

# Prevalence of Group A Beta Hemolytic Streptococcus Related Pharyngitis in Pakistan

ZAFAR MAHMOOD<sup>1</sup>, IKRAM ULLAH<sup>2</sup>, SOHAIL TIRMIZI<sup>3</sup>, MOHAMMAD YOUSUF<sup>4</sup>, ZUBAIR ANWAR<sup>5</sup>, HAMMAD RAZA<sup>6</sup>

<sup>1</sup>Head of ENT and Head & Neck Surgery Department, Liaquat College of Medicine & Dentistry, Karachi

<sup>2</sup>Associate Profess of ENT, Bolan Medical College, Quetta

<sup>3</sup>Associate Professor of ENT, Hamdard University, Karachi

<sup>4</sup>ENT Specialist, Sindh Government Qata Hospital, Karachi

<sup>5</sup>Assistant Professor, ENT and Head & Neck Surgery Department, Jinnah Postgraduate Medical Centre, Karachi

<sup>6</sup>Registrar, ENT and Head & Neck Surgery Department, Sir Syed College of Medical Sciences for Girls, Karachi

Correspondence to: Zafar Mahmood, Email: drzaar@hotmail.com, Cell: 0333-2108895

## ABSTRACT

**Objective:** To identify the prevalence of group A beta hemolytic streptococcus related pharyngitis in Pakistan.

**Study Design:** Retrospective Study

**Place and Duration of Study:** Department of ENT and Head & Neck Surgery, Liaquat College of Medicine & Dentistry, Karachi from 1<sup>st</sup> July 2021 to 31<sup>st</sup> March 2022.

**Methodology:** One hundred and seventy patients who showed symptoms of pharyngitis were enrolled. Two throat swabs were taken where first was used for rapid group a beta hemolytic streptococcus assessment. In cases of negative testing second swab was placed on 5% of the sheep blood agar plates at a temperature of 35°C with anaerobic conditions for two days. Beta hemolytic streptococcus colonies were checked. On sub-culturing pyrrolidonyl-arylamidase test was applied. A disc of >15mm with inhibited growth around bacitracin was considered as positive for group A β-hemolytic.

**Result:** The present study found that the mean age of the patients was 19.5±4.3 years. There were 51.7% males while 48.2% females in this study. There were 11.17% those who were found positive for group a beta hemolytic streptococcus There was a significant association between rapid test positive and modified Centor scoring assuming that as score increases from 0-3 the risk of group a beta hemolytic streptococcus positive cases also surges.

**Conclusion:** There is a significant prevalence of group A beta hemolytic streptococcus in pharyngitis cases reported from Pakistan.

**Keywords:** Prevalence, Pharyngitis, Group A β-hemolytic, Streptococcus

## INTRODUCTION

Group A β-hemolytic (GAS) streptococcus has commonly been associated with acute cases of pharyngo-tonsillitis on a global scale. Its overall prevalence in children in reported as 10-30% while in adults as 5-10%.<sup>1</sup> Timely diagnosis and detection of GAS has considerate effect on early treatments, reduced infection spread and decrease in symptoms duration.<sup>2</sup> Group A β-hemolytic linked disease severity has been reported worldwide as more than 18 million with greater than 600 million as those who develop GAS-pharyngitis. Unfortunately, more than five hundred thousand of these dies yearly.<sup>3,4</sup>

A modified standard has been applied for diagnosing GAS by the primary health professionals. It is known as Mclsaac. The diagnosis confirmation is made through culturing with acceptance referral accuracy value as 90 to 97%.<sup>5</sup> The process of culture generation is slow with crucial monitoring of the antibiotic-resistance.<sup>6</sup> As a consequence, use of rapid GAS test can provide results within ten to fifteen minutes with a 90% specificity and sensitivity.<sup>7,8</sup> In cases where the rapid test is positive is further processed for GAS while hose tests which comes negative on rapid GAS method are further followed for throat culturing.<sup>9,10</sup>

The variation in the emm-gene of GAS is responsible for the virulence of the bacteria. The genetic sequencing have shown that there are 200 or more various GAS serotypes which varies in there rheumatological properties and potentials.<sup>11,12</sup> The present study was designed for identifying the prevalence of group a beta hemolytic streptococcus related pharyngitis in Pakistan. The interpretation formulated through this study will assist in generating a proper idea of magnitude of problem which further will help in better treatment and understanding of the disease.

