Variations in hospitalization rates for asthma among Black and minority ethnic communities

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In response to the introduction of ethnic monitoring within the U.K. hospital inpatient data set, this study investigates the variations in secondary healthcare utilization by Black and minority ethnic communities whose cause of admission is related to asthma. The study examines all residents of the West Midlands: over 5 million people, of whom 8.5% are from Black and minority ethnic groups.

A retrospective study of 15,921 asthma-related hospital admissions, from 1 April 1995 to 31 March 1996, was carried out.

Age-standardized admission rates were higher in all Black and minority ethnic groups studied than in the White group. There were elevated rates in Black children aged 5-14 years, and particular differences were observed for Indian and Bangladeshi men and women aged 65 years or over. Emergency admissions to hospital for asthma were strongly associated with patients' socioeconomic background but this was largely observed for Black and minority ethnic groups that also generally experience high levels of deprivation.

The findings support previous studies which suggest that hospital utilization rates for asthma among people from Black and minority ethnic groups are high compared with the White group, despite little evidence in measured prevalence. This study suggests that ethnic background is more important in asthma admissions than deprivation, which raises serious concerns on the appropriateness and quality of asthma care for these patient groups within our society. Future studies need to examine pathways to care, that is the health-seeking behaviour of Black and minority ethnic groups, the type of treatment received at the primary care level and referral patterns to secondary care.

Introduction

There is a growing number of studies that explore differences in both asthma prevalence and rates of secondary care utilization for asthma patients of differing ethnic groups (1-14). However, many national and international studies of prevalence of asthma fail to provide clear evidence of differences by ethnic group (15-21). Some studies do demonstrate significant differences by ethnic background in the prevalence of asthma or asthma-like symptoms (22-24). Often, these differences may be explained by socioeconomic status, lifestyle or environmental factors (3,9-11,18,25-27).

In Southampton, Pararajasingam et al. reported that, although there was a higher proportion of South Asians with wheeze visiting their doctor, or being admitted to hospital in the past year, compared with their White contemporaries, the study failed to demonstrate a higher prevalence of asthma among 'Asian' than 'European' children (5). Robson et al. reported that prevalence and frequency of severe attack of wheezing were similar in Wellington for Maori, Pacific Islanders and others (6). Shaw et al. demonstrated that, although prevalence of asthma symptoms was higher among Maori than non-Maori, this difference disappeared when allowance was made for current smoking behaviour (3). Similarly, ethnic differences between Fijian and Indian children for asthma symptoms were not observed after accounting for exposure to smoking in the home, or overcrowding, both of which
lead to a greater burden of respiratory infection (9,10). However, in Australia, the prevalence of asthma in Asian immigrants was strongly associated with length of stay in the country, suggesting that environmental factors are important in the pathogenesis of this disease (18). In Singapore, Ng et al. showed that ethnic differences might be explained by environmental circumstances, but residual differences remained, and the cumulative prevalence of asthma was significantly higher in Indians and Malays than in the Chinese (11).

Several studies have highlighted differences in treatment and service utilization by ethnic background, particularly within secondary care (4,8,14,15,28–32). In Blackburn, Myers and Ormerod observed that hospital admission rates for asthma were significantly higher for South Asian children aged 5–14 years than White children (4). A later study of the same population revealed higher admission rates for asthma among South Asian males and females, compared with the White group, in all ages except females aged 15–19 years (14). Hospitalization rates among Polynesian children have been shown to be significantly higher than for those of European descent (28–30). Recent studies from the U.S.A. found that, although the prevalence of asthma-like symptoms was similar in White, Black and Hispanic children, hospitalization rates for the latter two groups were significantly higher (17,33). The Atlanta Center for Disease Control showed that, although prevalence of asthma was only slightly higher in Black-Americans, asthma-related death rates were much higher in this group, particularly in young adults aged 15–24 years (34,35). Furthermore, Watson et al. noted that differences in the healthcare received by asthma patients from different socioeconomic backgrounds play an important role in determining subgroup hospitalization rates (36). These studies suggest, as did Robson et al., that differences in the health experience of people with asthma-like symptoms from minority ethnic groups are related to differences in access to, and use of, available health services and medication, rather than intrinsic differences in prevalence (6).

