Bacteria Associated with Skin Piercing Equipment and their Antibiotic Susceptibility Pattern in Port Harcourt Metropolis

ABSTRACT

Skin Piercing is becoming rampant among adolescent in our contemporary society without considering its health implication and the risk of pathogenic microorganisms associated with equipment used. Hence, this research is carried out to determine the bacteria associated with this skin piercing equipment and their antibiotic susceptibility pattern in Port Harcourt metropolis. A total of thirty (30) skin piercing equipment were swab using sterile swab sticks and samples subjected to standard microbiological technique as well as standard plate count, culturing, identification and antibiotic susceptibility pattern using Kirby Bauer Disk diffusion method. The distributed questionnaires showed that the percentage of female (79.56%) involved in skin piercing is more than the males (20.44%). The total heterotrophic bacteria count ranged from $4.75\pm0.03\times10^3$ CFU/ml to $6.31\pm0.23\times10^4$ CFU/ml in RSU back gate and PH Victoria Street respectively. The total *Staphylococcal* count ranged from $1.90\pm0.01\times10^2$ CFU/ml to $4.31\pm0.03\times10^2$ CFU/ml in RSU back gate and PH Victoria Street respectively. A total of Seventeen (17) bacteria isolates were identified belonging to the following genera; *Staphylococcus* spp, *Streptococcus* spp, *Bacillus* spp, *Micrococcus* spp, and *Clostridium* spp. The prevalence of the bacteria indicated that *Staphylococcus* had the highest occurrence (26%), followed closely by *Pseudomonas* spp (19%), and *Clostridium* spp (11.7%) had the least prevalence across the locations. The Antimicrobial sensitivity testing results shows that *Staphylococcus* spp, *Streptococcus* spp, *Bacillus* spp, *Micrococcus* spp, and *Clostridium* spp are more susceptible to Erythromycin, Gentamicin and Ofloxacin (100%) and resistant to Augmentin, Ceftazidime, Cefuroxime and Ceftriaxone (100%) *Pseudomonas* spp was Susceptible to Gentamicin, Nitrofurantoin and Ciprofloxacin (100%) and resistant to Ceftazidime, Cefuroxime and Augmentin (100%). These bacteria isolated are mostly pathogenic and may result in an increase in health complication as a result of non-hygienic protocol employed during using this skin piercing equipment. Professionals should enlighten and give advisory comment to adolescent about the risks involved in skin piercing practices.

Keywords: Skin Piercing equipment, Bacteria, Susceptibility Pattern, Port Harcourt.

Introduction

Skin piercing are body modification or skin piercing is the decorative piercing of parts of the body such as the ear, nose, novel, tongue and lips which can be detrimental to health. It is when a hole is made in the skin or through a part of the body (Meltzer, 2005). This is performed using a piercing gun or by use of a hollow needle to create a hole in the body and a piece of jewelry is inserted in it for decoration (Meltzer, 2005). The earlobe is the most common part of the body that is pierced; other parts are auricular cartilage, eyebrow, nose, tongue, lip, navel (belly button), nipples, and genitals (Meltzer, 2005). Skin piercing is an ancient practice and has a long history; it is alleged to have been practiced during the Victorian era, by Roman centurions and the Mayans for spiritual rituals (Armstrong and Hogan, 2009).

Among the Igbo's of south East Nigeria, skin piercing was believed to be practiced by those responsible for the running and management of the land known as Oke Nze (Iroegbu *et al*., 2000). A decline in skin piercing and was observed due to the influence of religion and

civilization and despite some taboos surrounding skin piercing, the art continues to be popular in many parts of the world.

In Nigeria, documented data on the skin piercing is scarce as few studies has been conducted in this area. However, an observation by Osamudamien (2012) is that the practice is increasing in many Nigerian cities like Lagos, Port- Harcourt, Edo and Warri with more females having pierced skin (Hesse, 2007). Findings shows that skin piercing among adolescents and young adults has been increasing and has become common among individuals aged 16 to 25 years. Data from high school and college students between the ages of 13 to 25 years in the US showed a 25 to 35 percent for skin piercing this excludes traditional earlobe piercing in males and females (Kohut 2007).

