

# A Prospective Study Comparing Bacterial and Viral Tonsillitis, Diagnostic Pattern and Therapeutic Outcomes

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## ABSTRACT

**Background:** Tonsillitis is one of the common upper respiratory tract infections which can arise from either bacterial or viral causes. Correctly distinguishing between the two forms is essential for guiding effective therapy and limiting the overuse of antibiotics.

**Aim:** The goal of the study is A Prospective study comparing Bacterial and Viral tonsillitis "Diagnostic pattern and therapeutic outcomes" in Shadan Institute of Medical Sciences Teaching Hospital and Research Centre.

### Objectives:

- To evaluate triggering factors contributing to tonsillitis.
- To determine the most prevalent causative agents of bacterial and viral tonsillitis.
- To analyse the prevalence of acute, chronic, and recurrent tonsillitis.
- To study the diagnostic pattern in patients presenting with tonsillitis.
- To evaluate clinical presentations and laboratory findings in bacterial versus viral tonsillitis.
- To assess treatment strategies for tonsillitis following the WHO guidelines.
- To compare drug indicators and treatment outcomes in patients with bacterial and viral tonsillitis.

**Materials and Methods:** Data are collected from hospital-admitted patients with tonsillitis and sore throat symptoms. Prior to observation, the patient's guardian provided written informed consent, and confidentiality was upheld.

**Results:** Viral infections had been noted in most of the cases (63.3%), while bacterial cases represented 36.7%. Group A Streptococcus was the predominant bacterial pathogen, and in most of the viral cases, adenovirus was commonly seen. A family history of tonsillitis and complications such as scarlet fever and Rheumatic fever was more prevalent associated with bacterial infection. Viral tonsillitis typically resolves with conservative management, while antibiotic therapy in bacterial cases resulted in quicker symptom relief correlated with adjunctive treatment alone ( $p < 0.05$ ). Patients with bacterial tonsillitis also presented with higher severity scores, prolonged fever, and tonsillar exudates.

**Conclusion:** Tonsillitis continues to stand for a significant clinical concern, presenting in both bacterial and viral forms, each associated with distinct diagnostic patterns and treatment outcomes. In many rural and resource-limited settings, inadequate awareness, diagnostic delays, and inappropriate use of antibiotics contribute to complications and hinder recovery. Research shows that individuals with bacterial tonsillitis show favorable responses to proper antibiotic therapy, while viral infections are better managed with supportive care. This distinction highlights the critical importance of accurate diagnosis in guiding effective management and reducing unnecessary antibiotic use.

**Keywords:** Tonsillitis, Bacterial infection, Viral infection, Diagnostic pattern, Therapeutic outcome.

## INTRODUCTION

Tonsillitis, defined as inflammation of the palatine tonsils, remains a prevalent condition and accounts for 1.3% of outpatient consultations. In uncomplicated cases, it commonly presents with a sore throat and is most often attributable to either bacterial or viral pathogens. Clinical evaluation is sufficient for diagnosing acute tonsillitis; however, differentiating between bacterial and viral aetiologies can be difficult [1]. Accurate distinction is crucial, as misclassification may lead to inappropriate antibiotic use and contribute to antimicrobial resistance.

Tonsillitis commonly presents with fever, painful swallowing (odynophagia), sore throat, and erythematous or exudative tonsillar surfaces.

The palatine tonsils, found within the lateral oropharynx between the palatoglossal and palatopharyngeal arches, form a key part of Waldeyer's ring [2,3]. Composed of lymphoid tissue, they play a vital role as a primary immune barrier against inhaled or ingested pathogens. While most tonsillitis cases are viral in origin, bacterial pathogens may also serve as causative agents.

It could happen [4]

- As a singular incident
- In addition to generalised pharyngitis and various viral upper respiratory tract infections (URTIs).
- The majority of prevalent viruses are coronavirus, adenovirus, rhinovirus, and Respiratory Syncytial Virus.

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- Hepatitis-Arubella, cytomegalovirus, Epstein-Barr (which leads to mononucleosis), and HIV are additional viral causes that can result in tonsillitis.
- As a part of infectious mononucleosis (IMN) and other systemic infections
- Traditionally, Group A  $\beta$  Haemolytic Streptococci (GABHS) are the causative organism.
- Haemophilus influenzae, Streptococcus pneumonia, and Staphylococcus Aureus were also cultivated.

### Classification

Tonsillitis can take many forms. Doctors define them based on their symptoms and recovery time.

This includes:

- Acute tonsillitis is self-limiting, with symptoms present for 3–4 days, though prolonged cases lasting two weeks can occur.
- Recurrent tonsillitis shows multiple acute infections affecting the tonsils over a one-year period.
- Chronic tonsillitis often presents with continual throat pain and bad breath. Tonsillitis can present in several different ways {5}.

### Epidemiology

Tonsillitis is predominantly a childhood illness, though it is uncommon in those younger than two years. Infections with viruses are more often observed in younger age groups, while bacterial tonsillitis, particularly that caused by Streptococcus species, is most common in kids between the ages of 5 and 15 years {6}. Although it can appear earlier, a peri-tonsillar abscess (PTA) typically affects teenagers or young adults. Most of the URIs are accompanied by pharyngitis. It is possible to classify 2.5% to 10.9% of children as carriers. In one study, 15.9% of schoolchildren had a mean carrier status for the tonsillitis-causing group A streptococcus {7}. About one-third of peritonsillar abscess episodes in the US occur in children, according to Herzon et al. Annually, approximately 2% of the population seeks medical care for tonsillitis, while 7.5% report experiencing a sore throat within a three-month period {8}. The condition shows a seasonal pattern, occurring more often during the colder months of autumn and winter, with the highest prevalence seen among school-aged children {9}. Most individuals recover spontaneously from tonsillitis, irrespective of medical intervention {10}. Studies show that 82% of patients experience complete resolution of symptoms within one week, regardless of whether the underlying cause is bacterial or viral. Antibiotics help people who have headaches or sore throats, but it's important to weigh the risks of antibiotic resistance against the slight symptom reduction {11}.

