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# Influence of ethnicity on the frequency of nasal surgery*

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SUMMARY

*Objective: To determine whether surgery for nasal obstruction differs in frequency between ethnic groups.*

***Method:** Ethnicity data was collected from all patients attending otolaryngology clinic appointments and compared to census data. Odds ratios with confidence intervals were calculated for attendance at otolaryngology clinics, rhinology clinics, undergoing septoplasty, septorhinoplasty and/ or turbinate surgery for each ethnic group over a 3-year period.*

***Results:** The ethnic groups of the 39493 outpatient attendees closely mirrored demographic data from the 2001 Census. Non-Chinese Asian ethnic groups were more likely to undergo septal surgery than the general (mainly white) population (odds ratio 1.44, 95% CI 1.25 to 1.66, $p < 0.00001$), whereas Black groups (odds ratio 0.31 [0.23 - 0.41], $p < 0.00001$) and Chinese (odds ratio 0.28 [0.11 – 0.70], $p = 0.00311$) were much less likely. Similar results were found for rhinoplasty and turbinate surgery.*

***Conclusions:** There is strong statistical evidence for large differences in the frequency of surgery for nasal obstruction between ethnic groups. Asian groups were more likely to undergo surgery, whereas Chinese and Blacks were less likely than the general population, which was predominantly white in this study.*

*This may be due to anatomical variations, differences cultural views towards surgery, or inequalities in clinician's attitudes.*

*Key words: ethnic, septoplasty, septorhinoplasty, snoring, turbinate*

## INTRODUCTION

Nasal obstruction is often corrected surgically by septoplasty or septorhinoplasty [1,2]. This procedure is frequently combined with inferior turbinate reduction as inferior turbinate hypertrophy tends to occur on the side of a septal concavity, and many patients have turbinate hypertrophy resulting from rhinitis in addition to anatomical obstruction [3]. This study aims to determine whether surgery for nasal obstruction differs in frequency between ethnic groups.

In all branches of medicine decision-making is based on a large number of variables in an attempt to balance the patient's needs and wishes with evidence-based medicine. The relevance of the evidence base to the individual patient, cost effectiveness and resource availability are influential. Decision analysis can be used to examine these complex factors and even to formulate computer-based decision software [4]. However, this does not account for any parameters which are not quantified or for which the clinical impact is unknown and therefore not included in the decision analysis. It is well accepted and commonly stated that cultural attitudes towards medical and surgical treatments vary. However more descriptive details have not been published. Race, ethnicity and associated differences in cultural attitudes may play a part in the clinician's and patient's decision to undergo surgical procedures to the septum and turbinates. There are significant nasal architectural differences between racial groups [5]. Basic anthropometric classification simply compared the height and width of the nose to produce the narrow 'white' (leptorrhine) nose and progressively broader classes of mesorrhine to platyrrhine. Closer examination reveals greater variations such as the nasal aperture and the alar base, which are narrower in the Chinese and longer in the Indian population when compared to a white racial group [6].

The incidence of septal deviation in mixed race post mortem specimens is estimated to be 79% [7,8]. Most of these deviations cause little or no obstruction to the nasal airway. Objective assessment of nasal airflow with techniques such as acoustic rhinometry and rhinomanometry are useful as research tool but are not usually available in clinical practice [9]. The clinician's decision whether or not to offer surgery for nasal obstruction and which operation to offer is based on intuition,

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verbal consultation and a subjective impression of nasal anatomy and pathophysiology. This inevitably results in large variations in clinical practice, about which very little known.

## METHODS

### *Ethnicity of Patients*

Data on ethnicity was collected from all patients at the time of attending their outpatient clinic appointments from 1/1/2002 to 31/12/2004 within our department. Patients were asked to tick the box which best described their ethnic group on a standardised form which was recorded in the computerized patient administration system (PAS).

This ethnicity data was compared to the 2001 Census to ascertain if the ethnic group of clinic attendees reflected that of the general population served by our department [10].

We also examined the ethnic distribution of all patients attending specialist rhinology clinics and those undergoing nasal airway surgery in the form of septoplasty, septorhinoplasty, and or inferior turbinate surgery from the same patient administration system. If a patient had more than one procedure (eg. septoplasty and reduction of inferior turbinates) both were analysed separately.

