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Identification of clinical features of viral and bacterial pharyngitis, confirmed by throat swab.

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ABSTRACT

BACKGROUND & OBJECTIVE: Sore throat is one of the most common complaints in clinical practice and is often caused by pharyngitis. Although most cases are viral and self-limiting, antibiotics are frequently prescribed unnecessarily due to overlapping clinical features of viral and bacterial infections. Identifying reliable clinical features can help clinicians manage patients appropriately and reduce antibiotic misuse. This study aimed to determine the frequency and clinical features of viral and bacterial pharyngitis and to correlate these findings with throat swab results.

METHODOLOGY: A descriptive cross-sectional study was conducted in the Department of Otorhinolaryngology, Abbasi Shaheed Hospital, from 15/06/2024 to 30/06/2025. A total of 184 patients were included. Clinical findings were recorded using a structured proforma, and throat swab cultures were performed.

RESULTS: Bacterial and viral pharyngitis were diagnosed in 32 (17%) and 152 (83%) patients, respectively. Among 100 male patients, 84% had viral pharyngitis. The most affected age group was 18–40 years. A total of 96 patients presented after 3 days of illness, of whom 74 had viral pharyngitis and 22 had bacterial infection. High-grade fever, pus points, neutrophilia, and positive throat swab culture were strongly associated with bacterial pharyngitis.

CONCLUSION: Careful history-taking and clinical examination are essential to distinguish viral from bacterial pharyngitis, ensure appropriate treatment, and reduce unnecessary antibiotic use.

KEYWORDS: Bacterial Infection, Diagnosis, Pharyngitis, Throat, Viral disease.

INTRODUCTION

Pharyngitis is defined as an infection or irritation of the oropharynx [1]. According to the National Ambulatory Care Survey, between 1989 and 1999, an estimated 6.7 million adults visited primary care with the chief symptom of sore throat. Thus, issues of appropriate diagnosis and treatment are major health issues. The incidence of pharyngitis is very high globally, especially in countries where antibiotics are commonly prescribed, which drives bacterial resistance [2]. Pharyngitis in Pakistan, especially in rural areas, is a major public health issue. A study conducted in Lahore, Pakistan, showed that 27.6% of patients were affected by respiratory disease [3]. In Karachi, the prevalence of acute pharyngitis is 11%. This necessitated a sound health policy that primarily focuses on health education. Peak incidence is seen in children between 5 and 15 years of age but can be recurrent throughout life [4]. The largest number of cases are seen during the winter season and early spring. Many factors are responsible for pharyngitis. Unhygienic living conditions, unbalanced diet, use of spicy/sour food, and stressful

environment are strongly associated with the disease [5]. Less common causes include reflux, allergies, trauma and certain toxins.

Most pharyngitis cases are either viral or bacterial. Viral infections account for the approximately 50-80% of all pharyngitis cases [6]. The viruses responsible for pharyngitis are the rhinovirus, adenovirus, influenza, parainfluenza, and coronavirus. The incidence of bacterial infection is approximately 15% [7]. The most common bacteria responsible for pharyngitis are Group A beta-hemolytic streptococcus 15 to 30% [1]. Differentiating the clinical picture of viral and bacterial pharyngitis is challenging. Symptoms of viral pharyngitis are vague compared with bacterial infection, including low-grade fever, body myalgia, and sore throat. Clinical findings of viral pharyngitis include hyperemia of the throat but no pus points on the pharynx and no cervical lymphadenopathy.

Clinical signs on the tonsils are the most important diagnostic signs in bacterial pharyngitis. Bacterial pharyngitis symptoms include sore throat, odynophagia,

How to cite this: Hasnain SW, Khan FA, Abbasi AU, Iqbal H. Identification of clinical features of viral and bacterial pharyngitis, confirmed by throat swab. *Journal of University Medical & Dental College*. 2026; 17(3):1322-1326.



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high-grade fever and neck swellings. Signs may include high-grade fever ($>102^{\circ}\text{F}$), hyperemia of the oropharynx and hypopharynx with pus on the tonsils, and cervical lymphadenopathy^[7]. Throat culture may be helpful in the diagnosis of bacterial pharyngitis. Both bacterial and viral pharyngitis are usually self-limited to 5-7 days. Antibiotics are better for bacterial infections. Once bacterial pharyngitis is diagnosed, appropriate antibiotics should be started to control the sequelae of bacterial infections. Proper history and physical examination may help to differentiate between bacterial and viral pharyngitis^[8,9].