Skin piercing is not free from complications. The skin and mucous membrane of the body protects the body from infections, skin piercing and procedures involves piercing the skin and mucous membrane with a needle/sharp instrument which exposes the individual to pain, allergic reactions, keloids, granulomas, photosensitivity reactions, psoriasis and benign or malignant tumor (Pegas, 2001).

Skin piercing is an invasive procedure with some risks, People who get skin piercings run the same kind of health risks as anyone sharing needles. The skin and mucous membrane of the mouth, nose protect from infections and skin piercing procedures involves piercing the skin and mucous membrane with a needle/sharp instrument which exposes the individual to pain, allergic reactions, excessive scarring/keloids (thick scars), unanticipated injuries, granulomas, photosensitivity reactions, psoriasis and benign or malignant tumor and MRI complications. Various skin and blood borne diseases like bacterial infections: (impetigo, erysipelas, septicemia, toxic shock syndrome, tetanus, (Millar *et al.,* 2004).

Others include local infections, bleeding, tearing, hypersensitivity reactions; transfusion transmitted diseases example hepatitis B and C, HIV and syphilis, Chagas disease and infective endocarditis), bruise/hematoma may occur if a blood vessel is punctured.

Millar *et al.,* 2004; FDA, 2007 (U.S.A. Food and Drug Administration) in a 2005 survey in England of people aged over 16, complications were reported in some piercings, with professional help being necessary in about a quarter and a few had complications serious enough to require hospitalization, (Bone *et al.,* 2008). Risk of allergic reaction to the metal in the piercing jewelry, particularly nickel. Bacterial or viral, particularly from ***Staphylococcus aureus***,

group A *Streptococcus* and *Pseudomonas* species. Excess scar tissue, including hypertrophic scar and keloid formation. Physical trauma including tearing, friction or bumping of the piercing site, which may cause edema and delay healing. Oral trauma, including recession of gingival tissue and dental fracture and wear. This however is not free from health complications as contact and lichenoid dermatitis could also be gotten from the chemicals used in piercing skin temporarily (Pegas, 2001).

Dentists oppose oral piercing calling it a public health hazard since it can result in multiple dental complications like dental fractures, gum erosion and speech impediment. Jewel aspiration may also occur as a result of tongue piercing (Ram and Peretz, 2000). Treatment exist for these complications and complications can be prevented by good hygiene practices, use of sterilized instruments, proper care of piercing, avoidance of skin piercing if the individual has pre-existing health conditions such as congenital heart conditions and obtaining body art from a certified practitioner (Ram and Peretz, 2000). Hence, this research is carried out to determine the bacteria associated with this skin piercing equipment and their antibiotic susceptibility pattern in Port Harcourt metropolis.

MATERIAL AND METHOD

Description of study Area

The study was carried out in four (4) different Location viz; Rivers State University both main-gate and back gate axis, Agrey Road and Victoria Street all within Port Harcourt Metropolis where piercing activities are high.

Distributions of Questionnaires

A total of one hundred and thirty-seven (137) questionnaires were issued to individuals both male and female to obtain information on skin piercing around the areas were the samples were collected.

Sample Collection

A total of thirty (30) piercing equipment were swab using sterile swab sticks from the four (4) different locations under hygienic condition in Port Harcourt Rivers State, and transported to the Department of Microbiology Laboratory Rivets State University for further analyses.

