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EPIDEMIOLOGY AND BACTERIOLOGICAL ANALYSIS OF ACUTE PHARYNGITIS AND TONSILLITIS IN PEDIATRIC PATIENTS: A STUDY FROM A TERTIARY CARE HOSPITAL

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Abstract
Acute pharyngitis and tonsillitis are common infections, particularly in the pediatric population, leading to significant healthcare visits worldwide. This study aimed to analyze the incidence, clinical features, and bacteriological characteristics of acute pharyngitis and tonsillitis in children attending a tertiary care hospital. A total of 150 pediatric patients, aged 2-12 years, were included in this study. Data were collected on age, socioeconomic status, occupation, symptoms, signs, and bacterial pathogens. The highest incidence of acute pharyngitis and tonsillitis was observed in the 6-8 years age group (52%), with a higher prevalence in male patients (56%) and children from low-income families (59%). Clinical symptoms included sore throat (100%), fever (59%), and odynophagia (35%). Bacteriological analysis revealed that 76% of the samples contained pathogens, with 65% Gram-positive bacteria and 20% Gram-negative bacteria. The most common pathogen identified was *Streptococcus pyogenes.* These findings highlight the need for accurate diagnosis and appropriate antibiotic use, especially in pediatric patients from lower socioeconomic backgrounds, and emphasize the role of targeted treatment to prevent complications such as recurrent infections and antibiotic resistance.

Keywords: Acute pharyngitis, tonsillitis, pediatric infections, Streptococcus pyogenes, bacterial pathogens, socioeconomic status, age distribution, clinical symptoms, antibiotic treatment.

INTRODUCTION

Acute pharyngotonsillitis (APT) is a common health issue worldwide, particularly among children, and is most often associated with viral infections that are benign and self-limiting. The primary symptom of acute pharyngitis is a sore throat, typically caused by upper respiratory viruses such as rhinovirus, coronavirus, and adenovirus. Among bacterial causes, β-hemolytic group A Streptococcus (GAS) is the leading pathogen responsible for sore throat, and if untreated, it can lead to severe complications [1,2].

Pharyngitis refers to the inflammation of the pharynx, which may present with exudates, ulceration, or notable erythema. Redness of the throat is often seen as part of a systemic inflammatory response, particularly when the patient has a fever. A diagnosis of pharyngitis is usually confirmed when the pharynx appears distinctly redder than the surrounding oral mucosa [3].

Tonsillitis is the inflammation of the tonsils, which can be caused by either viral or bacterial infections. It can occur as a single episode or recur frequently. Acute tonsillitis is typically

characterized by the presence of white streaks of pus on the tonsils, and the tonsils may appear bright red. β-hemolytic Streptococcus and other bacterial agents are the most common causes of bacterial tonsillitis. Symptoms include sore throat, red and swollen tonsils, pain while swallowing, fever, cough, headache, fatigue, chills, and swollen lymph nodes in the neck. In some cases, additional symptoms such as ear pain, nausea, stomach aches, vomiting, bad breath, and difficulty opening the mouth may also occur [4].

According to the World Health Organization, there are approximately 600 million new cases of symptomatic APT caused by GAS annually in children worldwide. Among these, about 500,000 cases progress to rheumatic fever (RF), and around 300,000 develop rheumatic heart disease (RC). These conditions are more prevalent in less developed countries, such as those in Latin America, where the incidence of RF is notably higher compared to developed nations [5].

Understanding the bacterial pathogens responsible for acute tonsillitis and their antibiotic susceptibility is crucial in determining the most effective treatment strategies. This approach helps avoid unnecessary surgeries and minimizes the risk of complications. The objective of this study is to investigate the incidence of acute pharyngitis and tonsillitis among the pediatric population in a tertiary care hospital.