However, there is no gold standard investigation to diagnose pharyngitis or to differentiate viral pharyngitis from bacterial pharyngitis. Many laboratory investigations are available, including a blood count and throat swab culture. On a complete blood count, leukocytes usually increase. Throat swab culture report takes 4-7 days, which causes a delay in treatment. The objective of this study was to identify the clinical features of viral and bacterial pharyngitis and confirm them using throat swab culture, which is helpful for physicians to diagnose bacterial and viral pharyngitis based on clinical examination. This will help physicians, especially at the general physician level, differentiate these two conditions and will ultimately limit the injudicious use of antibiotics. Limiting the use of antibiotics not only limits the emergence of resistant organisms but also reduces the cost of treatment.

METHODOLOGY

The ethical approval letter was obtained from the Karachi Medical and Dental College, reference no. ERB/KMDC/Approval/2024O59 dated 2/05/2024. The study was approved by the ethical review board of the Department of Otorhinolaryngology and Head and Neck Surgery, Abbasi Shaheed Hospital, from 15/06/2024 to 30/06/2025.

This was a descriptive cross-sectional study. The sampling technique was consecutive non-probability sampling; 184 patients who fulfilled the inclusion and exclusion criteria were enrolled in the study. We obtained written informed consent from all patients. The history was taken and filled in the proforma. Complete ENT examination, including temperature and neck palpation, was performed to detect cervical lymphadenopathy in all patients. Proforma related to the patient's age, Sex, and signs and symptoms was noted. Complete blood count (CBC) and throat swab were sent to the hospital laboratory. The data regarding sign/symptoms and presence of growth on culture, raised TLC count, and neutrophilia were calculated and entered in the proforma. Neutrophilia was defined as neutrophil count $>75\%$ of total leukocyte count. The disease prevalence was 11%, with a 95% confidence level and a 5% margin of error; the sample size of 184 patients. Data were entered and analyzed using standard statistical methods. Categorical variables were expressed as frequencies and percentages. The Chi-square (χ^2) test was applied to assess the association between type of pharyngitis (viral or bacterial) and clinical variables such as Sex, age group, duration of illness, and clinical features. A p-value < 0.05 was considered statistically significant.

Inclusion criteria include sore throat for more than 2 days, documented fever of 100°F for more than 2 days and age 18 years and above. Exclusion criteria include patients with an immunocompromised state or already on antibiotics, patients on steroids, ulcers in the oral cavity and oropharynx and history of heartburn or epigastric pain.

RESULTS

Among the 184 patients included in the study, 152 (82.6%) were diagnosed with viral pharyngitis, while 32 (17.4%) had bacterial pharyngitis based on throat swab results (Table-I).

Table-I: Frequency of Bacterial and Viral Pharyngitis (n = 184).

Diagnosis	n(%)
Bacterial pharyngitis	32 (17.4)
Viral pharyngitis	152 (82.6)
Total	184 (100)

Table-II: Diagnosis according to sex.

Diagnosis	Male (n=100) n (%)	Female (n=84) n (%)
Bacterial pharyngitis	16 (16.0)	16 (19.0)
Viral pharyngitis	84 (84.0)	68 (81.0)

Viral pharyngitis was therefore considerably more prevalent than bacterial pharyngitis. Bacterial pharyngitis was identified in 16% of male patients and 19% of female patients, whereas viral pharyngitis was more common, affecting 84% of males and 80% of females. Chi-square analysis indicated that there was no statistically significant relationship between Sex and the type of pharyngitis ($p > 0.05$) (Table-II).

Table-III: Association between age group and type of pharyngitis.

Age groups	Diagnosis		Total n (%)	P-value
	Viral n (%)	Bacterial n (%)		
18-40	112 (84.8)	20 (15.2)	132 (100)	0.191
41 and above	40 (76.9)	12 (23.1)	52 (100)	
Total	152 (82.6)	32 (17.4)	184 (100)	

When patients were divided into younger adults (18–40 years) and older adults (41 years and above), viral pharyngitis was more common than bacterial pharyngitis in both age groups. Among younger adults, 112 had viral pharyngitis, and 20 had bacterial pharyngitis, whereas among older adults, 40 had viral pharyngitis and 12 had bacterial pharyngitis. The chi-square test showed no statistically significant difference between the age groups ($p = 0.191$), indicating a similar distribution of pharyngitis types across the two age groups (Table-III).

