



## Clinical Correlation between McISSAC Score and Throat Swab Culture In Predicting Streptococcal Pharyngitis In Patients Presenting With Sore Throat

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### Abstract

**Introduction:** GAS pharyngitis is both antecedent for invasive streptococcal infection and post infectious immunologic complication of Rheumatic fever/RHD, a leading cause of cardiovascular morbidity and mortality in many developing parts of the world.

**Aims and Objective:** To analyse the usefulness of symptoms and signs in assessing the risk of streptococcal pharyngitis and to correlate McISSAC score with throat swab culture.

**Results:** About 50% of patient tested positive for GABHS have Mc-Issac score of 5, whereas 25% of positive tested patient have score of 4 and again 25% of positive patient have score of 3. The chi-square test of association is significant. Therefore, 75% of positive GABHS findings have Mc-Issac score of 4 and 5.

**Conclusion:** Individual signs and symptoms are not powerful enough to discriminate GABHS pharyngitis from other types of sore throat. The McIsaac score is well calibrated clinical prediction rule for estimating the probability of GABHS pharyngitis. The result of McIsaac score and culture finding of GABHS have close association with each other.

**Keywords:** McIsaac score, GABHS, Throat swab culture and sensitivity.

### Introduction

Sore throat is a common complaint in upper respiratory tract infection and may indicate infection with Group A streptococci.<sup>1</sup> Although viruses cause most acute pharyngitis episodes, Group A streptococci causes 37% of cases of acute pharyngitis in children older than 3 years. GAS pharyngitis is both antecedent for invasive

streptococcal infection and post infectious immunologic complication of Rheumatic fever/RHD, a leading cause of cardiovascular morbidity and mortality in many developing parts of the world.

McIssac developed four criteria to predict the probability of the presence of streptococcus pyogenes in a throat swab culture and thereby

appropriately prescribe antibiotics to alleviate symptoms and decrease the rates of acute Rheumatic fever, suppurative complications, missed school and work days<sup>1</sup>

Throat swab culture and sensitivity is considered to be the reference standard for the diagnosis of streptococcal pharyngitis. Clinical prediction rules have been developed over the last 40yrs to distinguish streptococcal pharyngitis from other causes. The most widely recognised Clinical prediction rule for GABHS pharyngitis is the McISSAC score.

### Aims and Objective

To analyse the usefulness of symptoms and signs in assessing the risk of streptococcal pharyngitis and to correlate McISSAC score with throat swab culture

### Material and Methods

Study was conducted on a total of 100 patients who presented to ENT Department at Rajah Muthiah Medical College Hospital, Chidambaram during OCTOBER 2016 TO SEPTEMBER

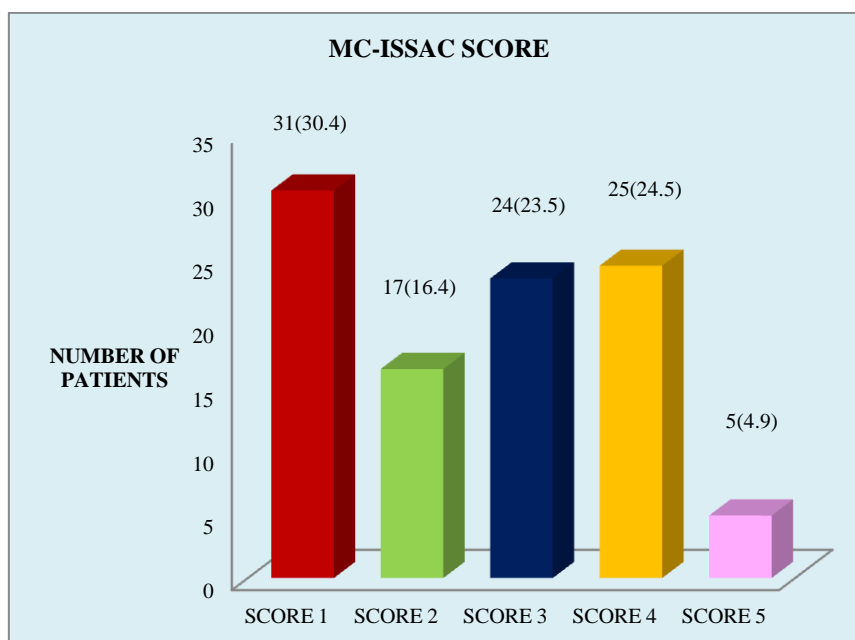
2017. Patients aged 3 years and above and all patients who presented with sore throat were included in the study. Children below 3 years, patients on antibiotic therapy in the previous week, Immuno compromised patients were excluded from the study. Patients included in the study were scored as per McIsaac score.