## MATERIALS AND METHODS

This retrospective study was conducted at Department of ENT and Head & Neck Surgery, Liaquat College of Medicine & Dentistry, Karachi from 1<sup>st</sup> July 2021 to 31<sup>st</sup> March 2022. An informed consent from each patient was taken via a written informed consent where patient was detailed about research protocol, objective, risk and benefits. A total of 170 patients who showed

symptoms of pharyngitis were enrolled. The sample size was calculated through WHO sample size calculating sight with 24% international prevalence of GAS, power of test at 80% and CI as 95%. Symptoms include fever, sore throat, anterior tonsillar-exudates and anterior cervical-adenitis. Those patients who had already completed two antibiotic course were not registered as participants. Swelled tonsils or exudate were scored as modified Centor score +1 for age ≤15 years and -1 for age ≥45 years. Patients having 1-2 points were assessed through throat culture swab for GAS while the one having above scoring points were immediately considered with GAS and treatment initialized. Two throat swabs were taken where first was used for rapid GAS assessment. In case of negative testing second swab was placed on 5% of the sheep blood agar plates at a temperature of 35°C with anaerobic conditions for two days. Beta hemolytic streptococcus colonies were checked. On sub-culturing pyrrolidonyl-arylamidase test was applied. A disc of >15mm with inhibited growth around bacitracin was considered as positive for GAS. Data was analyzed using SPSS version 25.0 using odds ratio and chi square test. p value <0.05 was taken as significant.

## RESULTS

The mean age of the patients was 19.5±4.3 years. The age between 15-22 years was most prevalent for pharyngitis cases suspected with GAS with a percentage of 40.5%. There were 51.7% males while 48.2% females (Table 1).

Table 1: Distribution of age and gender among patients (n=170)

Variable	No.	%
Age (years)		
15-22	69	40.5
23-32	64	37.6
33-42	29	17.05
>42	8	4.7
Gender		
Males	88	51.7
Females	82	48.2

There were 11.17% those who were found positive for GAS either through preliminary throat swab test or later culturing and 88.83% cases have non-detected GAS (Fig. 1).

The clinical symptoms and sign of GAS detected and not detected was compared it was found that a significant difference in clinical symptoms of head ache and sudden onset of disease occurred within both groups (Table 2).

There was a significant association between rapid test positive and modified Centor scoring assuming that as score

increases from 0-3 the risk of GAS positive cases also surges (Fig. 2).

Within the signs presented of GAS detected and not detected cases it was seen that there was a significant difference in all the signs except anterior tonsillar exudates. The other significantly variant signs involved red uvula, Soft palate petechiae and anterior cervical lymph node (Table 3).

Table 2: Comparison of clinical patient symptoms in GAS detected and not detected

Clinical features	GAS isolated (n=19)		GAS not isolated (n=151)		OR (95% CI)	P value
	Count	Percentage	Count	Percentage		
Sudden onset	16	84.2%	114	75.4%	4.1(2.5–7.0)	0.12
Sore throat	18	94.7%	150	99.3%	1.5(0.4–7.8)	0.71
Fever	17	89.4%	109	72.1%	15.3 (6.9–33.2)	0.06
Headache	10	58.8%	56	37.0%	1.7 (1.5–2.5)	0.001
Pain on swallowing	17	89.4%	130	86.7%	5.6 (2.7–11.8)	0.001
Vomiting	3	15.7%	16	10.5%	1.3 (0.8–1.9)	0.65