### Etiology

Tonsillitis and its associated issues could result from bacterial or viral pathogens and underlying immunological factors. Environmental contributors such as malnutrition and overcrowded living conditions also increase susceptibility. Most episodes of acute tonsillitis and pharyngitis are viral in origin, with common causative agents including herpes simplex virus, Epstein-Barr virus (EBV), cytomegalovirus, other herpes viruses, adenovirus, and measles virus {7}. A study verifies that EBV accounts for approximately 19% of exudative tonsillitis in children, proving its function as a causative agent despite the lack of systemic mononucleosis. In contrast, bacterial pathogens are implicated in around 15–30% of pharyngo-tonsillitis cases.

Among these, Group A  $\beta$ -haemolytic Streptococcus is the predominant organism, though anaerobic bacteria might also contribute to tonsillar disease {12}.

The possibility of complications makes bacterial causes of tonsillitis clinically significant, despite their rarity. *S. pyogenes*, also known as group A beta-haemolytic Streptococcus, is a prevalent bacterial pathogen, especially in children in the 5 and 15 age groups {13,14}. *Haemophilus influenzae*, *Fusobacterium necrophorum* (especially in adolescents and young adults), *Streptococcus pneumonia*, *Staphylococcus aureus*, and *Streptococcus dysgalactiae* are supplementary organisms that are implicated {15}.

*Neisseria gonorrhoeae*, *Mycoplasma pneumoniae*, and *Chlamydia pneumoniae* are less frequent bacterial pathogens, especially in sexually active people. Individuals who did not receive a vaccination should be evaluated for *Corynebacterium diphtheriae*. Additionally, *Mycobacterium tuberculosis* has been associated with recurring or chronic tonsillitis, especially in high-risk individuals {16,17}. The persistence of recurrent tonsillitis is commonly attributed to the presence of biofilm-forming organisms like *S. aureus* and *H. influenzae* {18}. Recurrence is also linked to dysbiosis, or decreased microbial diversity, and modulations in tonsillar microbiota {19}.

### Transmission

Because tonsillitis is contagious, it quickly transmits from one individual to another. Transmission of tonsillitis happens when there is direct contact with saliva, nasal secretions, or respiratory droplets expelled by an affected person during coughing or sneezing. Additionally, it could be indirectly spread by touching the mouth or nose after contacting contaminated objects or surfaces, such as toys, doorknobs, or cutlery {20}. Due to their immature immune systems and often spending time with other children in places like daycare centres and schools, children are especially vulnerable to tonsillitis. Parents must understand that tonsillitis is contagious and take the proper measures to stop it from spreading. Even though tonsillitis can strike anyone at any age, kids and teenagers are the most likely to get it. School-age children are mostly exposed to germs that can cause tonsillitis because they are often around or in contact with a lot of other people. Additionally, tonsillitis is less common in adults, which might be described with the tonsils' declining function with age {21}.

### Incubation period

The incubation period refers to the time between being exposed to a germ and developing symptoms. Tonsillitis typically has an incubation period of two to four days. You might not get tonsillitis if you were exposed to germs but do not experience any symptoms within this period {21}.

### Pathophysiology

In the etiopathogenesis of acute tonsillitis (AT), the initial critical step involves the penetration of the mucosal barrier covering the palatine tonsils. Both  $\alpha$ - and  $\beta$ -hemolytic streptococci have the ability to infiltrate this mucosal layer. Following penetration, the adherence of pathogenic microorganisms to the epithelial surface is another essential stage. A key factor in this procedure is the M-protein, a huge portion of the fimbriae on the surface of *Streptococcus pyogenes*. This protein, which is the most abundant surface antigen of virulent streptococci, plays a significant role in bacterial adhesion.

It is advised that lipoteichoic acid, in complex with M-protein, acts as the adhesive molecule, while fibronectin on the epithelial cells serves as its binding counterpart [22]. Once attached, the bacteria are capable not only of colonising the epithelial surface but also of invading epithelial cells, as proven *in vitro* as well as *in vivo* studies [23,24,25]. This highlights the therapeutic advantage of antibiotics capable of intracellular penetration in treating such infections. Furthermore, the rapid desquamation of infected epithelial cells is considered as an important host defence mechanism, and any factor impairing this process might elevate the risk factor to *S. pyogenes* infection [26].

**Treatment**

The first line treatment of bacterial pharyngotonsillitis is typically antibiotics, which functions against *Streptococcus pyogenes*, such as amoxicillin or penicillin V. Within 4 to 5 days, clinical symptoms usually start to get better, and within 48 to 72 hours, treatment effects are usually clear. The case should be reevaluated, and the first treatment may be considered ineffective if no improvement is seen within this period [27]. Examine the patient's compliance with the recommended dosage first. Second-line antibiotics like clindamycin, amoxicillin/clavulanate, ampicillin/sulbactam, or narrow-spectrum cephalosporins may be taken into consideration if antibiotic therapy is new and penicillin resistance in *S. pyogenes* is still uncommon [28]. Studies have found no discernible difference in treatment outcomes between a 10-day course of once-daily amoxicillin and a 10-day course of cephalexin, and the efficacy of ampicillin/sulbactam and amoxicillin/clavulanate is not well established [29]. Penicillin is widely utilised as a first-line antibiotic due to its demonstrated effectiveness, safety record and low price. However, due to concerns about penicillin allergies, macrolides such as erythromycin and clindamycin are becoming more popular alternatives. As a result of increased use, *S. pyogenes* strains are becoming more resistant to these antibiotics. In 2002, 51% of individuals isolated *S. pyogenes* in Jinju, Korea, were found to be resistant to macrolide [30]. Erythromycin resistance rates in Masan and Seoul were 20.5% and 28.5%, respectively, between 1998 and 2003 [31]. Erythromycin, azithromycin, and clindamycin resistance further rose to 42.9%, 42.9%, and 30.6%, respectively [32], between 2009 and 2011. Clindamycin and macrolides are typically not advised as first-line treatments because of these increasing rates of resistance, and if they are, treatment failure should be closely monitored. Third, along with *S. pyogenes*, other microbes which could result in acute pharyngotonsillitis include EBV, adenovirus, mycoplasma, *Fusobacterium*, *Corynebacterium diphtheriae*, *Acanobacterium haemolyticum*, and *N. gonorrhoea*. After taking amoxicillin, a rash may appear, which could indicate an EBV infection. *Fusobacterium* infections can be treated with ampicillin/metronidazole or ampicillin/sulbactam. There are fewer reports of *Fusobacterium* species developing penicillin resistance. Antibiotics recommended for infections caused by *Corynebacterium diphtheria* include erythromycin and penicillin. Because it is difficult to completely eliminate *Neisseria gonorrhoea*, a follow-up bacterial culture is recommended after treatment of acute tonsillitis. This infection is typically treated with a single 250 mg intramuscular dose of Ceftriaxone [33]. Most of the patients presenting to ENT outpatient departments having a sore throat were observed with acute bacterial or viral tonsillitis.

