	8(40.00)	8(18.20)	8 (20.00)	8 (14.30)
Klebsiella pneumonia	0(0.00)	8(40.00)	4(20.00)	0(0.00)	8 (20.00)	4 (7.10)
Proteus spp.	8(40.00)	4(20.00)	0(0.00)	8(18.20)	0(0.00)	0(0.00)
E. coli	0(0.00)	4(20.00)	4(20.00)	0(0.00)	4 (10.00)	0(0.00)
Mixed growth	4(20.00)	0(0.00)	0(0.00)	12 (27.20)	4 (10.00)	4 (7.10)
No bacteria growth	0(0.00)	4(20.00)	0(0.00)	8(18.20)	0(0.00)	16 (28.60)
Total	**20(100)**	**20(100)**	**20(100)**	**44 (100)**	**40 (100)**	**56 (100)**

Table 3: Prevalence of Microorganisms in wound infection of different gender

Isolate	**Burns**		**Road traffic accident**		**Leg ulcer**		**Diabetic foot ulcer**		**Surgical wound**		**Soft tissue wound**	
	F	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**
Staphylococcus aureus	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	4 (50.0)	4 (14.3)	4 (25.0)	8 (40.0)	8 (40.0)	12 (37.5)	12 (50.0)
Pseudomonas aeruginosa	4 (100.0)	4 (25.0)	0 (0.0)	0 (0.0)	4 (33.3)	4 (50.0)	4 (14.3)	4 (25.0)	0 (0.0)	8 (40.0)	0 (0.0)	8 (33.3)
Klebsiella pneumonia	0 (0.0)	0 (0.0)	0 (0.0)	8 (66.6)	4 (33.3)	0 (0.0)	0 (0.0)	0 (0.0)	8 (40.0)	0 (0.0)	4 (12.5)	0 (0.0)
Proteus spp	0 (0.0)	8 (50.0)	4 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	8 (28.5)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)

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E. coli	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	4 (33.3)	0 (0.0)	0 (0.0)	0 (0.0)	4 (20.0)	0 (0.0)	0 (0.0)	0 (0.0)
Mixed growth	0 (0.0)	4 (25.0)	0 (0.0)	4 (33.3)	0 (0.0)	0 (0.0)	8 (28.5)	4 (25.0)	0 (0.0)	4 (20.0)	0 (0.0)	4 (16.6)
No bacteria growth	0 (0.0)	0 (0.0)	4 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	4 (14.3)	4 (25.0)	0 (0.0)	0 (0.0)	16 (50.0)	0 (0.0)
Total	**4 (100)**	**16 (100)**	**8(100)**	**12(100)**	**12 (100)**	**8 (100)**	**28 (100)**	**16 (100)**	**20 (100)**	**20 (100)**	**32 (100)**	**24 (100)**

4.2 Sensitivity pattern of antibiotics on isolates from wound infections

Result obtained on sensitivity pattern of antibiotics on isolates from wound infections as presented in Table 4 showed that Staphylococcus aureus was sensitive to Gentamicin, Ofloxacin, Ciprofloxacin, Ceftriazone, Ceftazidime, Cefurozime and Ampicillin in (45 (86.7%), 42 (80.0%), 31 (60.0%), 14 (26.7%), 38(73.3%), 38(73.3%), 21 (40.0%) and 14 (26.7%) respectively. Pseudomonas aeruginosa was sensitive to Gentamicin, Ofloxacin, Ciprofloxacin, Ceftriazone, Ceftazidime, Cefurozime and Ampicillin in 15 (36.4%), 36 (90.9%), 33 (81.8%), 26 (63.6%), 18 (45.5%), 7 (18.2%) and 15 (36.4%) respectively. Klebsiella spp. was sensitive to Gentamicin, Ofloxacin, Ciprofloxacin, Ceftriazone, Ceftazidime, Cefurozime and Ampicillin in 12 (50.0%), 20 (83.3%), 24 (100 %),16 (66.7%), 20 (83.3%), 8 (33.3%) and 4 (16.7%) respectively. Proteus spp. was sensitive to Gentamicin, Ofloxacin, Ciprofloxacin, Ceftriazone, Ceftazidime, Cefurozime and Ampicillin in 11 (57.1%), 17 (85.7%), 20 (100%), 14 (71.4%), 11 (57.1%), 17 (85.7%) and 3 (14.3%) respectively. Escherichia coli was sensitive to Gentamicin, Ofloxacin, Ciprofloxacin, Ceftriazone, Ceftazidime, Cefurozime and Ampicillin in 8 (66.7%), 10 (83.3%), 10 (83.3%), 6(50.0%),6 (50.0%), 2 (16.7%) and 10 (83.3%) respectively. Mixed bacteria isolate was sensitive to Gentamicin, Ofloxacin, Ciprofloxacin, Ceftriazone, Ceftazidime, Cefurozime and Ampicillin in 24 (100%), 24 (100%), 24 (100%), 24 (100%), 24 (100%), 24 (100%) and 12 (50%) in respective order as shown below in table 4.4.It should be noted that Chlorampenicol, amoxicillin were resistant to all the isolated organism.