### *Statistics*

Odds ratios with confidence intervals were calculated for the likelihood of a member of each ethnic group in the general population attending a general otolaryngology clinic or a rhinology clinic and for clinic attendees of different ethnicities undergoing nasal surgery.

## RESULTS

During the three-year period 01/01/2002 to 31/12/2004, 39493 patients attended otolaryngology outpatient appointments. Of these, 4419 patients attended specialist rhinology clinics. Figures 1 and 2 illustrate the proportions represented by different ethnic groups in these clinics and Figure 3 illustrates the ethnic distribution in the general population served by our department.

Figure 4 illustrates the odds ratios with confidence intervals and p-values for the likelihood of a member of each ethnic group attending a general otolaryngology clinic (including snoring clinic) as compared to the census data. This shows that 'any other Asian', 'black African', 'black Caribbean', 'Indian', 'Pakistani', 'white and black' and 'white British' are less likely to attend otolaryngology outpatients than the general population. 'Any other black', 'any other white', 'Bangladeshi' and 'white and Asian' are more likely to attend. Figure 5 shows similar results for attendance at specialist rhinology clinics. There are no statistically significant differences in the likelihood of attending a general clinic as opposed to rhinology clinic.

Figure 6 shows the odds ratios for the likelihoods of different ethnic groups in general otolaryngology clinics undergoing

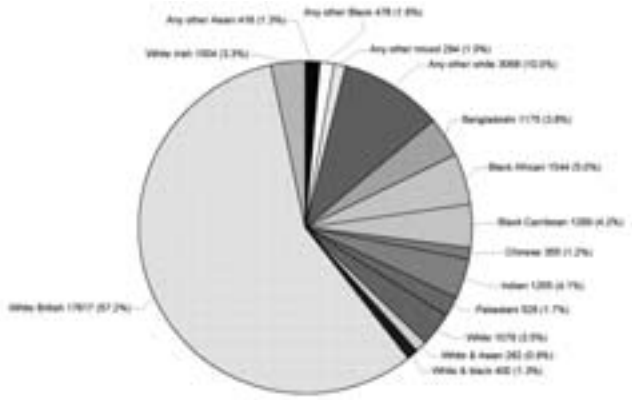

Figure 1. Self attributed ethnic groups for patients attending all otolaryngology outpatient clinics.

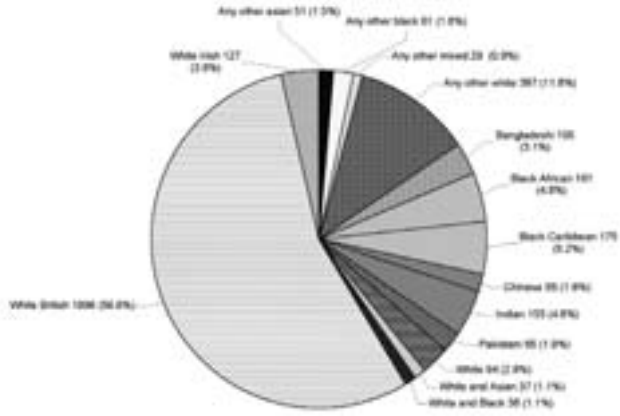

Figure 2. Self attributed ethnic groups for patients attending rhinology outpatient clinics.

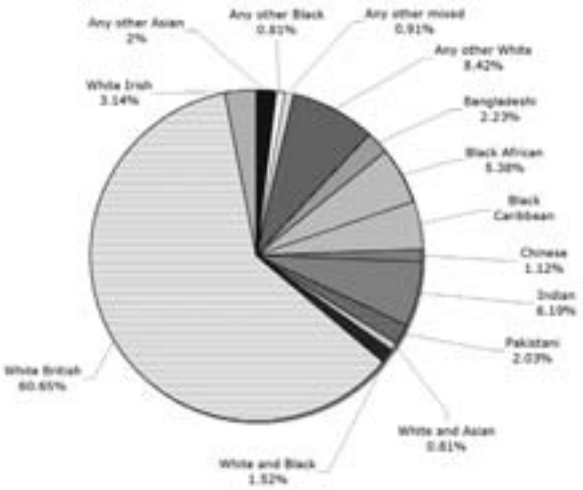


Figure 3. Ethnic groups of the population covered by the otolaryngology clinics (data from the National Census 2001).