Microbiological Analysis

Bacteria Enumeration

The enumeration of the total heterotrophic bacteria was carried out using nutrient agar while the total *Staphylococcal* count were performed on Mannitol salt agar. The stock analytical unit was done by moistening the swab stick with normal saline and swabbed over the surface of the piercing gun and dipped into the 2ml of normal saline separately to make 10^1 dilutions for enumeration, isolation and identification. Two-fold serial dilution was performed subsequently by pipetting 1ml of the samples into 2ml of sterile normal saline up to four (4) dilutions. About 0.1 aliquot of the appropriate dilutions (was inoculated in duplicates onto already prepared sterile plates of nutrient agar, Mannitol salt agar using the spread plate technique and incubated at 37^oC for 24hours after which the plates were counted and recorded. Representative colonies were described and sub-cultured onto nutrient agar plates and incubated at 37^oC for 24hours to obtain pure cultures (Taylor, 2008)

Preservation of pure culture

The pure cultures were stored in 10% (v/v) glycerol suspension at -4^oC as a cryo-preservative agent to prevent the damage of the pure cultures during drying for further analysis.

Isolation and Identification of the Bacterial Isolates

The bacterial isolates were isolated based on their colonial/morphological characteristics such as the size, margin, surface, colour, elevation, texture and transparency and Identification was carried out through conducting series of biochemical tests such as Oxidase, Catalase, Coagulase, Citrate Utilization, Methyl red, Indole, Voges Proskauer and sugar fermentation tests to confirm the identity of the test organisms (Cheesbrough, 2005)

Antibiotic Susceptibility Testing

The antimicrobial susceptibility profiles of the bacterial isolates to conventional antibiotics were determined using the Kirby Bauer disk diffusion method on sterile Mueller-Hinton agar. Standardization of the bacterial isolates was carried out by adjusting to 0.5 McFarland turbidity standards containing $x10^8$ cells. The swab is deepened into the bacterial suspension and streaked

over the surface of the agar plates, rotating the agar plate 60º each time to ensure even distribution of the inoculum. The plates were left to air dry for 3–5 min. Conventional antibiotics disk impregnated with Gentamicin (10µg), Cloxacillin (5µg), Erythromycin (5µg), Ofloxacin (5µg), Ceftazidime (30µg), Ceftriaxone (30µg), Cefuroxime (30µg), Nitrofurantoin (300µg), Ciprofloxacin (5µg) and Augmentin (30µg) were aseptically placed on the surface of the inoculated agar plate with sterile forceps. Each disk was pressed down to ensure full contact with the surface of the agar. The plates were then incubated for 24 hours at 33 to 35ºC in an inverted position. The zones of inhibition were measured in millimeter (mm) using a meter rule and compared to (CLSI, 2017)

Data Analysis

Statistical Package for Social Sciences (SPSS) version 25 was used to analyze the data obtained from counts and the measurement of the zones of inhibition. Descriptive statistics was used to summarize all data obtained. T-test was carried out to test for significant difference ($p \leq 0.05$) in the bacterial counts from the locations

RESULTS

The response to the questionnaire administered is presented in Table 1. The table below shows that, for the various location sampled, females gender had more skin piercing than their male counterpart.

Table 1: Response to the Distributed Questionnaires

Isolate	RSU-Bg	RSU-Mg	PH-Ag	PH-Vs	**TOTAL n (%)**
Female	23	28	27	41	109 (79.56)
Male	6	11	3	8	28 (20.44)

Key: RSU-Bg-Rivers University Back gate; RSU-Bg-Rivers University main gate; PH-Ag-Port Harcourt Aggrey road; PH-Vs-Port Harcourt Victoria street

The result from Table 2 showed that the total heterotrophic bacterial count was high in skin piercing equipment from Rivers State University back gate ($6.31 \pm 0.23 \times 10^4$ CFU/ml) and Port Harcourt Aggrey road had the least count ($4.75 \pm 0.03 \times 10^3$ CFU/ml). The result of the total Staphylococcal count showed that Rivers University Back gate had the highest count ($4.75 \pm 0.03 \times 10^3$ CFU/ml) and Port Harcourt Victoria street had the least count ($1.90 \pm 0.01 \times 10^2$ CFU/ml)