MATERIALS AND METHODS

A total of 150 instances of acute tonsillitis were selected from patients attending the outpatient Department of ENT at hospitals in the Chennai region. The study sample consisted of 90 male and 60 female participants, ranging in age from 4 to 18 years. These patients were randomly chosen and had not received antibiotics for at least one week prior to the study [6].

Informed written consent was obtained from the parents or guardians of all child participants before the study commenced. The laboratory analyses were performed in the Department of Microbiology.

Specimens were collected using sterile cotton swabs, one from the surface of the tonsils and the other from the cryptamagna, following aseptic techniques. These samples were then placed in sterile bottles and transported to the laboratory for further analysis. The specimens were subjected to direct microscopic examination to identify pathogens, followed by the isolation of causative organisms on various media, including sheep blood agar, chocolate agar, and McConkey agar.

Antibiotic sensitivity testing was conducted for all isolated organisms. Disc diffusion tests were performed using antibiotics such as penicillin, erythromycin, ampicillin, gentamycin, chloramphenicol, ciprofloxacin, cephalexin, cefotaxime, and amikacin. The inhibition zones were measured and recorded.

After antibiotic treatment was administered to the patients for tonsillitis, they were followed up for a period of six months or longer to monitor for any recurrence of tonsillitis. The collected data were analyzed in relation to factors such as age, sex, occupation, socioeconomic status, clinical manifestations, and bacteriological findings.

RESULTS

Table 1: Age-wise Distribution of Acute Pharyngitis and Tonsillitis Cases

S. No	Age Group	Number of Cases	Percentage
1	2-5 years	27	18%
2	6-8 years	78	52%
3	9-12 years	45	30%

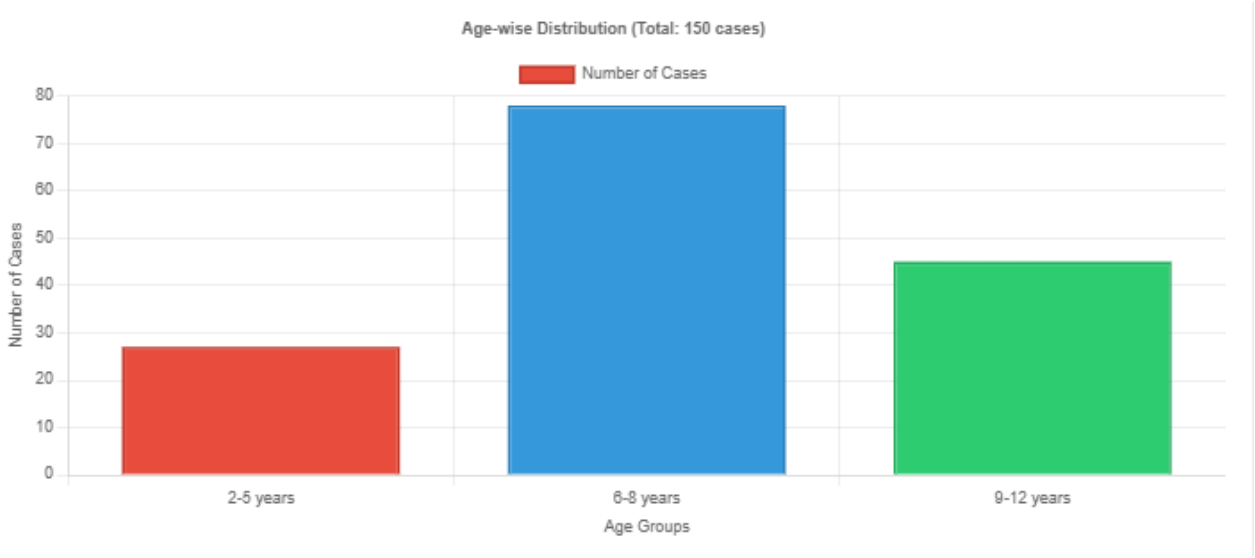

Table 1 presents the distribution of acute pharyngitis and tonsillitis cases among different age groups. The highest incidence of tonsillitis was observed in the 6-8 years age group, accounting for 52% of cases, followed by the 9-12 years group at 30%, and the 2-5 years group at 18%.