The most prevalent bacterial microbe linked to severe cases is Group A  $\beta$ -haemolytic streptococcus, while viral agents include adenoviral pathogens, rhinoviruses, and EBV.

Currently, the overuse and irrational prescription of antibiotics for tonsillitis is a notable public health concern that exacerbates the matter of antibiotic resistance. Reducing complications and improving patient outcomes requires prompt management, sensible medication use, and accurate diagnosis. To promote better healthcare practices and reduce disease burden, it is necessary to focus studies on tonsillitis prevalence, clinical patterns, management strategies, and treatment outcomes in patients.

A prospective comparative study in tonsillitis aims to follow patients diagnosed with tonsillitis over a set period of time, collecting information on their clinical manifestation, diagnostic assessment, therapy, and therapeutic outcomes. The comparative study helps to examine the differences in tonsillitis diagnostic patterns between bacterial and viral infections, as well as the efficacy of treatment options.

- This research aims to improve patient recovery and prevent antibiotic overuse by using accurate diagnostic methods.
- This study aims to collect epidemiological data on tonsillitis across all age groups and provide practical insights for better diagnosis, treatment, and antibiotic stewardship in clinical practice.

**METHODS**

A six-month prospective observational study was conducted in the ENT outpatient department of the Shadan Institute of Medical Sciences and Research Centre in Hyderabad, India. This research includes 300 ENT department patients. The quantity and kind of tonsillitis were determined by reviewing the diagnostic reports of the patients selected for sampling. Patients were screened according to the inclusion and exclusion criteria, and those fulfilling the definition of tonsillitis were enrolled. Inclusion criteria comprised every individual who has been diagnosed with tonsillitis, Patients who are ready to take part and complete the consent form. The study includes both genders of outpatients with tonsillitis. Exclusion criteria include Pregnant women, Patients who are uncomfortable and reluctant to provide information about their health issue, patient with cognitive impairment or psychiatric illness. Data is collected for any patient who is admitted to the hospital with tonsillitis and sore throat symptoms. Prior to observation, the guardian gave the written informed consent, and confidentiality is upheld. The study design was a prospective observational study with a total sample size of 300 participants.

Statistical analysis is performed using standard descriptive information, such as probabilities and frequencies, used to characterise the demographic features of the individuals being evaluated. The results of the data coding were performed in an EXCEL spreadsheet software by Microsoft. All analyses were performed.

**RESULTS**

**DEMOGRAPHICS OF PATIENTS**

Table 1: Gender-wise

GENDER	PERCENTAGE OF PATIENTS
Male	60.33%
Female	39.66%

Table 1: Illustrates the demographics of patient's gender-wise. This study used patient demographic information about the

patients that was gathered and analysed; tonsillitis affected both male and female individuals. Among the 300 patients, 181 were male (60.33%) and 119 were female (39.66%).

Table 2: Age-wise

Age (Years)	N (%)
2-10	29(9.67)
11-20	63(21)
21-30	48(16)
31-40	53(17.67)
41-50	37(12.33)
51-60	41(13.67)
61-70	23(7.67)
>70	6(2)

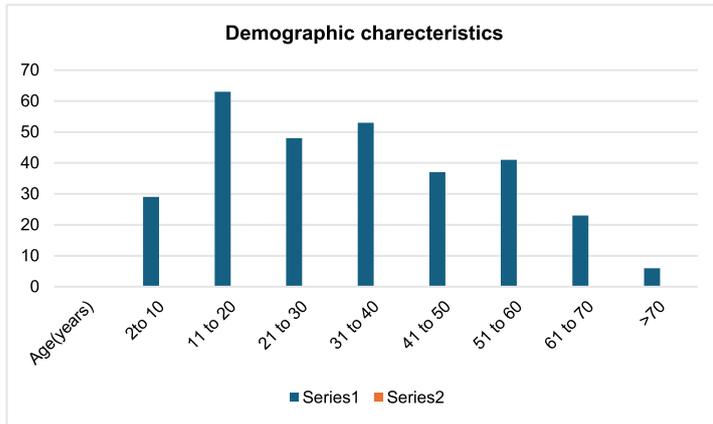


Table 2: According to the study's findings, 63 (around 21%) of 300 patients are over the age of 11 and have a higher incidence of tonsillitis than other age groups. The age groups 61-70 and over 70 have fewer participants, with approximately 23 and 6, respectively, accounting for 7.67% and 2% of the total population. The oldest patient diagnosed was 80 years old, while the youngest was two years old; both had tonsillitis.