Table 4 Sensitivity pattern of antibiotics on isolates from wound infection

Antibiotic	**Staphylococcus aureus N=52**	**Pseudomonas aeruginosa N=40**	**Klebsiella spp N=24**	**Proteus spp N=20**	**Escherichia coli N=12**	**Mixed bacteria growth N=24**
Gentamicin	45 (86.7%)	15 (36.4%)	12 50.0%)	11 (57.1%)	8 (66.7%)	24 (100%)
Ofloxacin	42 (80.0%)	36 (90.9%)	20 83.3%)	17 (85.7%)	10 (83.3%)	24 (100%)
Ciprofloxacin	31 (60.0%)	33 (81.8%)	24 100 %)	20 (100%)	10(83.3%)	24 (100%)
Ceftriazone	14 (26.7%)	26 (63.6%)	16 66.7%)	14 (71.4%)	6 (50.0%)	24 (100%)
Ceftazidime	38(73.3%)	18 (45.5%)	20(83.3%)	11(57.1%)	6 (50.0%)	24(100%)
Cefurozime	21 (40.0%)	7 (18.2%)	8 (33.3%)	17 (85.7%)	2 (16.7%)	24 (100%)
Ampicillin	14 (26.7%)	15 (36.4%)	4 (16.7%)	3 (14.3%)	10 (83.3%)	12 (50%)
Pefloxacin	31 (60.0%)	33 (81.8%)	24(100%)	20 (100%)	10(83.3%)	24 (100%)
Erythro	14 (26.7%)	26 (63.6%)	16 66.7%)	14 (71.4%)	6 (50.0%)	24 (100%)

mycin						
Streptomycin	21 (40.0%)	7 (18.2%)	8 (33.3%)	17 (85.7%)	2 (16.7%)	24 (100%)
Septrin	14 (26.7%)	26 (63.6%)	16(66.7%)	11 (57.1%)	8 (66.7%)	24 (100%)
Nalidixic Acid	14 (26.7%)	7 (18.2%)	8 (33.3%)	3 (14.3%)	2 (16.7%)	12 (50%)
Ampiclox	21 (40.0%)	7 (18.2%)	16 66.7%)	11 (57.1%)	8 (66.7%)	12 (50%)

V. CONCLUSION AND RECOMMENDATIONS

Wound infections remain a major concern among health care practitioners not only in terms of increased trauma to the patients but also the financial burden is places on them due to cost associated with its treatment. The study investigated the common bacterial agents associated with wounds infections, and examine the antibiotics sensitivity profile against bacterial agents associated with wound infections at Federal Medical Centre (FMC) Yenagoa. Findings revealed that Staphylococcus aureus and Pseudomonas aeruginosa are the two most common pathogens found in wounds and that men were more likely to contract pathogens than women. Surgical wound infections, burns, and leg ulcers each had a 100% frequency of wound infections, but soft tissue infections had the lowest prevalence. However, due to the fact that all isolates are sensitive to third generation cephalosporins (ceftaxidime and ceftrizone) and floroquinolones (ofloxacin and ciprofloxacin), these are the preferred medications for the empiric care of infected wounds. Hence, study recommends that wound bacteriology should always be carried out before treatment and sensitive drugs should be used to avoid organism developing resistance.

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