

## PREVALENCE OF BACTERIAL GROWTH IN THROAT SWAB CULTURE

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### ABSTRACT:

This study was aimed to observe the prevalence of bacterial isolates from throat swab specimens. The study was carried out between January 2015 and December 2015. Throat swab specimens were collected aseptically from patients and cultured on the appropriate bacteriological media. Bacterial isolates were identified by biochemical tests and antimicrobial susceptibility performed by standard methods. Out of 55 specimens, some 35 (63.6%) specimens were found to be bacterial growth and 20 (36.3%) were showed no growth. The prevalence of bacteria spp. isolated were as follows *Streptococcus pyogenes* (37%), followed by *Klebsiella pneumoniae* (31%), *Pseudomonas aeruginosa* (14%), *Staphylococcus aureus* (9%) and 3% for *E.coli*, *Citrobacter koseri*, *Acinetobacter baumannii*. The susceptibility patterns varied from one bacterial isolates to the other depending on the drug. This study will be useful for control strategies and for predicting pathogen prevalence in throat swab.

**Keywords:** Throat swab, bacterial strains, antibiotic susceptibility

### Introduction:

In human being the ear, nose and throat (ENT) are closely related and are interconnected. Like most other parts of the human body, the ENT are also colonized by a wide range of microorganisms, some of which are more or less harmless under normal conditions. According to Volk and Wheeler, (1990), in the course of normal breathing, humans will inhale a number of pathogenic organism like bacteria, fungi and viruses, most of them are filtered off by the hairs in the nose. Others by pass into the moist surface of the nasal mucous membranes. Some get up to the nasopharynx and reside there.<sup>(1,2)</sup>

Sore throat is a painful inflammation of the mucous membranes lining the pharynx. A sore throat can result from infection (bacterial or viral), allergy, inflammation, trauma, malignancy, airway obstruction, and other abnormal processes. A sore throat can indicate a relatively mild condition, such as irritation from shouting. It was due to moderate conditions, such as influenza (flu), upper respiratory infection, or adenoid disorder. It could also accompany quite serious conditions, such as airway obstruction, throat trauma, epiglottitis, or tumor of the larynx. A sore throat can also be due to a wide variety of other conditions, including laryngitis, strep throat, allergic reactions, postnasal drip, gastro- esophageal reflux disease (GERD), mumps, and infectious mononucleosis. A chronic sore throat was a long period of time can be caused by smoking or a tumor of the larynx.

The major causative agents of sore throat infections are streptococcus pyogenes (most common), Streptococcus group C & G, Corynebacterium diptheriae, Haemophilus influenza, Bordetella pertussis, Treponema vincentii, Leptotrichia buccalis. Group-A beta hemolytic streptococcal pharyngitis/tonsillitis (strep throat) typically presents with a sudden onset of sore throat, pain with swallowing and fever. Strep throat does not usually cause runny nose, voice changes or cough.<sup>(3)</sup>

Sore throat is one of the commonest symptoms that primary health care physicians have to deal with. More than 225 pathogens, including about 200 viruses, are responsible for upper respiratory tract infections . Streptococcus pyogenes, or Lance- field group A beta-haemolytic streptococcus (GAS), is one of the commonest bacterial pathogens that causes acute pharyngitis among school-aged children living in lower socioeconomic conditions.<sup>(4,5)</sup> These Gram-positive cocci are distributed worldwide and have been associated with a variety of sequela such as impetigo, otitis media, necrotizing fasciitis, glomerulonephritis, acute rheumatic fever/rheumatic heart disease (RF/RHD).<sup>(6)</sup>

Respiratory tract infection (RTI) is considered as one of the major public health problems and a leading cause of morbidity and mortality in many developing countries. It is a global problem accounting for over 50 million deaths of each year and occurs in both community and health care settings. Infection can arise from other people by cross-infection or even from an environmental sources. The microorganisms larger than

10µm are usually trapped by the hair and cilia lining the nasal cavity. Coughing and sneezing reflexes clear the respiratory system of microorganisms by expelling them forcefully from the lungs through the mouth and nose respectively. The most infections are limited to the upper respiratory tract and only 5% involve the lower respiratory tract, respectively. Upper Respiratory infections (URTIs) involve the nasal passages, pharynx, tonsils and epiglottis. The nasal discharge associated with colds contains virus particles, dead cells from the nasal mucosa and bacteria. Lower respiratory tract infections (LRTIs) involve the bronchi and alveoli.<sup>(7)</sup>

