Pharyngeal carriage of group A beta-haemolytic streptococci in Coloured and Indian schoolchildren

O. J. RANSOME, HERNA ROODE, I. SPECTOR, S. G. REINACH

Summary

Throat swabs for group A beta-haemolytic streptococci were taken from 120 Coloured children and 126 Indian children at approximately 3-monthly intervals during 1980. The prevalence of positive throat swabs was related to crowding at home as measured by the number of people per bedroom. Coloured homes were much more crowded than Indian homes, but no statistical relationship was found between the number of persons per bedroom and the positivity rates. Both groups of children had high positivity rates in summer (24.4% and 21.3% for Coloureds and Indians respectively) but low rates in spring (4.3% and 3.4% respectively). These positivity rates do not support the provision of primary prophylaxis against acute rheumatic fever for these children.

The sequelae of infection with Lancefield group A beta-haemolytic streptococci (GABHS) remain causes of morbidity and mortality among Coloured and Indian children in Johannesburg and its environs. During the years 1979 and 1980 104 children with acute post-streptococcal glomerulonephritis (APSGN) and 54 children with rheumatic heart disease (RHD) were admitted to Coronation Hospital, which serves the Coloured and Indian communities of Johannesburg. There were no deaths due to APSGN, but 4 children died of RHD. Carriage of streptococci has been shown to be commonest in those groups of children among whom acute rheumatic fever (RF) is also most common. \( ^1 \)

Overcrowding, inadequate housing and poor socio-economic conditions have also been shown to be associated with a higher prevalence of RHD. \( ^2 \) We therefore decided to investigate the carrier rate of Lancefield GABHS in two cohorts of schoolchildren, one Coloured and one Indian, and the influence of the degree of crowding in their homes.

Prophylaxis against acute RF may either be primary, when every patient with pharyngitis possibly due to GABHS is given prophylactic penicillin or entire school populations are given prophylactic penicillin at intervals, or secondary, when patients known to have RF are given long-term penicillin. We felt that if a high proportion of children (e.g. 30%) were shown to be carriers of GABHS, a case might be made for primary prophylaxis in affected communities. Thirty per cent is an arbitrary figure, but prevalences as high as this have been found by other workers in various parts of the world. \( ^1,2,4 \)

Subjects and methods

Subjects

One hundred and twenty Coloured children and 126 Indian children, most in Standard 1 (the third grade of schooling), were studied. The mean age of the Coloured children was 8.2 years and that of the Indians 7.9 years (ranges 7.2 - 11.7 and 7.2 - 8.9 respectively). The children were all attending school and were apparently asymptomatic. No attempt was made to look for objective evidence of streptococcal infection.

Home environment. Parents/guardians were given a questionnaire to complete; in this, they were asked how many people occupied their home and how many bedrooms there were in each home.

School environment. All the children were in conventional classrooms sitting at desks in pairs with approximately 30 pupils per classroom. Playground facilities were essentially similar at both schools and were moderately crowded.

Cardiac status. All the children were examined clinically, either by O.J.R. or H.R.

Throat swabs. Throat swabs were taken from all the children present on four different occasions during 1980. In order to determine whether there were seasonal changes in the prevalence of positive throat swabs, the investigations were done in early March (summer), May (autumn), August (winter) and November (spring). The posterior pharyngeal mucosal surface, tonsils (if present) and nasopharynx (if possible) were swabbed with a dry cotton-tipped swab.

Methods

Microbiological methods. Swabs were immediately inoculated on 5% horse-blood agar plates and incubated at 37°C in anaerobic Gaspak jars. Within 3 hours the inoculum on each plate was streaked for single-colony isolation, following which the plates were re-incubated for exactly 24 hours. Dry semitransparent pinpoint colonies showing beta-type haemolysis were then subcultured on blood agar and growth-tested for sensitivity to bacitracin discs (0.1 unit per disc) after 24 hours. Isolates of Streptococcus pyogenes were then serotyped using the Streptex latex test system and confirmed as Lancefield group A.

Urine testing. Urine specimens were tested for blood and protein on each of the four visits to the schools using the Labstix method.

Statistical methods. To test for a difference in the rate of infection of the two racial groups, the chi-square test for a 2 x 2
contingency table was used as programmed in the Biomedical Computer Programs (Program 1F).\(^3\)

To compare the mean age of the children as well as the number of persons per bedroom, Student's \(t\) test was applied by means of the Biomedical Computer Programs (Program 3D).\(^3\) Although the data might not have been normally distributed the large sample sizes ensured that the means would be, thus justifying the use of the \(t\) test.

All calculations were done on the IBM 4331 computer of the Institute for Biostatistics of the South African Medical Research Council.

Results

Numbers of persons per bedroom. Table I shows the statistical analysis of the data obtained. It is evident that crowding in the Coloured homes was much more severe than in the Indian homes in terms of average number of persons per bedroom.