Table 2. Bacterial Population of the Skin Equipment from the various Locations

Locations	THB /CFU/ml	TSC /CFU/ml
RSU-Bg	$6.31\pm0.23 \times10^{4}$	$4.31\pm0.13 \times10^{2}$
RSU-Mg	$7.40\pm0.05 \times10^{3}$	$3.40\pm0.02 \times10^{2}$
PH-Ag	$4.75\pm0.03 \times10^{3}$	$2.75\pm0.03 \times10^{2}$
PH-Vs	$9.90\pm0.09 \times10^{3}$	$1.90\pm0.01 \times10^{2}$

Key: **THB**- Total Heterotrophic Bacterial Count; **TSC**- Total Staphylococcal count; **RSU-Bg**-Rivers University Back gate; **RSU-Bg**-Rivers University main gate; **PH-Ag**-Port Harcourt Aggrey road; **PH-Vs**-Port Harcourt Victoria street

A total of Seventeen (17) bacteria isolates were identified belonging to the following genera; *Staphylococcus* **s**pp, *Streptococcus* spp, *Bacillus* spp, *Micrococcus* spp, and *Clostridium* spp. The prevalence of the bacteria indicated that *Staphylococcus* had the highest occurrence (26%), followed closely by *Pseudomonas* spp (19%**),** and *Clostridium* spp (11.7%) had the least prevalence across the locations as showed in Table 3**.**

Table 3. Prevalence of the bacterial isolates Skin Equipment from the various Locations

Isolate	RSU-Bg	RSU-Mg	PH-Ag	PH-Vs	TOTAL	Percentage (%)
***Staphylococcus* spp**	23	7	6	9	45	26.1
***Bacillus* spp**	11	9	7	5	32	18.6
***Streptococcus* spp**	3	5	3	10	21	12.2
***Micrococcus* spp**	3	3	7	8	21	12.2
***Clostridium* spp**	8	3	4	5	20	11.7
***Pseudomonas* spp**	8	4	12	9	33	19.2
Total	**56**	**31**	**39**	**46**	**172**	**100**

Key: RSU-Bg-Rivers University Back gate; **RSU-Bg**-Rivers University main gate; **PH-Ag**-Port Harcourt Aggrey road; **PH-Vs**-Port Harcourt Victoria street

Table 4. Colonial/Morphological and Biochemical Characteristics of Bacterial Isolates from the various Locations