Streptococci are gram positive cocci arranged in chains or pairs and are part of normal flora of humans and animals. Some of them are human pathogens. The most important of them is *Streptococcus pyogenes* causing pyogenic infections, with a characteristic tendency to spread, as opposed to staphylococcal lesions which are typically localized. It is also responsible for the non suppurative lesions, Acute Rheumatic Fever (ARF) and Glomerulonephritis (GN) which occur as sequelae to *S.pyogenes* infection.<sup>(8)</sup>

Infections of throat have a tremendous impact on public health. It is one of the reasons for the patients to visit the primary care providers. The present study was aimed to elucidate the prevalence of potential pathogenic bacteria in throat swab samples from the patients who came with throat infection.

## **MATERIALS AND METHODS**

### **Selection of Patients**

The study was conducted in the Department of Microbiology. A total of 49 samples were collected with throat infections, at the ENT and out patient Departments of SSSMC and RI, from January 2015 to December 2015. The patients presented with inflammation of the throat. They were registered at the General out patients department and their personal records: name, age, sex, occupation, contact address and other relevant information were taken.

### **Collection of Samples**

Throat swabs were collected aseptically in sterile swab packs by the Medical doctor in the ENT department. The samples were sent to the Microbiology Laboratory

immediately after collection for analysis. Swabs were collected aseptically using sterile Evepon swab sticks. All specimens collected were properly labeled with patient's number and date.<sup>(2)</sup>

### **Examination of Samples**

Throat swabs collected from selected patients were examined microbiologically using culture technique and direct microscopy as described by Cruickshank et al., (1985) and Chesbrough (1998).<sup>(9,10)</sup>

### **Antibiotic Susceptibility Test**

The antibiotic susceptibility of the bacterial isolates was tested using disc diffusion technique as in Cruickshank et al., (1985).<sup>(9)</sup> Commercially prepared single antibiotic discs were used for the study. The susceptibility test was done against microbial isolates by commercially used antibiotics.

### **Results:**

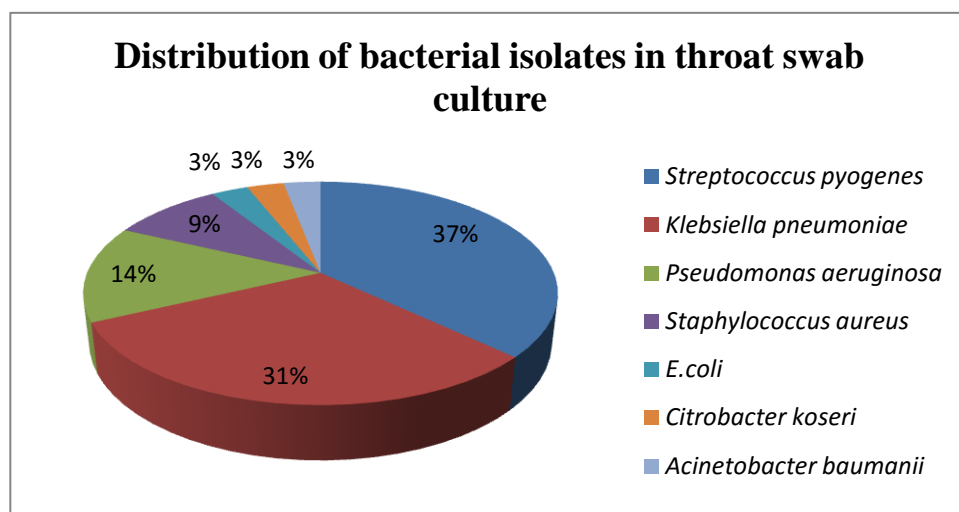
**Table 1: Bacteria isolated from the throat swab culture**

Throat swab	Number of isolates	Percentage
Growth	35	63.6%
No Growth	20	36.3%
<b>Total</b>	<b>55</b>	

**Table 2: Prevalence of bacteria in throat swab culture**

Isolated organisms	Number of isolates	Percentage of bacteria
<i>Streptococcus pyogenes</i>	13	37
<i>Klebsiella pneumoniae</i>	11	31
<i>Pseudomonas aeruginosa</i>	5	14
<i>Staphylococcus aureus</i>	3	9
<i>E.coli</i>	1	3
<i>Citrobacter koseri</i>	1	3
<i>Acinetobacter baumannii</i>	1	3

**Fig:1**



## RESULTS:

In this study, a total of 55 throat swab were collected from Jan 2015-Dec 2015, among which 35 (63.6%) samples were found to be growth and remaining 20 (36.3%) samples showed no growth as shown in the **Table1**.