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<table>
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<th></th>
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<th>Indian</th>
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<tr>
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<td>126</td>
</tr>
<tr>
<td>Mean</td>
<td>2.50</td>
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\(t\) = 4.27, \(P = 0.000\)

Throat swabs. Fig. 1 shows the percentage of children with positive swabs in each cohort on each of the four occasions. Statistical analysis of these figures yielded the results presented in Tables II and III. Only for swab 2 was there a significant difference between the positivity rates for the two groups; among the Coloureds there was a higher incidence of positive swabs during March and May than during August and November. No child was positive on all four occasions.

No statistical relationship was found between the number of persons per bedroom and the positivity rate within any of the racial groups or swab periods.

The only organic cardiovascular problem found was congenital total heart block in a Coloured child. Fourteen of the Coloured children and 14 of the Indian children had functional systolic murmurs.

No child had persistent haematuria or proteinuria and no child had both haematuria and proteinuria on any occasion.

Discussion

Although the study was conducted on a relatively limited number of children, the positivity rate for GABHS was expected to be high in view of the high prevalence of RHD and APSGN in these populations. The rates for both groups of children in summer (24.4% and 21.3% for Coloureds and Indians respectively) and for Coloureds in autumn (17.1%) were in fact high and comparable to those found by Holmes and Rubbo\(^1\) in Melbourne, where they found rates of 25.3% in the poorer areas and 12.5% in the wealthier areas. However, the rates in our study were not consistently high and indeed in spring were low at 4.3% and 3.4%. Interestingly, these low rates compare with the rate of 5.2% found by McLaren and Hawkins\(^5\) in Soweto, Johannesburg, during 1972 in a population probably more overcrowded than ours. Quinn and Federspiel\(^4\) in Nashville, Tennessee, found positivity rates at times as high as 45% during the 3rd year of schooling in low socio-economic groups. It is difficult to explain the difference between the Johannesburg findings and the findings in North America and Australia, particularly in view of the high prevalences of RHD and APSGN in Johannesburg. It is possible, however, that our children had more exposure to streptococci at a younger age in their home environments and that consequently their positivity rates were on the decline earlier than those of the overseas populations. In support of this view is the finding in the Nashville study of a gradual decline to the 5th and 6th years of schooling.\(^4\) Our finding that the highest positivity rates were in summer differs from the findings of both Murray \textit{et al.}\(^7\) and Van Zyl \textit{et al.}\(^8\). Murray \textit{et al.} found the...
positivity rate to be highest in winter and spring, while Van Zyl et al. found no significant seasonal difference. McLaren and Hawkins found a prevalence of RHD of 6.9/1000 in Soweto, so that we might have expected to find one or two cases. However, the number of children we examined was too small to draw any conclusion about the prevalence of asymptomatic RHD.

In summary, we have shown that the positivity rate for β-haemolytic streptococci in the throats of Coloured and Indian schoolchildren was not unduly high and that in our study groups there was no relationship between the number of persons per bedroom and the percentage of positive throat swabs. Primary prophylaxis against acute RF is therefore probably not a practical proposition for these schoolchildren.

We wish to thank Mr Y. Dangor for skilled technical assistance, Dr S. D. Miller for carrying out the streptococcal agglutination tests, Professors H. J. Koornhof and S. E. Levin for valuable advice, Sister M. van Vuren and the late Dr J. L. Helgasen of the Department of Health and Welfare for help and co-operation, Sisters C. Terblanche and O. Marcus of the same Department for testing the urine, Ames Laboratories for supplying the Labstix, and Dr Salome Miller for her encouragement.

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Consultation-liaison clinical psychology in modern general hospital practice

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Summary
The past few decades have witnessed rapid international development of the interface between psychiatry and the mainstream of medicine. This development, which is a characteristic of general hospital psychiatric units, has become known as consultation-liaison psychiatry and has evolved as a clinical and teaching activity dealing with psychosomatic medicine.

Problems of health and illness are inextricably related to physical as well as behavioural and environmental factors, each contributing to problems encountered in the medical management of patients. Therefore as a corollary to the developments mentioned above, a new role has emerged for clinical psychology within the general hospital and has become known as 'medical psychology'. By this term is meant all the medical applications of normal and abnormal psychology.

A clinical psychology consultation-liaison service in a general hospital is discussed and an analysis of 1092 consultations and 4193 outpatient attendances at a psychiatric unit of a general hospital between 1 January and 30 June 1982 is presented. A rationale for the role of the clinical psychologist as a consultant within the medical setting is suggested.

The past few decades have witnessed a rapid international development of the interface between psychiatry and the mainstream of medicine. This development is a characteristic of general hospital psychiatric units and has become known as consultation-liaison psychiatry, which has evolved as a clinical and teaching activity dealing with psychosomatic medicine with the ultimate aim of promoting optimal care for the sick. A similar development has occurred in South Africa. Consultation refers to the services performed for the patients and their families, while 'liaison' refers to the services provided by the mental health specialist on behalf of the attending or referring physician and staff.

Problems of health and illness are inextricably related to physical as well as behavioural and environmental factors, each contributing to problems encountered in the medical management of patients; an integrated model of health care that...