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CARRIAGE OF STAPHYLOCOCCUS AUREUS AND BETA HAEMOLYTIC STREPTOCOCCI IN RELATION TO RACE

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Abstract. Following suggestions that some under-utilization of health services might occur in respect of the diagnosis and treatment of minor skin lesions, a survey was undertaken in a London Borough with a substantial immigrant community. Few skin lesions were found but nose and throat swabs taken during the survey showed that although throat carriage of streptococci did not differ between races, nasal carriage of *Staph. aureus* was significantly higher in caucasoids (41%) than in negroids (30%).

Nasal carriage of *Staphylococcus aureus* has previously been reported to be lower in negroids than in caucasoids, though some doubts may be expressed regarding the comparability of the populations. Findlay & Abrahams (3), working in West Africa, studied 300 Africans including 150 soldiers half of whom were orderlies and 100 Europeans half of whom were officers. Nasal carrier rates for *Staph. aureus* were Africans 23%, Europeans 38%. Millian and his colleagues (5) reported essentially similar differences between negroids and caucasoids in the USA although it is difficult to be sure that the individuals were of comparable social status.

Allen, Taplin and their co-workers have reported differences in prevalence of streptococcal infection and in fungal infection between races (1, 2). The following work was prompted by discussion with Taplin regarding the potential under-reporting of skin infection and under-utilization of medical services by some sections of the community.

MATERIALS AND METHODS

The survey reported here was carried out during visits to schools in the London Borough of Hackney. According to the figures published by the Registrar General, about one-fifth of the inhabitants were born outside the U.K. and about half of these were negroid. Many of the children have been born in the Borough, however. The various groups are well integrated, indigenous and immigrant families living in the same streets and attending the same schools. There is therefore comparability, if not equality, in the social status of the various groups.

The survey was carried out by attending the schools in the company of the school nurse, often, and especially with the 5–11-year-olds, during a routine school hygiene inspection when the children were undressed. Letters asking for consent to swabbing were sent to parents before the visit. It was appreciated that consent may have been with-held because of some fear that a child might have something wrong and accordingly in one infant and one junior school all children were seen by the nurse and the investigators but only those with consent forms were swabbed. In these schools, no bias was evident between those agreeing and those refusing permission for their child to be sampled.

Cotton swabs were used throughout in the results reported here. Nose swabs and throat swabs were taken and broken off directly into Stuarts Transport Medium, even though they were generally inoculated onto blood agar within a few hours. Nasal swabs were incubated aerobically and throat swabs were incubated anaerobically for 24 hours at 37°C. At the time of the survey the age, sex, and apparent race of each child was noted together with the location of any skin lesion. Lesions were sampled with cotton swabs and inoculated onto a range of growth media to determine the presence of pathogens. Streptococci were grouped on the basis of bacitracin sensitivity and *Staph. aureus* were investigated for resistance to penicillin and tetracycline by the disc test. Children were usually examined by a bacteriologist and a dermatologist as well as by the school nurse.

RESULTS

Very few skin lesions were seen and these were predominantly in the 5–6 year age group (Table I). Nasal carriage of *Staphylococcus aureus* was greater in the caucasoids than in the negroids at all ages (total carriage for all ages $\chi^2 = 17$, $P < 0.1\%$) (Table II) but no difference was seen in relation to age or sex. The distribution of sensitivity patterns was the same in both races. (Sensitive to penicillin and tetracycline: negroids 33% of carriers, caucasoids 28%, Resistant to penicillin only: negroids 58% of

Table I. *Skin lesions in children*

Age (years)	Caucasoids				Negroids			
	Total population	Pyogenic lesions	Herpetic lesions	Other[a]	Total population	Pyogenic lesions	Herpetic lesions	Other[a]
5–6	140	5	1	14	223	3	1	4
7–8	145	3	2	2	155	2	0	6
9–10	159	0	1	2	135	2	1	3
11–12	86	0	0	2	66	0	0	1
13–14	51	0	0	1	28	0	0	0
All	581	8[b]	4	21	607	7[b]	2	14

[a] "Other" lesions were principally pityriasis alba, a non-pyogenic lesion of the skin associated with local drying, especially common on the cheeks and around the mouth. Mild lesions are easier to see in Caucasoids. Atopic eczema was present in 5 caucasoid children and in 6 negroids.

[b] The flora of the pyogenic lesions was: Group A beta haemolytic streptococcus (3), *Staph. aureus* (11), Group A streptococci and *Staph. aureus* (1).

carriers, caucasoids 65%. These values are not statistically significantly different.) Throat carriage of beta haemolytic streptococci was equal in the races and was not dependent on age or sex. About half of the throat streptococci were sensitive to bacitracin. All Asians and those of clearly mixed racial origin (totalling 100 children) have been omitted from this survey.

DISCUSSION

From these studies it is clear that there is little or no significant under-reporting of pyogenic lesions amongst children attending school. The few lesions seen were equally divided amongst the caucasoid and negroid children. D. Taplin and A. Allen (personal communication) have found that acute glomerulonephritis following streptococcal skin infection is 15 times more common in negroid children than in caucasoids in the Miami (USA) area. This they attribute to socio-economic factors rather than to race.

The present survey has confirmed previous statements that negroids carry *Staph. aureus* less frequently than caucasoids. There is no apparent reason for this difference. It may be that anatomical differences make it simpler to swab the nasal mucosa in caucasoids. However, the present data was given a preliminary analysis after the first 500 samples and the racial difference was noted; in the subsequent 650 children therefore a particular effort was made to sample mucosa in all cases. The results did not differ from the first group. The numbers of carriers of both *Staph. aureus* and beta haemolytic streptococci was that expected on the basis that carriage was independent. Number of double carriers observed: caucasoid 38, negroid 19; number expected: 41% of 13% of 581 = 31 caucasoids, and 29.6% of 12% of 607 = 22 negroids.

Others have observed that in caucasoids an abnormal nasal septum may predispose to carriage of *Staph. aureus* (4) and some genetic susceptibility to carriage has been proposed (6) but the factors which

Table II. *Nasal carriage of* Staph. aureus *and throat carriage of beta haemolytic streps*

Age (years)	Caucasoids			Negroids		
	Total population	Staph aureus (%)	Beta streps (%)	Total population	Staph aureus (%)	Beta streps (%)
5–6	140	39	11	223	30	11
7–8	145	39	16	155	32	9
9–10	159	49	12	135	33	17
11–12	86	34	9	66	24	10
13–14	51	39	18	28	18	14
All	581	41	13	607	30	12

govern carriage in normal persons are not known. The reasons for racial differences in carriage are yet to be determined.

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