Clinical criteria	Points
Absence of cough	1
Swollen and tender nodes	1
Temperature >38c	1
Tonsillar exudates or swelling	1
Age 3 to 14 years	1
Age 15 to 44 years	0
Age 45 years and older	-1

Throat swab was taken for all these patients. McIsaac score and Throat swab culture and sensitivity results were compared and analysed statistically.

### Results

The mean age of our patients was  $22.59 \pm 12.06$  years. The majority of patients were female (56.9%)



Out of 102 patients, 49 patients (49%) had McIsaac score of 3 & 4.

**Table-1:** Association of Mc-ISSAC score with GABHS

Mc-Issac Score	GABHS						Chi-Square Test	
	Positive		Negative		Total		Value	Significant
	N	%	N	%	N	%		
1	-	-	31	31.6	31	30.4	19.24	.001
2	-	-	17	17.3	17	16.7		
3	1	25	23	23.5	24	23.5		
4	1	25	24	24.5	25	24.5		
5	2	50	3	3.1	5	4.9		
Total	4	100	98	100	102	100		

Out of 54 patients with McIsaac score of 3 to 5, GABHS was cultured on throat swab in 4 patients. However, in patients with McIsaac score of 1&2, GABHS was not found on throat swab culture.

The chi-square test of association was statistically significant ( $X^2 = 19.24, P = .001$ ). Therefore GABHS finding is significantly associated with Mc-Issac score.

**Table - 2:** Comparison of GABHS VS MC-Issac Score by sensitivity and specificity analysis

GABHS	Positive	Negative	Total
Positive	True Positive = 3	False Positive = 27	Total Positive = 30
Negative	False Negative = 1	True Negative = 71	Total Negative = 72
	T.Positive = 4	T.Negative = 98	102

**Table -3:** Outcome of Comparison

Measure	Percentage
Sensitivity = $\frac{T.P}{T.P+F.N} \times 100$	75%
Specificity = $\frac{T.N}{T.N+F.P} \times 100$	72.45%
Positive predictive value = $\frac{T.P}{T.P+F.P} \times 100$	10%
Negative predictive value = $\frac{T.N}{T.N+F.N} \times 100$	98.61%

The sensitivity is 75%, which means that Mc-Issac score is rightly identifying the disease in 75% of the patients. The specificity is 72.45%, which means that Mc-Issac score is rightly identifying no disease in 72.45% of the patients. The positive predicted value is only 10%, that is if the test result is positive, the probability of having disease is only 10%. The negative predicted value is high ie 98.61%. If the test result is negative, the probability of not getting the disease is 98.61%.

**Discussion**

GABHS is accepted to be the most important pathogenic bacterium that causes sore throat because of its sequela and complications Tonsillopharyngitis due to streptococci is a potentially serious disease as it can cause suppurative complications like rheumatoid valvular heart disease and acute glomerulonephritis. As a result, rapid diagnosis and adequate treatment are necessary. For 50 years, the fundamental test has been throat swab culture. It detects 90%–99% of positive cases and is accepted as the gold standard in GABHS diagnosis.

Studies comparing clinical diagnosis with throat culture have shown a sensitivity of 50% to 70% and a specificity of 60% to 80%. Thus clinical judgement may miss up to 50% of GAS infections while identifying 20% to 40% of the large number of non-GAS sore throat presentations. Clinical prediction rules have been proposed as a way to increase the accuracy of clinical diagnosis. Although several scores have been proposed for assessing patients with sore throat, Centor & McIsaac scoring system are most widely used clinical prediction rules.

In our study McIsaac scoring system had sensitivity 75%. Specificity 72.45%, positive predictive value 10%, negative predictive value 98.61%.

Amber Hanif Palla studied 137 patients using McIsaac scoring system. McIsaac scores were found to be 100% sensitive and 68.7% specific in their study, giving a positive predictive value (PPV) of 12.7% and a negative predictive value (NPV) of 100%.<sup>3</sup>

Ching-Tang Shih et al studied 342 patients using McIsaac scoring system and throat swab cultures. A McIsaac score of 5 had a sensitivity of 71%, specificity of 70%, and a positive predictive value of only 9.3%.<sup>4</sup>

The McIsaac scoring system is a simple primary care management approach that improves identification of GAS infection, limits the need for throat swabs in all patients with sore throat.<sup>1</sup>

### Conclusion

Individual signs and symptoms are not powerful enough to discriminate GABHS pharyngitis from other types of sore throat. The McIsaac score is well calibrated clinical prediction rule for estimating the probability of GABHS pharyngitis. The result of McIsaac score and culture finding of GABHS have close association with each other.

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