S/N	Isolate code	Color	Elevation	Opacity	MMP	GLU	MAN	MAL	LAC	XYL	GAT	OXI	MoT	VP	MR	IND	CIT	URS	SH	STT	Suspected Organisms
1	**RSUBa1a**	Golden yellow	Raised	Opaque	GPC	A	A	A	A	A	+	+	–	+	–	–	+	–	–	–	*Staphylococcus* spp
2	**RSUBg1b**	Light Yellow	Convex	Opaque	GPC	A	N	A	A	A	–	–	–	+	+	–	+	–	–	–	*Streptococcus* spp
3	**RSUBg2a**	Cream	Raised	Flat	GPR	Ag	A	A	N	A	+	+	+	–	+	–	+	–	–	–	*Bacillus* spp
4	**RSUBg2b**	Golden yellow	Raised	Opaque	GPC	A	A	A	A	A	+	+	–	+	–	–	+	–	–	–	*Staphylococcus* spp
5	**RSUBg2c**	Greyish white	Raised	Translucent	GPC	A	A	A	A	A	+	+	–	+	–	–	–	–	–	+	*Micrococcus* spp.
6	**RSUBg2d**	Light Yellow	Convex	Opaque	GPC	A	N	A	A	A	–	–	–	+	+	–	+	–	–	–	*Streptococcus* spp
7	**RSUMg1a**	Colorless white	Irregular flat	Translucent	GPR	A	A	A	N	A	–	–	+	–	+	–	+	–	–	–	*Clostridium* spp
8	**RSUMg2a**	Golden yellow	Raised	Opaque	GPC	A	A	A	A	A	+	+	–	+	–	–	+	–	–	–	*Staphylococcus* spp
9	**RSUMg2b**	Cream	Raised	Flat	GPR	Ag	A	A	N	A	+	+	+	–	+	–	+	–	–	–	*Bacillus* spp
10	**RSUMg2c**	Greyish white	Raised	Translucent	GPC	A	A	A	A	A	+	+	–	+	–	–	–	–	–	+	*Micrococcus* spp.
11	**PHAgr1a**	Golden yellow	Raised	Opaque	GPC	A	A	A	A	A	+	+	–	+	–	–	+	–	–	–	*Staphylococcus* spp
12	**PHAgr1b**	Green	Umbonate	Opaque	GNR	A	A	N	N	A	+	+	–	–	–	–	+	+	+	–	*Pseudomonas* spp
13	**PHAgr2a**	Green	Umbonate	Opaque	GNR	A	A	N	N	A	+	+	–	–	–	–	+	+	+	–	*Pseudomonas* spp
14	**PHVs1a**	Colorless white	Irregular flat	Translucent	GPR	A	A	A	N	A	–	–	+	–	+	–	+	–	–	–	*Clostridium* spp
15	**PHVs1b**	Greyish white	Raised	Translucent	GPC	A	A	A	A	A	+	+	–	+	–	–	–	–	–	+	*Micrococcus* spp.

16	**PHVs2a**	Light Yellow	Convex	Opaque	GPC	A	N	A	A	A	–	–	–	+	+	–	+	–	–	–	*Streptococcus* spp
17	**PHVs2b**	Golden yellow	Raised	Opaque	GPC	A	A	A	A	A	+	+	–	+	–	–	+	–	–	–	*Staphylococcus* spp

Key: RSU-Bg-Rivers University Back gate; **RSU-Bg**-Rivers University main gate; **PH-Ag**-Port Harcourt Aggrey road; **PH-Vs**-Port Harcourt Victoria street, MMP – Microscopic Morphology, GLU – Glucose, MAN – Mannitol, MAL – Maltose, LAC – Lactose, XYL – Xylose, CAT – Catalase Test, OXI – Oxidase Test, MOT – Motility Tests, VP – Voges Proskaur Test, MR – Methyl Red, INO – Indole, CIT – Citrate, URS – Urea, SH – Starch Hydrolysis, STT – Salt Tolerance Test

The result of the susceptibility test as shown in Table 5-7 revealed that *Staphylococcus* was more susceptible to Erythromycin (100%) and resistant to Augmentin and Cefuroxime (100%). *Bacillus* and *Clostridium* were more susceptible to Erythromycin, Gentamicin and Ofloxacin (100%) and resistant to Ceftazidime, Cefuroxime and Ceftriaxone (100%). *Streptococcus* was more susceptible Gentamicin (100%), Ofloxacin and Erythromycin (66.6%) and resistant Ceftriaxone, Cefuroxime (100%). *Micrococcus* was more susceptible to Erythromycin and Cefuroxime (100%) and resistant to Ceftriaxone (100%), Cloxacillin, Gentamicin and Ceftazidime (66.6%).

Table 5. Susceptibility Pattern of *Staphylococcus* spp and *Bacillus* spp

Antibiotics	**Conc.**	***Staphylococcus* spp (n=5)**			***Bacillus* spp (N=2)**		
	µg	Susceptibility	Intermediate	Resistance	Susceptibility	Intermediate	Resistance
ERY	5	5(100)	0(0)	0(0)	2(100)	0(0)	0(0)
CXC	5	2(40)	1(20)	2(40)	1(50)	1(50)	0(0)
OFL	5	2(40)	2(40)	1(20)	2(100)	0(0)	0(0)
AUG	30	1(20)	1(20)	3(60)	1(50)	0(0)	1(50)
CAZ	30	2(40)	1(20)	2(40)	0(0)	0(0)	2(100)
CRX	30	2(40)	0(0)	3(60)	0(0)	0(0)	2(100)
GEN	10	2(60)	0(0)	2(40)	2(100)	0(0)	0(0)
CTR	30	2(40)	1(20)	2(40)	0(0)	0(0)	2(100)