Table 2: Socioeconomic Status of Patients

S. No	Socioeconomic Status	Number of Cases	Percentage
1	Low income group	89	59%
2	Middle income group	38	25%
3	High income group	18	12%

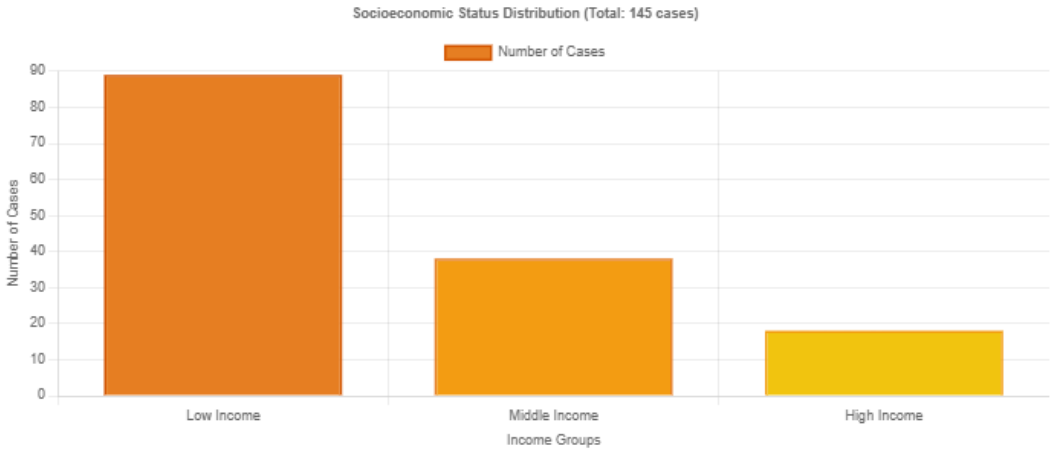

Table 2 shows the distribution of acute pharyngitis and tonsillitis cases according to the patients' socioeconomic status. A majority of the cases were observed in the low-income group (59%), followed by the middle-income group (25%), and the least number of cases were reported in the high-income group (12%). Additionally, the data showed that the incidence of acute pharyngitis and tonsillitis was higher in male patients (56%) compared to female patients (44%).

Table 3: Professional Distribution of Patients

S. No	Occupation	Number of Cases	Percentage
1	Students	103	69%
2	Homemakers	24	16%
3	Laborers	9	6%
4	Preschool Children	14	9%