Table 3: Family History

Medical history of tonsillitis	Bacterial tonsillitis(n=110)	Viral tonsillitis(n=190)
Present	42(38.2%)	48(30.0%)
Absent	68(61.8%)	142(74.7%)

Table 3: Compare the presence of family background of medical history of individuals with bacterial and viral tonsillitis. Out of 110 bacterial cases, 42 patients (38.2%) reported a positive family history, while 68 patients (61.8%) did not. In contrast, among the 190 viral cases, 48 patients (25.3%) had a family history, and 142 patients (74.7%) lacked such a background. Overall, this suggests that a family background of a history of tonsillitis is more often linked to bacterial infections compared to viral ones, indicating a possible genetic or hereditary predisposition that may increase susceptibility to bacterial tonsillitis.

Table 4: Clinical features

Clinical features	Percentage
Sore throat	300 (100)
Fever (duration about 2 to 3 days)	220(73)
Halitosis (bad breath)	56(18)
Excess salivation	48(16)
Swollen tonsils	270(90)
Impaired voice	78(26)
Trouble swallowing	85(28.33)
Pus	56(18.66)
Headache	68(22.66)
Fatigue	26(8.67)
Swollen lymph nodes	39(13)

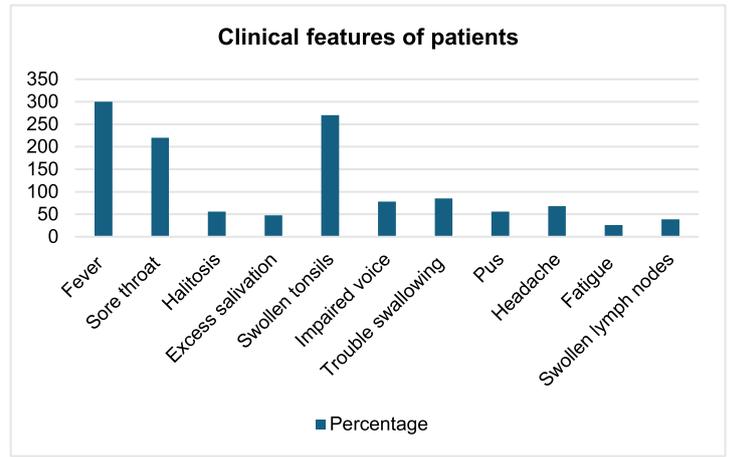


Table 4: Shows the clinical features of tonsillitis. It shows that a sore throat was present in all patients presenting to the hospital, and the other symptoms include fever 220 (73%), halitosis (bad breath) 56 (18%), excess salivation 48 (16%), swollen tonsils 270 (90%), impaired voice 78. (26%) trouble swallowing 85. (28.33%), pus 56 (18.66%), headache 68 (22.66%), fatigue 26 (8.67%), swollen lymph nodes 39 (13%).

Table 5: Risk factors associated with tonsillitis

Risk factors	Percentage
Weather	80(26.67)
Young age	29(9.6)
Germ exposure	78(26)
Exposure to infection	97(32.33)
Weak immune cells	40(13.3)

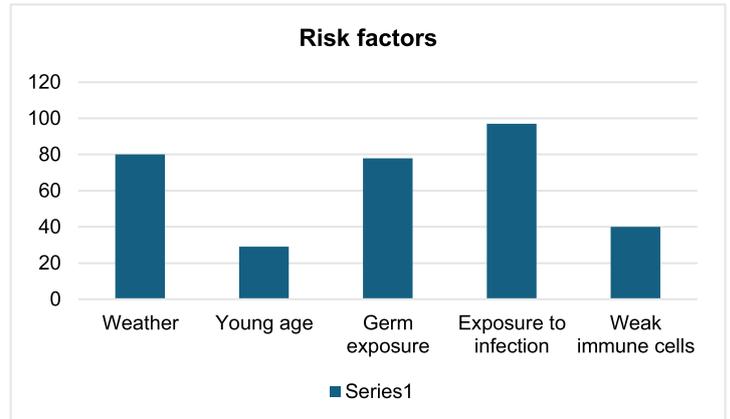


Table 5: Displays the tonsillitis risk factors. Considering the data presented above, exposure to infection was determined to be the main risk factor responsible for 97 (32.33%). The study involved 300 patients in total. Most of the tonsillitis risk variables are infection related. Additional risk factors consist of being young 29 (9.6%), being exposed to germs 78 (26%), weather 80 (26.67%), and having a weakened immune system 40 (13.3%).

Table 6 & 7: Comparison between bacterial and viral tonsillitis

Viral tonsillitis	No of patients (percentage)
Male	107(35.66%)
Female	83(27.66%)

Bacterial tonsillitis	No of patients (percentage)
Male	68(22%)
Female	42(14%)

Tables 6 and 7 the comparison between bacterial and viral tonsillitis. Out of 300 patients, 110 (36%) were diagnosed with bacterial tonsillitis, and 190 (63.33%) with viral tonsillitis.

Males accounted for 68 (22% of the bacterial cases) and females for 42 (14%). Viral tonsillitis affected 107 males (35.66%) and 83 females (27.66%). Overall, males (55%) had more tonsillitis than females (40%), and viral tonsillitis was more prevalent than bacterial tonsillitis in both genders

**Table 8: Diagnostic patterns of Bacterial versus Viral tonsillitis**

Parameter	Bacterial (N%)	Viral (N%)
Fever	94(85.5%)	69(36.3%)
Tonsillar exudate	82(74.5%)	34(17.9%)
Tender cervical lymph nodes	64(58.2%)	39(20.5%)
Cough	13(11.8%)	129(67.9%)
Mean WBC	13.0 ± 3.4	7.2 ± 2.0
Neutrophilia (>70%)	72(65.5%)	29(15.3%)
Median CRP (mg/L)	28(IQR 16-48)	6(IQR 3-10)
Centor score 0-1	11(10%)	99(52.1%)
Centor score 2	28(25.5%)	62(32.6%)
Centor score 3-4	71(64.5%)	29(15.3%)

Table 8: illustrates the comparative analysis of 300 patients revealed clear differences between bacterial and viral tonsillitis. Fever, tonsillar exudate, and tender cervical lymphadenopathy were significantly higher in bacterial cases (85.5%, 74.5%, and 58.2%) than in viral ones (36.3%, 17.9%, and 20.5%), while cough was more common in viral infections (67.9% vs. 11.8%). Laboratory findings showed higher WBC counts, neutrophilia (>70%), and elevated CRP levels in bacterial cases. Centor scores of 3–4 was mostly seen in bacterial tonsillitis, whereas viral cases had lower scores (0–1). These findings indicate that bacterial tonsillitis is characterized by stronger inflammatory responses and higher Centor scores, while viral tonsillitis shows milder symptoms and lower inflammatory markers, highlighting the importance of combined clinical and laboratory diagnosis.