Patients who presented after more than 3 days of symptoms were more likely to have bacterial pharyngitis than those who sought care earlier. However, viral pharyngitis remained the most common diagnosis regardless of the duration of symptoms. Duration of illness was significantly associated with type of pharyngitis ($p = 0.039$) (Table-IV).

Table-IV: Diagnosis according to the duration of illness.

Variable		Diagnosis		Total	P-value
		Viral n (%)	Bacterial n (%)		
Days	3days	74(77.08)	22(22.91)	96	0.039
	< 3 days	78(88.63)	10(11.37)	88	
Total		152(82.60)	32(17.40)	184	

Table-V: Signs and symptoms according to disease type.

Symptoms	Response	Bacterial pharyngitis (n=32) n (%)	Viral pharyngitis (n=152) n (%)	P=value (Fisher's exact test)
Restricted mouth opening	Present	2 (6.2)	2 (1.3)	0.123
	Absent	30 (93.8)	150 (98.7)	
Neck swelling	Present	8 (25)	8 (5.3)	< 0.001
	Absent	24 (75)	144 (94.4)	
Myalgia	Present	6 (18.8)	110 (72.4)	< 0.001
	Absent	26 (81.2)	42 (27.6)	
Pain in swallowing	Present	32 (100)	152 (100)	Not applicable
	Absent	0 (0)	0 (0)	
High-grade fever	Present	32 (100)	0 (0)	Not applicable
	Absent	0 (0)	152 (100)	
Low-grade fever	Present	0 (0)	152 (100)	Not applicable
	Absent	32 (100)	0 (0)	
Pus point	Present	32 (100)	0 (0)	Not applicable
	Absent	0(0)	152 (100)	
Neutrophil	Present	32 (100)	0 (0)	Not applicable
	Absent	0 (0)	152 (100)	
Throat swab	Present	32 (100)	0 (0)	Not applicable
	Absent	0 (0)	152 (100)	

Several clinical features differed between bacterial and viral pharyngitis. Myalgia and low-grade fever were more common among patients with viral pharyngitis, whereas high-grade fever, pus points, neutrophilia, and positive throat swab findings were significantly associated with bacterial pharyngitis ($p < 0.001$). Restricted mouth opening and neck swelling were not significantly associated with either bacterial or viral pharyngitis ($p > 0.05$) (Table-V).

DISCUSSION

Pharyngitis is an infection or irritation of the oropharynx and can occur in both adults and children^[9]. Approximately 1.19 million people are affected by pharyngitis every year in the United States^[10]. The peak incidence is seen in children between the ages of 4-7 years, but pharyngitis can be recurrent throughout life. The largest number of cases are observed during the early spring and late winter^[6]. Pharyngitis is typically classified into two main categories: bacterial and nonbacterial (e.g., viral, allergic, fungal, and normal). There are many agents that cause pharyngitis^[11]. Viral pharyngitis is usually self-limited and treated symptomatically. Although it can be self-limiting, bacterial pharyngitis has important suppurative and non-suppurative sequelae that the use of antibiotics can avoid. However, we must avoid antibiotics for viral infections; we have to

control the sequelae of bacterial infections by prescribing antibiotics. This study was conducted to determine the differentiating points between viral and bacterial pharyngitis based on history and examination. There is no consensus on a gold standard for diagnosing bacterial pharyngitis or distinguishing it from viral pharyngitis.

In our study, throat swab culture was the primary diagnostic tool. The history, examination, and additional investigations were evaluated in relation to the diagnosis established through throat swab culture. In the above study, 184 patients were selected for the study. On the basis of throat swab culture, bacterial pharyngitis was diagnosed in 17% of the patients. The remaining 83% were labelled as having viral pharyngitis. Approximately 50-80% of cases with sore throat are viral in origin^[1]. According to a study by Forrer, 22% of pharyngitis cases were bacterial in origin^[12]. One local study showed that 25.3% of pharyngitis cases were due to Group A beta-hemolytic Streptococcus^[13]. In the present study, 100 patients (54%) were male. Among male patients, 16% had bacterial pharyngitis and 84% had viral pharyngitis, whereas among female patients, 19% had bacterial pharyngitis and 80% had viral pharyngitis. A local study reported that 51.7% of patients with pharyngitis symptoms were male^[14], which is consistent with our findings. In contrast, a study conducted in the United States

reported that females accounted for 51.51% of cases of acute pharyngitis, compared with 48.49% in males^[15]. This difference in sex distribution may reflect variations in population characteristics and healthcare-seeking behaviour. It may also be related to differences in the timing of medical consultation between males and females.

