

# SUBCLINICAL GROUP A STREPTOCOCCAL THROAT INFECTION IN SCHOOL CHILDREN

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## ABSTRACT

Seven hundred and forty nine apparently healthy school children aged 5-15 years were investigated for throat infection with Group A streptococci (GAS) during December 1990 to May 1991. The prevalence of beta hemolytic streptococci (BHS) was 18.8%; most organisms belonged to Group A streptococci (13.7%). The prevalence of BHS in throat was significantly higher ( $p < .001$ ) in girls as compared to boys. Immune response to extracellular antigens was studied in 53 children who had GAS strain in their throat, 54.7% had elevated titers of antistreptolysin O or antideoxyribonuclease B or both indicating subclinical infection with GAS. Thus it is recommended that serological examinations should be done along with throat culture to identify subclinical Group A streptococcal throat infection.

**Key words:** Throat infection, Streptococcus, School Children.

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Streptococcal infections have been described as a disease of school children. It is estimated that approximately 20% of all streptococcal infections of the upper respiratory tract produce symptoms(1). A history of upper respiratory tract infection may not be available in half the cases of acute rheumatic fever(2). It, therefore, becomes essential to identify subclinical Group A streptococcal (GAS) throat infection so that they can be treated in order to minimize the risk of development of rheumatic fever (RF).

The prevalence of beta hemolytic streptococci (BHS) carriage in throat of normal asymptomatic school children varies from 13 to 50% depending upon the population studied, season and other factors(3-7). The nature of streptococcal antibody responses, to our knowledge, has not been determined in these children. Thus there has been no general agreement on the definition of the term carrier as it is based on clinical observations and culture results alone.

Rheumatic fever and rheumatic heart disease are more prevalent in children from lower socio-economic group. In order to determine the prevalence of subclinical throat infections with GAS, we evaluated school children studying in Corporation schools of Delhi.

## Material and Methods

Seven hundred and forty nine, apparently healthy children 5 to 15 years of age were studied from December 1990 to May 1991. A team of doctor and technician visited the school, which was 20 km from the Medical College, twice a week.

A detailed history as per recommendation of the WHO(8) for identification of streptococcal sore throat such as fever, soreness of throat, cough and watery nasal

discharge were taken. The throat was examined for redness of pharynx, petechiae on palate and exudates.

Throat swabs were collected from these children and inoculated on sheep blood agar plates at the spot and brought to the laboratory the same day and incubated for 18 hours at 37°C. The next morning the plates were examined for BHS. The isolates of BHS were subjected for Lancefield grouping by grouping antigen prepared by Fuller's Method(9) and the group identification was done by agar gel precipitation(10).

Out of the 103 children from whom GAS were isolated, immunological tests could be done only in 53 patients as parents of few children refused blood examination and others were not present on follow up visits. Blood for antistreptolysin O (ASO) and antideoxyribonuclease B (ADNase B) estimation was collected between 2 and 3 weeks of isolation of GAS. Estimation of ASO and ADNase B was done by the method described in the WHO manual(11). ASO and ADNase B titer 200 units and above were taken as elevated and suggestive of infection.

Chi square test was used for comparing the differences.

**Results**

Of the 749 children, 631 were boys and 118 girls. It was observed that none of the children, even those who yielded BHS had any signs and symptoms of streptococcal sore throat as per the WHO criteria(8).

BHS were isolated from 141 children (18.8%), out of these 103 (73.5) were belonged to sero Group A and 33 (23.5%) strains to Group G. Groups C and B were isolated from 3 and 1 patients, respectively.

Out of 631 boys, 95 (15%) yielded BHS; 67 (71.2%) belonged to Group A and 24 (25%) strains to Group G. However, BHS were isolated from 46 (38.9%) girls out of 118 examined. The most prevalent strains were Group A-36 (78.2%) followed by Group G 9 (19.5%). The prevalence of BHS throat carriage was significantly (p<0.001) higher in girls as compared to boys (38.9 and 15.0%, respectively) but the serogroups were equally distributed among boys and girls.

Out of 53 children who yielded GAS in their throat swab, 29 (54.7%) had elevated titers of either ASO or ADNase B or both indicating current infection of throat. Twenty four with positive throat culture did not show elevated titers of ASO or ADNase B (Table).

**Discussion**

There is evidence that asymptomatic throat infection caused by GAS may lead to acute rheumatic fever(2). Asymptomatic infections with subsequent rise in streptococcal antibody titers have also been reported in patients with previously diagnosed rheumatic fever(12).

The prevalence of asymptomatic carriage of BHS has been reported (5,13,14-17) between 11-47% from various coun-

**TABLE —ASO\* and ADNase B\* Titers in Cases with Asymptomatic Group A Streptococcal Infection**

No. of cases	ASO >200 ADNase <200	ASO <200 ADNase ≥200	ASO >200 ADNase ≥200	ASO <200 ADNase <200
53	2	19	8	24

\*ASO—Anti streptomycin O;

ADNase B—Antideoxyribonuclease-B.

tries (Table II). However, we observed that the prevalence of BHS in throat of asymptomatic school children was 18.8% and Group A was the predominant strain. Various studies conducted in South India have reported a predominance of Group G over Group A organisms(3,13). This difference could be attributed to difference in climatic conditions. A high recovery rate of Groups C and G BHS has been reported by other investigators from tropical and subtropical countries(3,5,18).

TABLE II—Beta Hemolytic Streptococcal Infection in Asymptomatic Children

Authors	Years of study	Country	Carrier rate (%)
Koshi(13)	1965-67	S. India	34.0
Karoui(5)	1978-79	Kuwait	47.0
Reid(14)	1982	Trinidad	22.0
McMillan(15)	1985	New York	11.7
Chibber(16)	1985	Rohtak, India	11.2
Prakash(17)	1973	Delhi, India	34.0
Present Study	1990-91	Delhi, India	18.8

In this study none of the school children showed the characteristic picture of streptococcal pharyngitis(8). This is not unusual, as in a 3 year study from Egypt(18), none of the patient had streptococcal exudative tonsillitis out of 1041 children examined. The clinical picture alone is not reliable, as subclinical throat infection caused by GAS is known. Also isolation of GAS alone, is not enough to suggest infection in asymptomatic children. Thus the demonstration of rise in antibody titers against extracellular antigens of GAS essential for diagnosis of infection(19).

In our study in asymptomatic children throat infection was confirmed by GAS isolation and elevated antibody titers against streptomycin O and DNase B. We observed that the elevated titers of ASO, ADNase B or both were present in 54.7% of children from whom GAS were isolated. However, two swab examinations and paired serum samples would have helped in diagnosis of more cases of streptococcal pharyngitis. Surveys have also been done of streptococcal antibodies in school children from Asian and African countries by the WHO, which demonstrated elevated ASO titers over 200 units in 18-53%(20).

For an acute attack of rheumatic fever to occur it is essential that an immune response takes place in which high level of antibodies are produced(21). Therefore, asymptomatic children with high titers of either ASO or ADNase B may develop rheumatic fever. A diagnosis of subclinical streptococcal pharyngitis is, therefore, important in order to provide antibiotic therapy. A proportion of these children if not treated can spread infection to other children and may also be predisposed to develop rheumatic fever. Thus, it is recommended that serological examination should be done to differentiate between carrier and true infection.

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