

A STUDY TO ESTIMATE THE PREVALENCE OF NON-GROUP A β -HAEMOLYTIC STREPTOCOCCI IN SCHOOL-GOING CHILDREN OF TRIPURA, INDIA



Paediatrics

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ABSTRACT

Non-group A β -haemolytic streptococci have long been considered as commensals, but now they are increasingly linked with various disease conditions. However, their disease burden remains grossly underestimated. The present study was conducted to assess their prevalence among school-going children of Tripura. A cross sectional study was carried from the Dept. of Paediatrics, Agartala Government Medical College and G.B. Pant Hospital among children aged 5-15 years in the form of school health surveys covering 66 schools in three districts of Tripura. Their throat swabs were collected and cultured in Dept. of Microbiology, Agartala Government Medical College. Grouping was done with streptex kit. Descriptive statistics were used for analysis. A total of 2661 children were examined. The prevalence of Non-Group A β -haemolytic streptococci in the present study was found to be 0.45% or 4.5 per 1000 school-going children, with almost equal proportion of Group C and Group G streptococci. Given the similarity in some virulence factors with *Streptococcus pyogenes*, Group G and Group C streptococci should also be kept in mind as a possible diagnosis and methods for their isolation should be made available at tertiary level institutions.

KEYWORDS

Group G streptococci, Group C streptococci, school-children, Non-Group A β -haemolytic streptococci

INTRODUCTION

Streptococcus is one of the most ubiquitous organisms described in medical literature. There are various groups and species of streptococci some of which are pathogenic while others are considered part of the normal microbial flora of the human body. Non-Group A streptococci, especially Group C (GCS) and Group G (GGS) have long been considered as commensals, but they are now increasingly associated with conditions like pharyngitis, pyoderma, sepsis, toxic shock, reactive arthritis, and post-infectious glomerulonephritis in different regions of the world.^{1,2,3} The most widely reported pathogenic β -haemolytic streptococci is *Streptococcus pyogenes*, which belongs taxonomically to Group A as per the Lancefield classification. Group A streptococcus (GAS) is the commonest cause of acute bacterial pharyngitis, rheumatic fever and rheumatic heart disease.⁴ There is considerable evidence today that both Group A and Non-group A streptococci share some common pathogenic factors. Therefore, it is possible that the disease burden attributed to Non-group A is grossly underestimated. The present study was undertaken to assess the prevalence of Non-Group A β -haemolytic streptococci among school children in Tripura which is the first of its kind in the state and probably the entire north-eastern India.

MATERIAL AND METHODS:

A cross-sectional study was carried out from the department of Paediatrics, Agartala Government Medical College and GB Pant Hospital for a period of one year six months from May 2012 to October 2013. School health surveys were carried out among children in the age group of 5-15 years. School visits were planned after getting permission from Director of School Education. Sixty-six schools were surveyed in three out of eight districts of the state. Exclusion criteria for the study were children who were unwilling to participate in the study, or absent and couldn't be traced on two repeat visits and those who were ill. Throat swabs were collected from the participants. They were streaked on blood agar plates and incubated for 24-48 hours in the department of Microbiology, Agartala Government Medical College and GB Pant Hospital. The pattern of haemolysis and colony formation in them was observed. Grouping of β -haemolytic streptococcus was done by commercially available Streptex kit. Leaflets for health education were also distributed in the schools visited. The data thus

obtained was analyzed using Microsoft Excel. Descriptive statistics were applied.

RESULTS:

A total of 2661 students were examined (2173 from govt. schools and 488 from private schools) as shown in Table 1.

Table 1: Distribution of the participants in the study

Sl no.	Schools	Number Of School	Males	Females
1	Government	54	1232	941
2	Private	12	236	252
Total		66	1468	1193

Out of the children examined, depending on the symptoms like sore throat, 1394 children were grouped as having pharyngitis and 1267 were grouped as non-pharyngitis. Overall, 12 cases of β -haemolytic growths were identified on culture of the throat swabs, out of which grouping yielded 7 cases of Group C Streptococci and 5 cases of Group G Streptococci. Interestingly, no Group A cases were found among the participants (Figure 1).

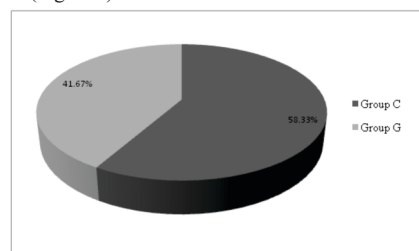


Figure 1: Proportion of various groups of β -haemolytic Streptococci isolated in the study

The prevalence of Non-Group A β -haemolytic streptococci in the present study was found to be 0.45% or 4.5 per 1000 school-going children aged 5-15 years. The ratio of β -haemolytic cultures from pharyngitis and non-pharyngitis was found to be 1.36. All isolated cases were in the age group 10 – 15 years and no β -haemolytic

streptococcal growth was recorded in children below 10 years of age in the study.

DISCUSSION

The present study revealed that the prevalence of non-group A β -haemolytic streptococci like Group C (GCS) and Group G streptococci (GGS) was more than Group A streptococci. This could be due to a rapidly declining trend in Group A streptococci infections subsequent to its effective treatment and prophylaxis.

Lancefield Group C streptococci refers to a group of organisms with several subspecies, namely *S. dysgalactiae subsp. dysgalactiae*, *S. equisubsp. zooepidemicus* and *S. dysgalactiae subsp. equisimilis*.^{5,6} Group G streptococci refers to *S. anginosus* which was previously known as *S. mileri*. Virulence factors similar to those of *S. pyogenes*, including M-like proteins expressed by the homologs of the "emm" gene have been reported in these species.¹⁵ Recent studies show an increase in infections caused by GCS and GGS and clinical disease similar to group A β -haemolytic streptococcus.^{9,10}

A similar study in Chennai reported quite higher prevalence (10.9%).¹¹ Other similar works reported in literature state a prevalence ranging from 1.7% to 13.5% among children.^{12,13} Studies on children with tonsillopharyngitis in Turkey and Bangladesh have also brought forth similar evidence.¹⁴ Rheumatic fever, which until now has been associated with only Group A β -haemolytic streptococcus is now also being linked with Group C and group G streptococci. In Aborigines inhabiting Australia and New Zealand, which reports the global highest prevalence of Rheumatic Fever (80-508/1,00,000), traits of both group A and G streptococcus is common.¹⁴ Group C streptococci has especially been linked with adolescent and school outbreaks.¹⁵

CONCLUSION

Group C and Group G Streptococci present with clinical features similar to Group A β -haemolytic streptococci (*Streptococcus pyogenes*). The disease burden due to non-group A species is therefore under-recognized.¹⁶ Given the commonness in the virulence factors, the possibility of long-term autoimmune complications cannot be absolutely ruled out. Therefore, efforts must also be taken to incorporate facilities for diagnosing and treating non-group A strains in our healthcare set-up, at least at tertiary level.

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Conflict of Interest: None

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