**Table 2 and Fig 1:** depicts the prevalence of bacteria in throat swab. The most commonly isolated bacteria was *Streptococcus pyogenes* (37%), followed by *Klebsiella pneumoniae* (31%), *Pseudomonas aeruginosa* (14%), *Staphylococcus aureus* (9%) and 3% for *E. coli*, *Citrobacter koseri*, *Acinetobacter baumannii* were involved in throat infections amongst patients examined at SSSMC & RI.

All bacteria were tested for their susceptibility to different antibiotics. The use of antibiotics in treatment of throat infections and diseases still offers good results. The mean zones of growth inhibition produced by the selected antibiotics on the test isolates were comparable to those on the standard organisms used as control. This finding shows that the chemotherapeutic effects of the antibiotics on the infective organisms are reproducible elsewhere. So health sectors should educate public on proper usage of antimicrobial agents.

This findings shows the prevalence rate of bacteria among the patients at variable ages who were suffering from sore throat infection at the time of their sampling in the hospital. The control of throat infections demands the availability of primary care

and appropriate treatment.

## DISCUSSION:

The findings of this study showed that seven species of bacteria was 37% *Streptococcus pyogenes* followed by 31% *Klebsiella pneumoniae*, 14% *Pseudomonas aeruginosa*, 9% *Staphylococcus aureus* and 3% for *E.coli*, *Citrobacter koseri*, *Acinetobacter baumannii*.

This study showed that bacteria are major causes of infection and diseases in human throat. The findings corroborates that of previous workers (Coker et al., 1983; Azeez, 2000)<sup>(11,12)</sup> who reported that bacterial species (*Staphylococcus* species, *Streptococcus* species, *Proteus* species *Haemophilus* species and *Coliforms*) were responsible for most cases of throat infections. Improved personal hygiene and health education of the masses on how to care for ear, nose and throat will greatly reduce the incidence of these microbial infections.

Our findings were Similar pattern obtained from other studies (C. Manikandan et al, Riley and Riley 2003, Rudan, 2008 )<sup>(7,13,14)</sup> reported *Pseudomonas* spp., *Streptococcus* spp., *Proteus* spp., *Klebsiella* spp., *Staphylococcus* spp., *Enterobacter* spp., *Acinetobacter* spp., and *Haemophilus influenza*. Generally, throat infections may be associated with mild to severe pains, fever and headache (Azeez, 2000)<sup>(12)</sup> running or stuffy nose, fullness of the ear (Elaine et al., 1987).<sup>(15)</sup>

A number of factors have been mentioned by previous workers to cause ENT infections and diseases. These include poor habits, carelessness and hard blowing of the nose or excessive sniffing, which drives infected mucus into the middle ear leading to *otitis media* in adults (Schnert, 1996).<sup>(16)</sup>

In our study, the most prevalent organism was *streptococcus pyogenes* and the least prevalent was *E.coli*, *Citrobacter koseri*. and *Acinetobacter baumannii*. Majority of cases are caused by *Streptococcus pyogenes*. These findings corroborate the findings of previous workers (Volks and Wheeler, 1990).<sup>(1)</sup>

Sobhan Nandi et al, also showed that the prevalence of beta haemolytic streptococcal sore throat was 13.6% in rural area of Varanasi, India.<sup>(17)</sup> Similarly in our study we

found *Streptococcus pyogenes*(45%) to be the most predominant pathogenic organism in throat followed by *Staph.aureus*. Whereas P.T. Wakodel et al, reported *Staph.aureus* (25.25%) to be the predominant pathogenic organism in throat followed by *Streptococcus pyogenes* (1.05%).<sup>(18)</sup>

Like our study, the common bacteria isolated from patients having throat infections are *Staphylococcus aureus*, *Streptococcus pyogenes*, *Proteus spp.* *Klebsiella spp.*, *Pseudomonas aeruginosa etc.* The primary pathogen of oropharynx is *Streptococcus pyogenes* where *Staph.aureus* is a secondary pathogen.<sup>(19)</sup>

### **CONCLUSION:**

The main findings in this study were the identification of prevalence of bacteria in throat swab. We have detected seven species, among that *Streptococcus pyogenes* is the higher prevalence in throat infection.. This study highpoints the regular screening and the treatment to control the development of throat infection by treating the patients with suitable antibiotics by routine culture and sensitivity.

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