Table 3: Comparison of clinical patient signs in GAS detected and not detected

Clinical features	GAS isolated (n=19)		GAS not isolated (n=151)		OR (95% CI)	P value
	Count	Percentage	Count	Percentage		
Anterior tonsillar erythema	16	84.2%	87	57.6%	5.1(3.5–7.5)	0.001
Anterior tonsillar exudates	17	89.4%	135	89.4%	3.2 (1.6–6.4)	0.54
Red uvula	6	31.5%	14	9.27%	6.5 (4.4–10.3)	0.03
Soft palate petechiae	5	26.3%	6	3.97%	9.9 (5.8–16.8)	0.001
Anterior cervical lymph node	12	63.1%	21	13.9%	14 (9.1–19)	0.001

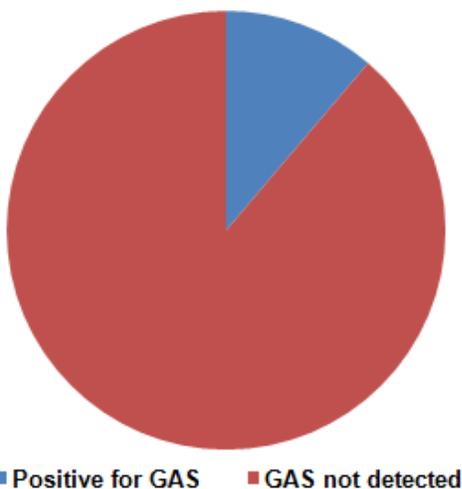


Fig. 1: Prevalence of GAS in pharyngitis cases

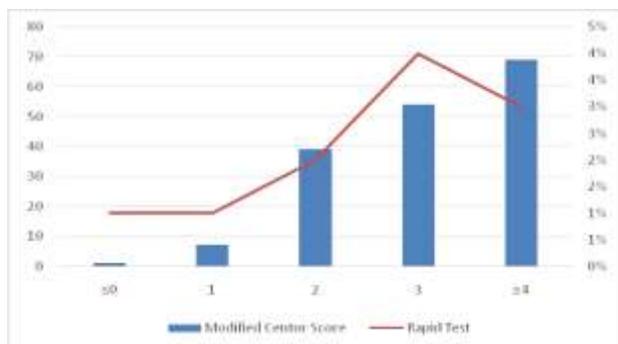


Fig 2: Relationship of MCS with Rapid tests positivity value

**DISCUSSION**

GAS is a frequent etiological factor for causing pharyngitis. There have been extensive studies on its prevalence in various countries of the world. However, there is a very limited data available on its

prevalence in Pakistan. The present study was designed for achieving the aim of fining the prevalence of GAS in pharyngitis cases reported in this part of the world. As already mentioned Gas can be presented both in children as well as adults. Therefore, its overall prevalence assessment is a required mandate.

The current study found that the there were more males than females registered with pharyngitis symptoms. Males are prone towards external environment and have a greater chance of catching infections than females especially in developing countries where males share major load of employment as well as attending educational institutes. Similar results have been presented in literature documenting high frequency of males with pharyngitis.<sup>13-15</sup> Throat culturing has not been used frequently for testing purpose in Pakistan therefore many of the cases are left untested and verified. Rapid test kit approach can assist in identifying many missed cases. Various studies have also proven the effectiveness of this process.<sup>16,17</sup> MCS has a direct correlation with rapid testing method as reported to in this study as well as other.<sup>18</sup>

The prevalence of GAS in pharyngitis cases is relatable to the available previous data from various international studies conducted in both developed and developing countries with a percentage range between 11-26%.<sup>19-21</sup> There have been various complications related with GAS in cases with pharyngitis requiring early detection and treatment. In early age groups rheumatic fever has been reported where as chest complications are related with adult population.

**CONCLUSION**

There is a significant prevalence of GAS in pharyngitis cases reported from Pakistan as can be predicted through hospital-based data.

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