**Table 9: Severity of tonsillitis**

Severity	No of patients (%)
Acute tonsillitis	187(62.33%)
Mild	96(32%)
Moderate	65(21.66%)
Severe	26(8.6%)
Recurrent tonsillitis	105(35%)
Chronic tonsillitis	8(2.6%)

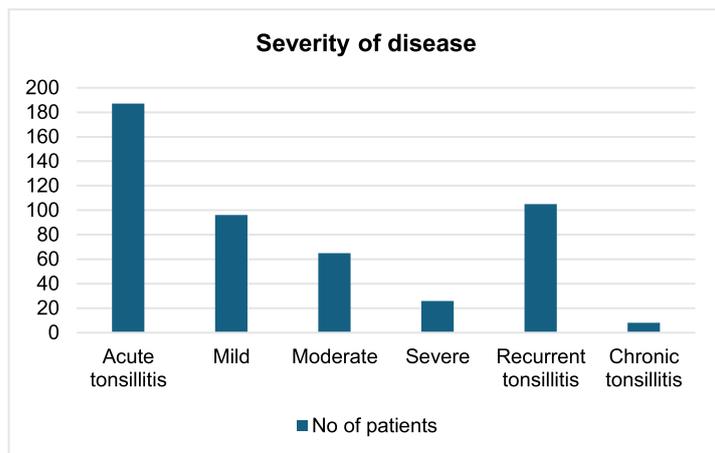


Table 9: Shows the severity of tonsillitis. Acute tonsillitis was the most prevalent type based on severity, affecting 187 patients (62.33%). Most mild symptoms were seen in 96 patients (32%), followed by moderate symptoms in 65 patients (21.66%) and severe symptoms in 26 patients (8.6%). While chronic tonsillitis was comparatively uncommon, occurring in only 8 patients (2.6%), recurrent tonsillitis was reported in 105 patients (35%).

According to this distribution, mild to moderate cases of tonsillitis are more commonly seen, and acute and recurrent types are more prevalent than chronic cases.

**Table 10: Pathogen in bacterial tonsillitis**

Pathogen in Bacterial tonsillitis	No of patients (%)
S. pyogenes	66(22%)
Haemolytic streptococcus	10(3.33%)
Group C and Group G streptococcus	14(4.6%)
H. influenza	12(4%)
S. pneumonia aureus	8(2.6%)

**Table 11: Pathogen in Viral tonsillitis**

Pathogen in Viral tonsillitis	No of patients (%)
Adenovirus	76(25.33%)
Influenza virus	28(9.33%)
Rhinovirus	48(16%)
Corona virus	22(7.33%)
Respiratory syncytial virus	16(5.33%)

Tables 10 and 11 Depict the analysis of the tables on pathogens causing tonsillitis reveals that both bacterial and viral agents make a major contribution to the disease's growth. Streptococcus pyogenes represents the largest share of bacterial microbes detected within 66 individuals (22%), followed by Group C and Group G streptococci 14 patients (4.6%), hemolytic streptococci in 10 patients (3.33%), Haemophilus influenzae in 12 patients (4%), and Staphylococcus pneumoniae aureus in 8 patients (2.6%). In contrast, viral pathogens were discovered to be more common, with Adenovirus being the leading cause in 76 patients (25.33%), followed by Rhinovirus in 48 patients (16%), Influenza virus in 28 patients (9.33%), Coronavirus in 22 patients (7.33%), and Respiratory syncytial virus in 16 patients (5.33%). This distribution demonstrates that, although bacterial causes, particularly S. pyogenes, continue to be important, viral infections, particularly adenovirus and rhinovirus, contribute significantly to the overall tonsillitis burden.

**Table 12: Diagnostic tests**

Diagnostic tests	No of patients (%)
Throat swab	86(28.66%)
CBP	64(21.33%)
RADT	97(32.33%)
PCR	53(17.66%)

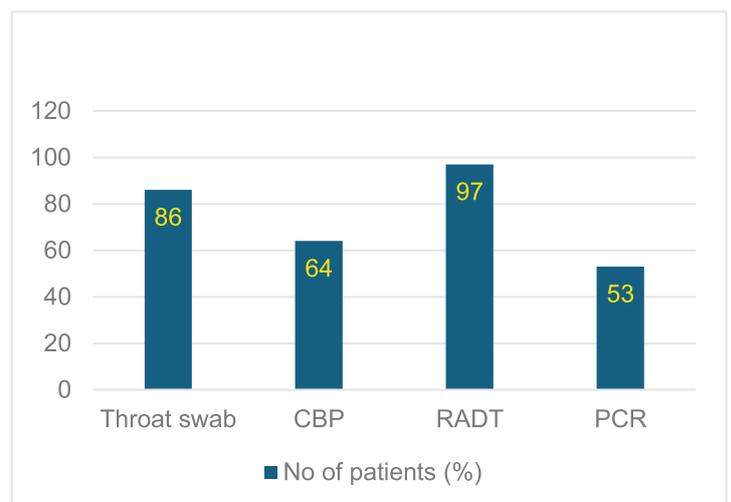


Table 12: Describe diagnostic tests used in tonsillitis highlights the different methods employed to identify causative pathogens. Among the diagnostic approaches, throat swab culture was the most widely used, performed in 86 patients (28.66%), which remains the most reliable method for verifying bacterial tonsillitis.