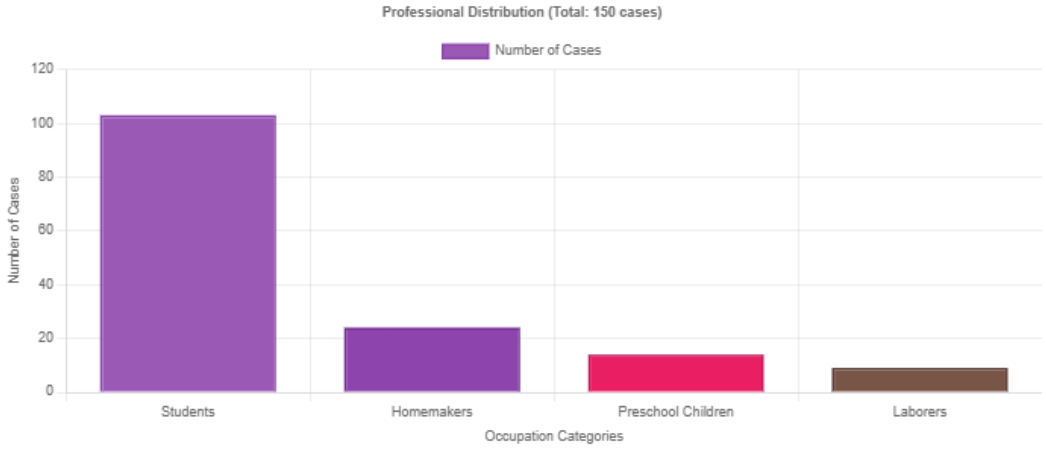

Table 3 shows the distribution of acute pharyngitis and tonsillitis cases based on the occupation of the patients. The highest incidence (69%) was observed in students, followed by homemakers (16%), preschool children (9%), and laborers (6%).

Table 4: Symptoms of Patients

S. No	Symptoms	Number of Cases	Percentage
1	Sore throat	150	100%
2	Fever	89	59%
3	Odynophagia	53	35%
4	Constitutional symptoms	69	46%

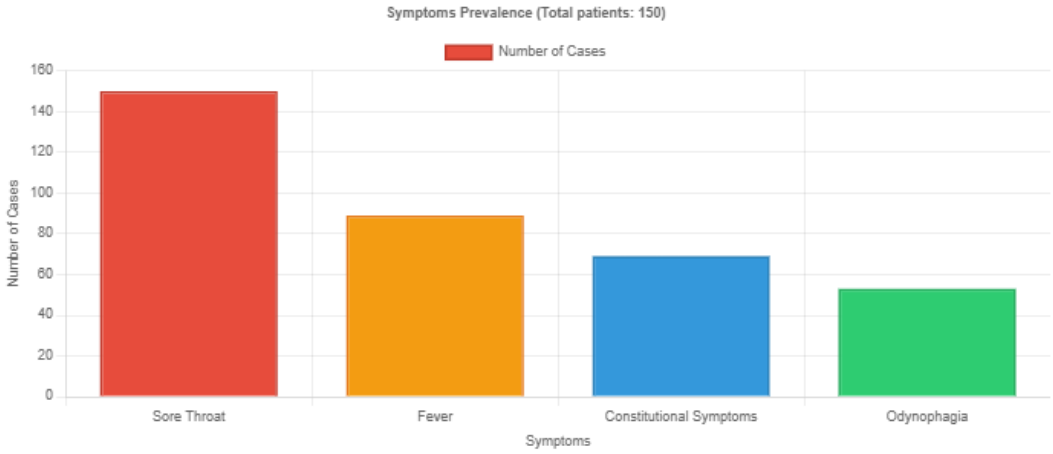

Table 4 shows the incidence of symptoms among the patients. Sore throat was reported in all the patients (100%), followed by fever in 59%, odynophagia in 35%, and constitutional symptoms in 46% of the cases.

Table 5: Signs of Patients

S. No	Signs	Number of Cases	Percentage
1	Acute parenchymatous	84	56%
2	Acute follicular	74	49%
3	Acute membranous	18	12%
4	Palpable tender lymph node	103	69%