Aspects of inequality need to be considered carefully when exploring differences in asthma hospitalization rates by ethnic background. Systematic routine ethnic monitoring could play an essential part in this process only if appropriately combined with detailed sociodemographic information. Such studies could then effectively inform the process of service planning and management (37). Until relatively recently, however, routine information about either the size of the ethnic population or their utilization of secondary healthcare services was not available in the U.K. Only in 1991 did the census include for the first time a question on ethnic background in addition to the previously recorded country of birth (38). This census categorisation of ethnic background is now widely used by researchers and service providers (39). More recently, from 1 April 1995, it has been mandatory for healthcare provider units to collect and record data on the ethnic background of hospital inpatients, following recommendations made by the Department of Health in 1993 (40,41).

Since 1987, hospital episode statistics (HES) data have provided comprehensive information on the utilization of inpatient services, including diagnosis, treatment and patient characteristics (prior to 1987 other slightly different versions of hospital statistics existed, dating back as far as 1948) (42). The variable for ethnic background is a welcome addition. A new variable for self-reported ethnic background was added to the database in 1995. If patients are unable to respond to questions, information is to be sought from others such as relatives. However, as with the introduction of every new data item, initial concerns are raised regarding the coding reliability and completeness, particularly during the early stages of its introduction. Across the West Midlands an audit of the first 6 months of ethnic monitoring showed that around 50% of all records within HES reported ethnic background as either ‘not given’ or ‘missing’ (43). This was of great concern, but, using methods specifically developed to evaluate HES coding consistency, the audit found that the database was generally not biased against the recording of ethnic background for patients from Black and minority ethnic groups (44). In particular, the data were observed to be without bias towards black and minority ethnic groups for patients admitted with asthma (43).

Although the poor coverage of the ethnic background variable within the regional data set remains a concern, this study reports on initial findings for emergency asthma admissions for the first complete year of ethnic monitoring within the West Midlands. The study examines ethnic variations in hospital inpatient activity when the primary or subsidiary medical diagnosis is related to asthma. In particular, the study aims to identify whether significant variations in hospitalization rates among minority ethnic groups exist for asthma, and if so, which factors account for them, and in what way might they be modified.

**Methods**

The study obtained hospital inpatient activity data for West Midlands residents for the period from 1 April 1995 to 31 March 1996. Data were extracted from the HES database held by the West Midlands NHS Executive. The data included information on age, gender, diagnosis, specialty and ethnic background. The ethnic group categories used within the HES database, compatible with the 1991 census, were ‘White’, ‘Black-Caribbean’, ‘Black-African’, ‘Black-other’, ‘Indian’, ‘Pakistani’, ‘Bangladeshi’, ‘Chinese’, ‘any other ethnic group’ and ‘not given’. In addition, population data by ethnic group were obtained from the 1991 census for all West Midland Health Authorities.

An asthma-related admission was defined as an episode of inpatient care in which any of the seven diagnosis fields contained the ICD-10 classification codes J45–J46 and the admission method was recorded within the database as an ‘emergency’ (45). A primary asthma admission was defined as an emergency episode of inpatient care in which only the primary diagnosis field contained the ICD-10 classification codes J45–J46. Secondary care utilization rates for asthma were evaluated for West Midlands residents, by ethnic group, for several age groups, and standardized for all ages using the World Health Organisation standard population.
The 826 electoral wards of the West Midlands were assigned a Townsend area deprivation measure (46). The wards were ranked by their score and divided into five bands of roughly equal population. A weighted Townsend score was evaluated for each band to account for differences in electoral ward populations. Using the combined West Midlands population as the standard, age- and gender-specific asthma admission rates were calculated and multiplied by the population within each Townsend band to derive expected rates (adopting the age-groups 0–4 years, ten-yearly thereafter, and 75 years and over). Standardized admission ratios (SARs) were derived by dividing the observed number of admissions by the expected, and multiplying by 100 (42). Emergency asthma admission ratios were plotted against their corresponding weighted average Townsend score for all patients with ethnic background recorded and for all those with no ethnic background recorded (Fig. 1). This was also done separately for each ethnic group (Fig. 2).

There was only one primary asthma admission recorded as being Chinese, which is not surprising given the relatively small proportion of Chinese in the West Midlands community (less than 0.25%). Similarly, there were only seven admissions attributed to the Bangladeshi community (population of 0.81% of the region). Consequently, the analyses did not examine variations for these minority ethnic groups. Furthermore, 117 primary asthma admissions recorded as ‘other’ were excluded from the analyses, and because of the small numbers involved the categories for Black–Caribbean, Black–African and Black–other were combined into a single group.