The Rapid Antigen Detection Test (RADT), which provides rapid results for streptococcal infections, was the next most popular technique, used in 97 patients (32.33%). A complete blood picture (CBP) was taken of 64 patients (21.33%), primarily to evaluate indicators of inflammation or systemic infection. To detect bacterial and viral genetic material more sensitively, 53 patients (17.66%) used Polymerase Chain Reaction (PCR), a more sophisticated molecular diagnostic technique. This distribution shows that although rapid and traditional culture methods are most frequently relied upon in clinical practice, molecular tests like PCR are also being used more frequently for precise and confirmatory diagnosis.

**Table 13: Comorbidities in Bacterial versus Viral tonsillitis**

Comorbidities	Bacterial (n=110)	Viral (n=190)
Diabetes mellitus	18(16.4%)	12(6.3%)
Allergic rhinitis	14(12.7%)	30(15.8%)
Chronic sinusitis	12(10.9%)	14(7.4%)
GERD (acid reflux)	10(9.1%)	8(4.2%)
Immunosuppression	5(4.5%)	3(1.6%)
No comorbidity	51(46.4%)	123(64.7%)

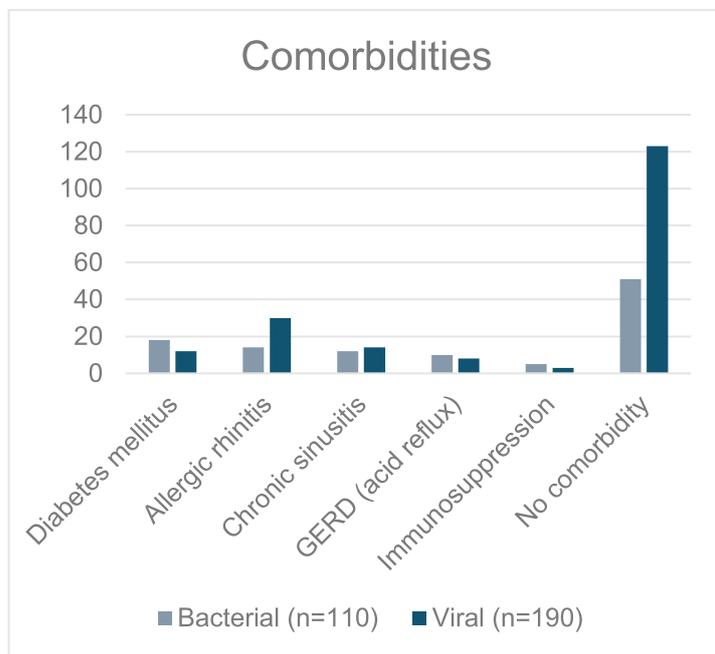


Table 13 Comparison observed in bacterial (n=110) and viral (n=190) tonsillitis cases. Among bacterial cases, diabetes mellitus was noted in 16.4%, allergic rhinitis in 12.7%, chronic sinusitis in 10.9%, and GERD in 9.1%, while only 4.5% were immunocompromised. Nearly half of bacterial cases (46.4%) had no associated comorbidity. In viral tonsillitis, diabetes was less common (6.3%), while allergic rhinitis (15.8%) and chronic sinusitis (7.4%) were slightly more frequent. GERD was present in 4.2% and immunosuppression in 1.6%. A larger proportion of viral cases (64.7%) reported no comorbidities. Overall, comorbid conditions were more prevalent in bacterial tonsillitis, whereas viral cases were more often isolated without underlying diseases.

**Table 14: Complications**

Complications	Bacterial tonsillitis (N%)	Viral tonsillitis (N%)
Scarlet fever	10(9.1%)	0
Rheumatic fever	6(5.5%)	0
Peritonsillar abscess	8(7.3%)	2(1.1%)
Obstructive apnea	7(6.4%)	3(1.6%)
Otitis media	5(4.5%)	4(2.1%)
No complications	74(67.2%)	181(95.2%)

Table 14: Outlines the complications seen in individuals who have bacterial and viral tonsillitis. In bacterial cases, the most prevalent complication was otitis media, affecting 54 patients (45%), followed by peritonsillar abscess in 18 patients (15%) and obstructive apnea in 7 patients (6%). Systemic complications like scarlet fever and rheumatic fever were observed in 10 patients (9%) and 5 patients (5%), respectively, while 74 patients (62%) experienced no complications. In contrast, viral tonsillitis was commonly linked with lower complications, with 31 patients (16%) developing peritonsillar abscess, 21 (11%) having obstructive apnea, and 42 (21%) presenting with otitis media. Notably, scarlet fever and rheumatic fever were absent in viral cases, and a larger proportion—181 patients (95%)—showed no complications. This highlights that bacterial tonsillitis tends to result in more frequent and severe complications compared to viral tonsillitis.

**Table 15: Treatment used in tonsillitis**

THERAPY	DRUGS	NO OF PATIENTS (300)
Mono therapy	1. Amoxicillin	40
	2. Augmentin (Amoxicillin-Clavulanate)	25
	3. Azithromycin	13
	4. Clarithromycin	15
	5. Cefuroxime	38
Dual therapy	1. Amoxicillin+Clavulonic acid	35
	2. Amoxicillin+Ibuprofen	45
	3. Cefuroxime/Cefixime+Clindamycin	23
	4. Amoxicillin+Metronidazole	10
Multi-drug therapy	1. Augmentin +Metronidazole+Azithromycin	11
	2. Cefixime +Clindamycin+NSAID	30
	3. Amoxicillin+NSAID+Prednisolone	15