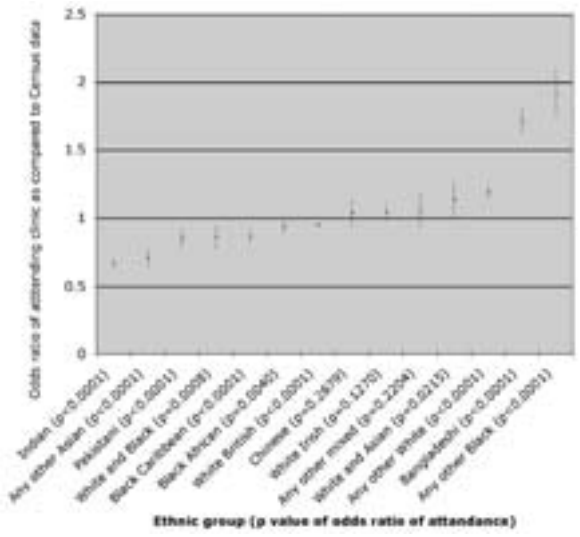


Figure 4. Odds ratio (with p values) and 95% confidence intervals for attending any otolaryngology clinic as compared to Census data for local population.

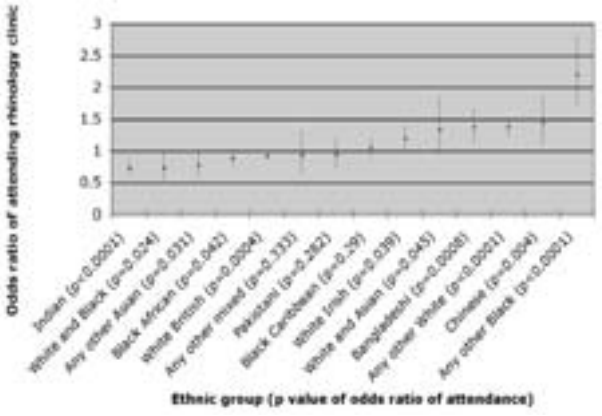


Figure 5. Odds ratio (with p values) and 95% confidence intervals for attending rhinology clinic as compared to Census data for local population.

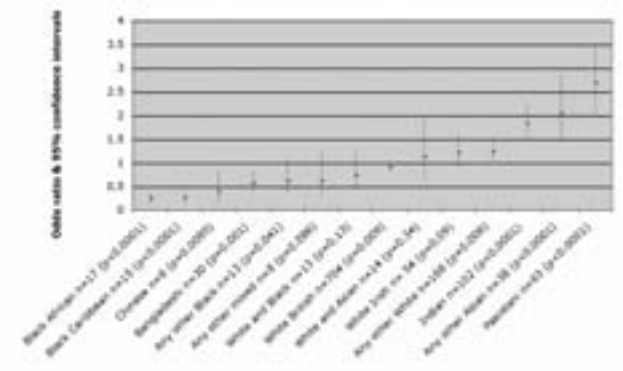

Figure 6. Odds ratio (with p-values) and 95% confidence intervals of the likelihood of differing ethnic groups to undergo septoplasty or septorhinoplasty as compared to their attendance at general otolaryngology clinic.

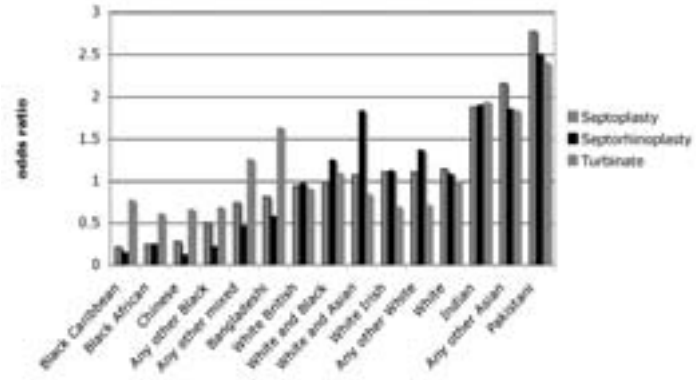


Figure 7. Odds ratios of the differing ethnic groups undergoing septoplasty, septorhinoplasty and turbinate procedures as compared to their attendance at rhinology outpatients.