The highest incidence of pharyngitis was noted between the ages of 18 and 40 years, at 71%, of which 112 cases were viral and 20 cases were bacterial pharyngitis. A study conducted in Malaysia shows that the highest incidence of pharyngitis is between the ages of 18-28^[16]. In the Bobby et al. study, sore throat, cough, rhinorrhea, hoarseness, conjunctivitis, and low-grade fever were significantly associated with viral pharyngitis compared with bacterial infection^[17]. In our study, high-grade fever (>102 °F), swallowing difficulty, pus point on the pharynx, and cervical lymphadenopathy were associated with bacterial pharyngitis. We did not include headache as it is a very nonspecific symptom and related to most conditions with fever. We used 102 °F as the cutoff value to differentiate between bacterial and viral pharyngitis. Leung et.al. used a fever greater than 100.4 as the standard for bacterial pharyngitis^[18].

By increasing the fever cutoff, we can be more specific for bacterial pharyngitis but less sensitive. This fact can be seen when we compare the results of our study with those of Leung and his colleagues^[18]. Neck swelling (lymphadenopathy) was present in 28 of 32 patients with bacterial pharyngitis. In contrast, it was noted in 8 of 152 cases of viral pharyngitis, reducing its reliability as a sole sign of bacterial pharyngitis. However, the absence of cervical lymphadenopathy makes the diagnosis of bacterial pharyngitis unlikely.

A previous study recommended examination of the pharynx for erythema, exudates, foreign bodies, enlarged tonsils, masses, petechiae and enlargement of lymph nodes of the neck^[19]. Myalgia was found in the majority of cases of viral pharyngitis in 130 of 152 patients. In bacterial pharyngitis, myalgia was noted in only 6 of 32 cases. Therefore, myalgia can point toward viral pharyngitis but cannot confirm it. The pus point was observed in all 32 cases of bacterial pharyngitis, and it is a strong point in the diagnosis. Similarly, blood count tests supported our diagnosis; neutrophilia was observed in all cases of bacterial pharyngitis compared with viral pharyngitis. During the study, pus point, cervical lymphadenopathy, and high-grade fever were observed in all cases of bacterial pharyngitis. Therefore, the presence of these signs and symptoms simultaneously may raise the clinical suspicion of bacterial pharyngitis and support further evaluation, including throat swab testing, before initiating antibiotic therapy. For further confirmation, a complete blood count can be performed, and the presence of neutrophilia can further support the diagnosis of bacterial pharyngitis. According to the study, most cases of viral pharyngitis are treated with antibiotics in Pakistan^[20]. Since many viruses and bacteria cause similar symptoms, diagnosing upper respiratory tract infections can be challenging and often requires careful evaluation^[21]. A thorough history and examination help differentiate viral from bacterial pharyngitis^[6].

CONCLUSION

We can conclude that a careful history and examination of the pharynx and oral cavity can provide sufficient evidence to differentiate viral pharyngitis from bacterial pharyngitis and ensure the judicious prescription of antibiotics in such patients.

ACKNOWLEDGEMENT: The authors express sincere gratitude to the staff and faculty of the Department of Otorhinolaryngology and Head and Neck Surgery, Karachi Medical and Dental College, and Abbasi Shaheed Hospital for their invaluable support during this study. We also extend our appreciation to all the patients who participated in this research, without whom this work would not have been possible.

CONFLICT OF INTEREST: None.

GRANT SUPPORT AND FINANCIAL DISCLOSURE: None.

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Authors Contributions:

Syed Wadood ul Hasnain: Substantial contributions to the conception or design of the work.

Faheem Ahmed Khan: Analysis and interpretation of data for the work.

Asif Uddin Abbasi: Drafting the work.

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Submitted for publication: 27-12-2025

Accepted after revision: 24-8-2026