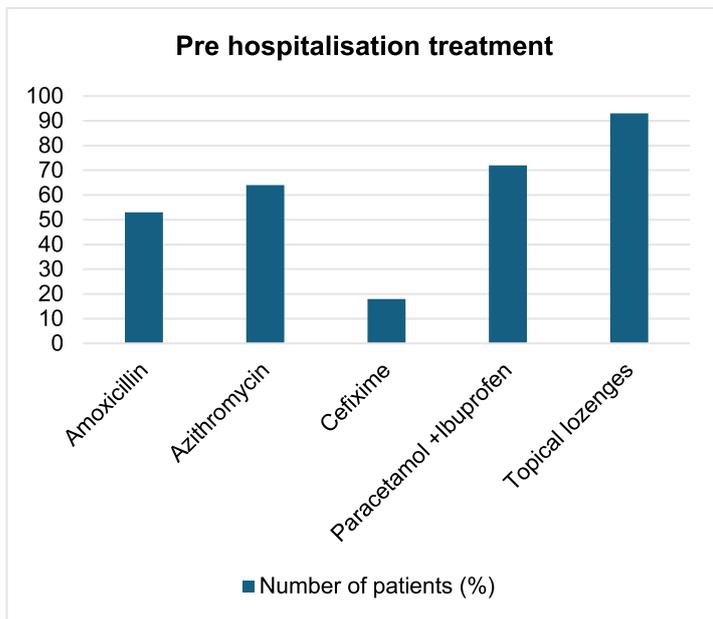
Table 15 illustrates treatment patterns in tonsillitis showing the distribution of patients managed with mono therapy, dual therapy, and multi-drug therapy from a total of 300 patients. Amoxicillin was the most frequently used drug in mono therapy, with 40 patients receiving it, followed by Cefuroxime in 38 cases. Augmentin (Amoxicillin-Clavulanate) was prescribed to 25 patients, Clarithromycin to 15 patients, and Azithromycin to 13 patients, showing that  $\beta$ -lactam antibiotics are still the primary treatment option.

In terms of dual therapy, the most often prescribed combination of antibiotics and analgesic/anti-inflammatory drugs was Amoxicillin + Ibuprofen, which was given to 45 patients. Forty-five patients received Amoxicillin + Clavulonic acid, and twenty-three patients received Cefuroxime/Cefixime + Clindamycin. In order to provide broader coverage for mixed infections, a smaller group of 10 patients received both amoxicillin and metronidazole.

The most preferred multi-drug regimen was Amoxicillin + NSAID + Prednisolone, which was directly administered to 30 patients, indicating that it must be utilized in severe or recurrent cases of inflammation. In addition, 15 patients received Cefixime + Clindamycin + NSAID, while 11 patients received Augmentin + Metronidazole + Azithromycin. Overall, the data indicates that the most popular course of treatment was monotherapy with either cefuroxime or amoxicillin. Dual and multi-drug regimens, which combine antibiotics with supportive or anti-inflammatory drugs for better therapeutic results, were reserved for patients with severe, recurrent, or resistant tonsillitis.

**Table 16: Treatment received by patients before**

Pre-hospitalization treatment	Number of patients (%)
Amoxicillin	53(17.67%)
Azithromycin	64(21.33%)
Cefixime	18(6%)
Paracetamol +Ibuprofen	72(24%)
Topical lozenges	93(31%)



**hospitalization**

Pre-hospitalization treatmentNumber of patients (%) Amoxicillin 53 (17.67%) Azithromycin 64 (21.33%) Cefixime 18 (6%)Paracetamol +Ibuprofen72(24%)Topical lozenges 93 (31%)

Table 16: The analysis of pre-hospitalization care among tonsillitis patients revealed a preference for symptomatic management over antibiotic use. Topical lozenges were the most common remedy (31%), followed by paracetamol and ibuprofen (24%) for pain and fever relief. Among antibiotics, azithromycin was most often used (21.3%), followed by amoxicillin (17.7%) and cefixime (6%). Overall, 55% of patients relied on symptomatic treatment compared to 45% who used antibiotics, indicating a general tendency toward self-care before hospital consultation.

**Table 17: Indicators for prescription as per WHO**

Sl. No	PRESCRIBING INDICATORS	PERCENTAGE
1.	Average number of drugs per encounter	2.3
2.	Percentage of drugs-prescribed-by-generic name	100
3.	Percentage of encounters with an antibiotic prescription	75
4.	Percentage of encounters with injection prescribed	12
5.	Percentage of drugs prescribed from essential drug list (EDL) or formulary	80
6.	Compliance with clinical guidelines	65
7.	Rational use of medications	80

**1. Average number of drugs per encounter – 2.3**

Slightly above WHO's recommended range (1.6-1.8). This suggests mild polypharmacy, which is still within acceptable limits in conditions that require both supportive and therapeutic drugs.

**2. Percentage of drugs prescribed by generic name – 100%**

Excellent outcome. Complete adherence to WHO guidelines, guaranteeing affordability, improved accessibility, and consistency in prescription practices.

**3. Percentage of encounters with an antibiotic prescription – 75%**

Significantly higher than the WHO's recommended range (20-26%). This suggests an overuse of antibiotics, elevating concerns about antimicrobial defense and irrational prescribing.

**4. Percentage of encounters with an injection prescribed– 12%**

Falls within the WHO's recommended range (13.4-24.1%), indicating a sensible and cautious approach to injection prescribing.

**5. Percentage of drugs prescribed by the essential drug list (EDL) or formulary – 80%**

The results were fairly good, indicating that most of medications were as directed by the national EDL or WHO. The 20% that is left off the list, however, suggests that efforts to promote affordable and necessary medications need to be strengthened.

**6. Compliance with clinical guidelines – 65%**

Almost two-thirds of prescriptions followed guidelines, which is moderately good. However, one-third continued to deviate, highlighting the need for stronger enforcement of evidence-based prescribing guidelines.

**7. Rational use of medications – 80%**

Prescriptions were reasonable, showing a promising trend. However, 20% of prescriptions showed unreasonable behavior, related to excessive use of antibiotics and partial noncompliance with recommendations.