either septoplasty or septorhinoplasty. A total of 1756 (septo)rhinoplasties were performed ie. 4.4% of the 39493 attendees underwent either septoplasty or septorhinoplasty. These results can be summarized by pooling similar ethnic groups: Asians are more likely to undergo septal surgery (odds ratio 1.44, p value $<0.00001$), whereas Blacks are much less likely (odds ratio 0.31, $p<0.00001$).

Of the 4419 rhinology clinic attendees, 1446 underwent a septoplasty (32.7%), 651 underwent septorhinoplasty (14.7%), and 848 underwent a turbinate procedure (19.1%). Figure 7 shows the odds ratios for attendees of rhinology clinics undergoing either septoplasty, septorhinoplasty or inferior turbinate surgery. These results show similar ethnic distribution to general otolaryngology clinics (Figure 6). The likelihood of undergoing a turbinate procedure is similar to that of having a septal procedure in most ethnic groups. Black ethnic groups are less likely to have nasal airway surgery of any form, but are relatively more likely to undergo inferior turbinate reduction than septal surgery. 'Bangladeshi' and 'any other mixed' groups appear to have a disproportionate likelihood of undergoing turbinate procedures as compared with other airway procedures whereas 'white and Asian' have a higher frequency of having septorhinoplasties. 'Indian', 'any other Asian' and 'Pakistani' have a highly significantly increased incidence of undergoing septo(rhino)plasty and turbinate procedures compared to the population as a whole.

## DISCUSSION

This study provides strong statistical evidence for large differences between ethnic groups in the frequency of surgery for nasal obstruction in our department. In general, most Asian groups are far more likely to undergo surgery, whereas Chinese and Blacks are less likely than the general population, which is predominantly white in the population studied. It appears that the composition of both general otolaryngology and rhinology clinics is similar to that of the local population: the differences arise as a result of selection for surgery rather than for specialist referral.

There are several possible explanations for these differences:

Previous studies have demonstrated racial differences in nasal anatomy. Morgan et al. used acoustic rhinometry to demonstrate that Blacks have a larger minimum cross sectional area within their nose both with and without decongestants than Caucasians and Orientals [(11)]. Orientals had a slightly smaller minimum cross sectional area in comparison to Caucasians without decongestants [(11)]. Nasal resistance is less in 'Black' groups in comparison to Caucasians [(12)]. Similar methodology showed no difference in minimum cross section area between Anglo-Saxon and Indian noses [(13)]. Another study using acoustic rhinometry showed a larger minimum cross sectional area in Blacks compared to Asians but with both groups being larger than Whites [(14)]. These findings may explain why blacks are less likely to undergo surgery but do not explain why Chinese are less likely and other Asians more likely to undergo surgery.

The incidence of rhinitis (and atopy) may vary between ethnic groups but this has never been shown to be significant after controlling for environmental factors [(15)].
There may also be cultural differences in attitudes to medical and surgical treatments. These may influence both patients' expressed preferences and surgeons' attitudes to those patients.

This study is limited by the lack of information available about the conditions for which patients were originally referred. Although the clinic populations correspond well with the local population, it is likely that the distribution of symptoms and pathologies differs, which may explain some of the observed differences in the patterns of treatment. Accurate recording of ethnicity, a complex and fluid concept, is difficult and our catchment area may not precisely match that described by the census [(16)].

Sinus surgery and polypectomies were excluded from the study in order to analyse surgery for anatomical variation, as perceived by the patient and clinician, rather than inflammatory mucosal disease, although clearly there is some overlap between mucosal and anatomical pathologies [(17)]. To differentiate anatomical obstruction from mucosal congestion as the main cause of nasal obstruction more objective measures such as acoustic rhinometry, computer tomography (CT) scanning or nasal nitric oxide levels are important.

Despite these limitations, the statistical evidence for racial differences in the frequency of nasal surgery is very strong, a finding that has not previously been reported.

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