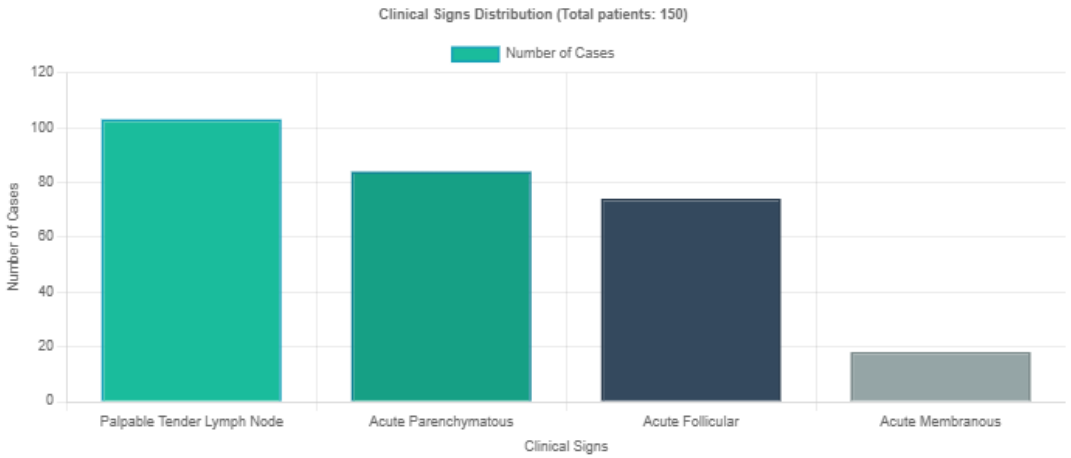

Table 5 shows the signs observed in the patients. Palpable tender lymph nodes, particularly in the digastric region, were noted in 69% of the cases. Additionally, 56% of patients exhibited signs of acute parenchymatous tonsillitis, 49% showed acute follicular tonsillitis signs, and 12% had acute membranous tonsillitis.

Table 6: Bacterial Pathogens Isolated from Patients

S. No	Bacteria Isolated	Number of Cases	Percentage
1	Pathogens	114	76%
2	Commensals	23	15%
3	No growth	28	19%
4	Gram-positive bacteria	98	65%
5	Gram-negative bacteria	30	20%

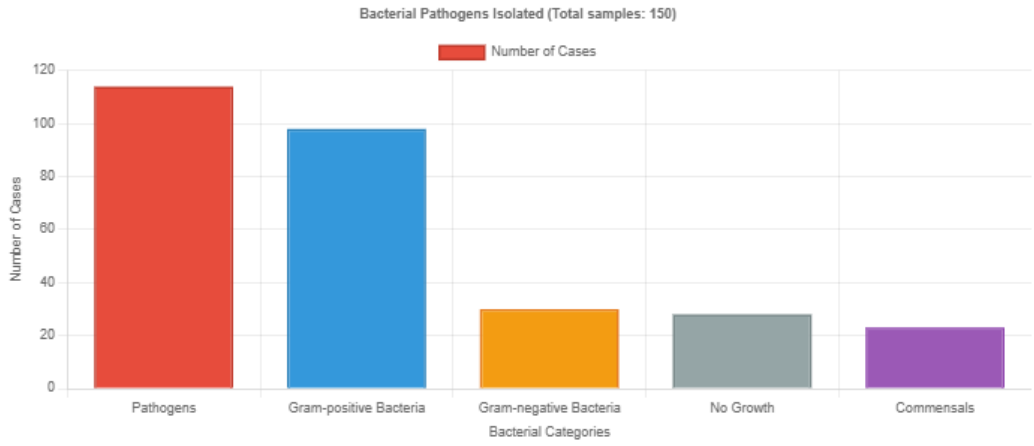

Table 6 presents the results of the bacteriological study of throat swabs. Among the samples, 76% showed the presence of pathogens, while 15% had commensals, and 19% showed no bacterial growth after 48 hours of incubation on culture media. Among the isolated bacteria, 65% were Gram-positive, and 20% were Gram-negative.

DISCUSSION

The findings from this study provide important insights into the epidemiology, clinical presentation, and microbiological characteristics of acute pharyngitis and tonsillitis in pediatric patients at a tertiary care hospital. Our study involved a cohort of 150 children, with an age range from 2 to 12 years, and highlighted several key aspects regarding the distribution of these infections based on age, socioeconomic status, occupation, symptoms, signs, and bacterial pathogens [7,8].

Age-wise Distribution

As shown in Table 1, the highest incidence of acute pharyngitis and tonsillitis was observed in the 6-8 years age group, accounting for 52% of the cases, followed by the 9-12 years age group (30%) and the 2-5 years age group (18%). This finding is consistent with previous studies, which also report a higher frequency of these infections in school-age children (6-8 years) due to increased exposure to pathogens in communal settings like schools and daycare centers. Younger children (2-5 years) tend to have a lower incidence, likely due to reduced social interactions and more frequent protection from infections in controlled environments [9].