**Table 18: Treatment outcomes**

Treatment outcomes	N (%)
Fever	75%
Sore throat	68%
Tonsillar swelling	85%
Difficulty in swallowing	72%
Improvement in speech	78%

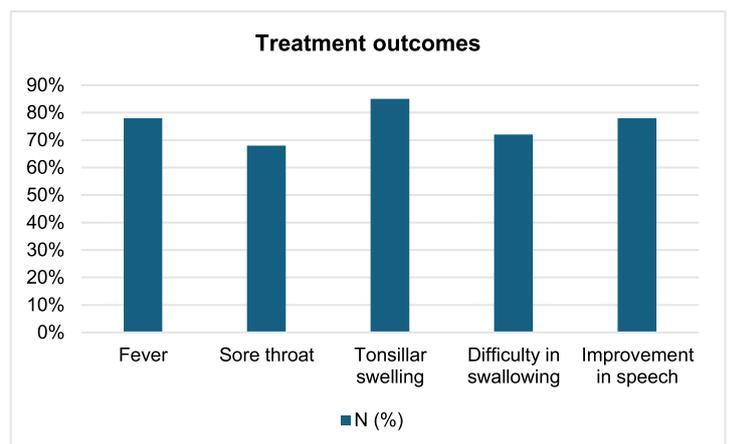


Table 18 Analysis of treatment outcomes showed that most patients experienced marked clinical improvement. Tonsillar swelling reduced in 85% of cases, indicating effective control of local inflammation. Improvement in speech (78%), fever reduction (75%), and relief from swallowing difficulties (72%) further reflected successful recovery. However, sore throat improvement was lower (68%), suggesting mild residual irritation may persist post-treatment. Overall, the findings demonstrate that tonsillitis treatment effectively alleviates inflammation and systemic symptoms, even though some discomfort may remain temporarily.

## DISCUSSION

The present study provides a comprehensive evaluation of the demographic, clinical, microbiological, diagnostic, and therapeutic characteristics of tonsillitis among 300 patients. The results demonstrate that the condition is more common in males (60.3%) compared to females (39.7%), which aligns with reports indicating a slight male predominance in upper respiratory tract infections. Age distribution revealed that children and adolescents, particularly those above 11 years, were more affected, whereas the elderly population had fewer cases, reflecting the typical age-related susceptibility to tonsillar infections. Clinically, sore throat was seen in every affected individual, while fever, tonsillar swelling, dysphagia, and impaired voice were also common, consistent with the established symptomatology of acute tonsillitis. Risk factor analysis highlighted infection exposure and weather changes as significant contributors, further reinforcing the multifactorial nature of tonsillitis. These findings emphasize the importance of environmental and host-related factors in disease onset. Microbiological analysis confirmed that the prevalence of viral infections was higher (63.3%) than bacterial infections (36.7%), with adenovirus and rhinovirus being the leading viral agents, and *Streptococcus pyogenes* remaining the primary bacterial pathogen. These findings concur with earlier studies indicating that viral tonsillitis predominates in community settings, though bacterial causes, particularly Group A *Streptococcus*, continue to be clinically important due to their complications such as rheumatic fever and post-streptococcal sequelae. The comparative analysis between bacterial and viral cases revealed distinct diagnostic profiles. Bacterial tonsillitis was substantially linked to fever, tonsillar exudates, cervical lymphadenopathy, elevated WBC counts, neutrophilia, and higher CRP levels, whereas viral tonsillitis more frequently had a symptom of cough and lower inflammatory markers. Centor scoring proved to be a reliable clinical tool in differentiating bacterial from viral etiology, supporting its utility in rationalizing antibiotic use.

Regarding severity, acute tonsillitis was the most common presentation, with mild-to-moderate forms being more frequent. Recurrent tonsillitis constituted a substantial proportion (35%), whereas chronic cases were rare. This distribution reflects the tendency of tonsillitis to present either acutely or in recurrent episodes, rather than as a chronic condition. Treatment patterns shown that mono therapy, particularly with amoxicillin and cefuroxime, was the preferred approach, while dual and multi-drug regimens were reserved for complicated or resistant cases. The predominance of  $\beta$ -lactam antibiotics in this study corresponds with global treatment guidelines. Importantly, supportive therapy with NSAIDs and corticosteroids enhanced symptomatic relief in severe and recurrent cases. Outcomes showed significant clinical improvement, especially in reducing tonsillar swelling and systemic symptoms, though residual sore throat persisted in some patients. Overall, the study's results demonstrate the effectiveness of supportive care and targeted antibiotics, the prevalence of viral etiology in tonsillitis, and the diagnostic value of combining clinical and laboratory parameters.

## CONCLUSION

The prospective study highlights the need to distinguish between bacterial and viral tonsillitis for accurate diagnosis and treatment. Bacterial tonsillitis showed high fever, tonsillar exudates, lymphadenopathy, and elevated leukocyte counts,

while viral cases presented with mild sore throat, cough, and coryza without bacterial signs. Proper diagnostic tools, like RADT and throat cultures, reduced misclassification. Antibiotics were effective for bacterial cases but unnecessary and harmful in viral ones, increasing resistance risks. The study emphasizes evidence-based diagnostics, rational antibiotic use, and patient education to improve outcomes and reduce antimicrobial resistance.

Tonsillitis continues to stand for a significant clinical concern, presenting in both bacterial and viral forms, each associated with distinct diagnostic patterns and treatment outcomes. In many rural and resource-limited settings, inadequate awareness, diagnostic delays, and inappropriate use of antibiotics contribute to complications and hinder recovery. Research shows that individuals with bacterial tonsillitis show favorable responses to proper antibiotic therapy, while viral infections are better managed with supportive care. This distinction highlights the critical importance of accurate diagnosis in guiding effective management and reducing unnecessary antibiotic use.

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