KEY: (GEN) Gentamicin, (CTR) Ceftriaxone, (ERY) Erythromycin, (CXC) Cloxacilin, (OFL) Ofloxacin, (AUG) Augmentin, (CAZ) Ceftazidime, (CRX) Cefuroxime

Table 6. Susceptibility Pattern of *Streptococcus* spp and *Clostridium* spp

Antibiotics	**Conc.**	***Streptococcus* spp (n=3)**			***Clostridium* spp (N=2)**		
	µg	Susceptibility	Intermediate	Resistance	Susceptibility	Intermediate	Resistance
ERY	5	2(66.6)	1(33.3)	0(0)	2(100)	0(0)	0(0)
CXC	5	3(100)	0(0)	0(0)	1(50)	1(50)	0(0)
OFL	5	2(66.6)	0(0)	1(33.3)	0(0)	0(0)	2(100)
AUG	30	1(33.3)	0(0)	2(66.6)	2(100)	0(0)	0(0)
CAZ	30	0(0)	1(33.3)	2(66.6)	0(0)	0(0)	2(100)
CRX	30	0(0)	0(0)	3(100)	0(0)	0(0)	2(100)
GEN	10	3(100)	0(0)	0(0)	1(50)	0(0)	1(50)
CTR	30	0(0)	0(0)	3(100)	0(0)	0(0)	2(100)

KEY: (GEN) Gentamicin, (CTR) Ceftriaxone, (ERY) Erythromycin, (CXC) Cloxacillin, (OFL) Ofloxacin, (AUG) Augmentin, (CAZ) Ceftazidime, (CRX) Cefuroxime

Table 7. Susceptibility Pattern of *Micrococcus* spp (N=3)

Antibiotics	Conc.	*Micrococcus* spp (n=3)		
	µg	Susceptibility	Intermediate	Resistance
ERY	5	3(100)	0(0)	0(0)
CXC	5	1(33.3)	0(0)	2(66.6)
OFL	5	3(100)	0(0)	0(0)
AUG	30	1(33.3)	1(33.3)	1(33.3)
CAZ	30	0(0)	1(33.3)	2(66.6)
CRX	30	3(100)	0(0)	0(0)
GEN	10	1(33.3)	0(0)	2(66.6)
CTR	30	0(0)	0(0)	3(100)

KEY: (GEN) Gentamicin, (CTR) Ceftriaxone, (ERY) Erythromycin, (CXC) Cloxacillin, (OFL) Ofloxacin, (AUG) Augmentin, (CAZ) Ceftazidime, (CRX) Cefuroxime

The result of the susceptibility test as shown in Table 8 revealed that *Pseudomonas* was more susceptible to Gentamicin, Nitrofurantoin, Cefuroxime, Ciprofloxacin (100%) and resistant to Ceftazidime (100%).

Table 8. Susceptibility Pattern of *Pseudomonas* spp (N=2)

Antibiotics	Conc.	*Pseudomonas* spp (n=2)		
	µg	Susceptibility	Intermediate	Resistance
OFL	5	1(50)	1(50)	0(0)
GEN	10	2(100)	0(0)	0(0)
NIT	300	2(100)	0(0)	0(0)
CRX	30	2(100)	0(0)	0(0)
CAZ	30	0(0)	0(0)	2(100)
CPR	5	2(100)	0(0)	0(0)
AUG	30	1(50)	0(0)	1(50)
CXM	5	1(50)	0(0)	1(50)

KEY: GEN) Gentamycin, (CPR) Ciprofloxacin, (NIT) Nitrofurantoin, (CXM) Cefixime, (OFL) Ofloxacin, (AUG) Augmentin, (CAZ) Ceftazidime, (CRX) Cefuroxime.