Socioeconomic Status

Regarding socioeconomic status (Table 2), the majority of cases (59%) were reported in the low-income group, followed by the middle-income group (25%) and the high-income group (12%). This distribution is significant as it underscores the impact of socioeconomic factors on the incidence of acute infections. Children from lower socioeconomic backgrounds may experience higher rates of infection due to factors such as overcrowded living conditions, limited access to healthcare, and inadequate nutritional status, which can impair immune function. These findings align with global trends, where lower socioeconomic status is frequently associated with a higher burden of infectious diseases [10].

Professional Distribution

The professional distribution (Table 3) showed that the majority of cases were among students (69%), followed by homemakers (16%), preschool children (9%), and laborers (6%). The high incidence among students is likely due to the increased exposure to infections in schools and daycare centers, which are environments conducive to the spread of respiratory pathogens. Preschool children also contribute to the incidence, though to a lesser extent, as they tend to be in environments such as daycare, where infections can spread rapidly. The relatively low incidence in laborers could reflect the fact that tonsillitis and pharyngitis are more common in children, while adults typically develop other respiratory conditions [11].

Symptoms and Signs

Table 4 presents the symptoms of patients, with sore throat being reported in all cases (100%), as expected for both acute pharyngitis and tonsillitis. Fever was the second most common symptom, affecting 59% of the patients, followed by odynophagia (35%) and constitutional symptoms such as fatigue and malaise (46%). These findings are consistent with the classic presentation of these conditions, where sore throat and fever are the hallmark symptoms. Odynophagia, or pain during swallowing, is a common complaint in tonsillitis and pharyngitis, while constitutional symptoms reflect the systemic inflammatory response [12].

In terms of signs, as shown in Table 5, 69% of patients had palpable tender lymph nodes, which is typical in cases of acute tonsillitis and pharyngitis due to lymph node involvement in the immune response. Acute parenchymatous tonsillitis was observed in 56% of cases, followed by acute follicular tonsillitis (49%) and acute membranous tonsillitis (12%). These findings reflect the variety of clinical presentations that can be seen in pediatric tonsillitis and pharyngitis, with parenchymatous and follicular types being the most common, while membranous tonsillitis is less frequently observed but more severe when it occurs [13].

Bacterial Pathogens

Table 6 presents the results of the bacteriological analysis, which showed that 76% of cases were caused by pathogens, with 15% showing commensals and 19% exhibiting no bacterial growth after incubation. Among the isolated pathogens, 65% were Gram-positive bacteria, and 20% were Gram-negative. The high prevalence of Gram-positive bacteria, particularly Streptococcus pyogenes (GAS), is consistent with previous studies on acute tonsillitis, as this pathogen is a well-known cause of both pharyngitis and tonsillitis in children. The presence of Gram-negative bacteria in 20% of cases suggests that, while less common, other bacterial pathogens may also contribute to the disease burden in this population. The finding that 19% of samples showed no bacterial growth may reflect cases of viral pharyngitis or tonsillitis, highlighting the viral etiology of some cases of these conditions [14].

CONCLUSION

In conclusion, the results of this study underscore the importance of understanding the epidemiological distribution, clinical features, and microbiological characteristics of acute pharyngitis and tonsillitis in the pediatric population. The findings indicate that these conditions are more prevalent in school-aged children, particularly those from low-income backgrounds. The high incidence of bacterial pathogens, especially Streptococcus pyogenes, emphasizes the need for targeted antibiotic therapy and careful consideration of antibiotic resistance patterns. By identifying the common clinical features and pathogens associated with acute pharyngitis and tonsillitis, healthcare providers can better manage these conditions, reduce unnecessary treatments, and improve patient outcomes.

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