DISCUSSION

Many people have different perception towards skin piercing which may likely affect their attitude and body, without considering the health risks associated with skin piercing practices. The health risks associated with skin piercing has clarified that adolescents with positive attitudes towards body modification are not aware of health implications and were less likely to refer to professional for the body art or seek medical advice in case of complications (Cegolon, *et al*., 2010). Majority of the people performed the skin art illegally (in an unauthorized environment or carried out by adolescent themselves or by their friends) and this poses a serious threat to public health. The result of the questionnaire shows that the percentage of female that indulge in skin piercing is more than their male counterpart because of aesthetic to highlight particular areas of the body, as a navel piercing may reflect a woman's satisfaction with the shape and condition of her stomach and identity-related in nature. However, some may pierce because of low self-esteem. An adolescent girl showed a positive relationship between body-modification and negative feelings towards the body and self-esteem and it is in agreement of the work of Carroll *et al*. (2002) which showed that a strong motive for body-modification was the search for "self and attempts to attain mastery and control over the body in an age of increasing alienation as well as to enhance sexual pleasure or gratification. The sense of fashion Is more among women which enhance their ability for more body piercing (Currie-McGhee, 2006). There was a high bacterial load from the skin piercing equipment from the various location probably because the person carrying out piercing did not wash his or her hands with a germicidal soap before carrying out the skin piercing, nor wear disposable gloves or use disposable or sterilized tools and the use old needle to do the piercing as well as the use of wrong piercing equipment, non-sterilized material or inappropriate hygiene increases the possibility of perichondritis and cellulitis obtaining body arts in an unsafe/unclean environment can cause high bacterial load in the skin piercing equipment (Meltzer, 2005). The presence of pathogenic microorganisms such as *Staphylococcus, Pseudomonas, Bacillus* that colonies the skin piercing equipment can cause severe diseases to the user causing a great threat to the public and high prevalence of *Staphylococcus* could be due several sanitary factors such as; poor cleaning and hand hygiene, poor quality of raw materials and cross-contamination. *Staphylococcus* spp, *Streptococcus* spp, *Bacillus* spp, *Micrococcus* spp, *Pseudomonas* spp and *Clostridium* spp where highly susceptible to the gentamicin, ofloxacin and ciprofloxacin The drug ofloxacin and ciprofloxacin interferes with nucleic acid synthesis during DNA replication by inhibiting either DNA gyrase or topoisomerase IV (Akani *et al*., 2021). Gentamicin belonging to aminoglycosides group is not surprising because it is known to be effective against most Gram negative bacteria by binding to their ribosomes and inhibiting protein synthesis as described by

Vakulenko and Mobashery, (2003) and they were resistance to the penicillin class of antibiotic such as ceftazidime, cefuroxime could be explained by uncontrolled use of antibiotics in the treatment of skin piercing infections and the availability of these drugs non-restrictively in this areas which enables self-prescription and presence of beta lactamases enzyme possessed by this organisms as well as acquisition of resistant genes

Conclusion and Recommendation

The research shows that skin piercing equipment harbor many pathogenic microorganism and if body piercing, is not done by a professional and in a safe environment as the use of sterilized skin piercing equipment, could endanger the individual and lead to diseases and infections that will affect the individual. Body piercing has been associated with various health complications such as hepatitis, keloid, tetanus, syphilis and risk taking behaviors (substance use, violence, and suicide attempts). The use of sterilized equipment should be use as well as personal hygiene should be encouraged to reduce the presence of pathogenic microorganism from habiting this surfaces and misuse of drugs should be discouraged to reduce the rate of antimicrobial resistance.

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