Table 1 shows the utilization rates for emergency inpatient secondary care for asthma patients in the West Midlands. These figures are approximately half of the expected ‘true’ rates, because of the underreporting within the ethnic background variable. However, it is the relative differences that are important. The rates increased when the larger data set of nearly 16,000 asthma-related admissions was analysed, but the differences by ethnic background remained consistent throughout.

Results

The data set of asthma-related admissions totalled some 15,921 emergency episodes of care, for which 53.3% (8490) reported valid ethnic background, and 8.5% (1361) were from Black and minority ethnic communities. This represented 16.0% of admissions where ethnic background was recorded (excluding ‘not given’ and 235 missing entries). Revising the inclusion criteria to consider only those asthma admissions whose ‘primary diagnosis’ was pertaining to asthma, some 10,444 admissions were selected, of which 5738 had ethnic background recorded (4566 ‘not given’ and 140 missing entries). All results reported by this study refer to this data set of primary asthma admissions, although analyses were repeated (but not presented) on the larger data set of asthma-related admissions.

AGE AND GENDER DIFFERENCES IN HOSPITAL UTILIZATION RATES

In children aged 0–4 years, utilization rates for asthma were higher for boys than for girls, although similar for boys and girls aged 5–14 years, and thereafter generally higher for women than men. High rates of asthma admissions were observed among older men and women, and it is important to recognize that asthma is not only a disease of childhood and adolescence (47,48).

ETHNIC VARIATIONS

Age-standardized admission rates were higher in all Black and minority ethnic groups studied than in the
Table 1. Emergency asthma admission rates to hospital by ethnic background for the West Midlands (5613 patients)

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>White</th>
<th>Black‡</th>
<th>Indian</th>
<th>Pakistani</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0–4</td>
<td>557</td>
<td>844*</td>
<td>1140**</td>
<td>1427**</td>
</tr>
<tr>
<td>5–14</td>
<td>107</td>
<td>377**</td>
<td>224**</td>
<td>168</td>
</tr>
<tr>
<td>15–44</td>
<td>46</td>
<td>96*</td>
<td>53</td>
<td>91</td>
</tr>
<tr>
<td>45–64</td>
<td>45</td>
<td>93</td>
<td>217**</td>
<td>186*</td>
</tr>
<tr>
<td>65+</td>
<td>51</td>
<td>98</td>
<td>693**</td>
<td>954**</td>
</tr>
<tr>
<td>ASR§</td>
<td>211</td>
<td>474**</td>
<td>540**</td>
<td>672**</td>
</tr>
<tr>
<td>(95% CI)</td>
<td>(205, 217)</td>
<td>(413, 535)</td>
<td>(489, 592)</td>
<td>(649, 694)</td>
</tr>
<tr>
<td>Females</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0–4</td>
<td>316</td>
<td>422</td>
<td>482</td>
<td>490</td>
</tr>
<tr>
<td>5–14</td>
<td>79</td>
<td>232**</td>
<td>128</td>
<td>147*</td>
</tr>
<tr>
<td>15–44</td>
<td>103</td>
<td>162*</td>
<td>123</td>
<td>267**</td>
</tr>
<tr>
<td>45–64</td>
<td>90</td>
<td>113</td>
<td>344**</td>
<td>385**</td>
</tr>
<tr>
<td>65+</td>
<td>97</td>
<td>95</td>
<td>1116**</td>
<td>1314**</td>
</tr>
<tr>
<td>ASR§</td>
<td>734</td>
<td>388**</td>
<td>506**</td>
<td>651**</td>
</tr>
<tr>
<td>(95% CI)</td>
<td>(228, 240)</td>
<td>(333, 442)</td>
<td>(456, 556)</td>
<td>(578, 724)</td>
</tr>
</tbody>
</table>

†Rates presented here are approximately half their true value, as approximately 45% of all episodes have no record of ethnic background (and this was not biased against any ethnic group).
‡Black is a composite group of Black-Caribbean, Black-African and Black-other.
§Age-standardized rates using the World Health Organization standard population.
*Significant differences from the White groups at the 95% confidence level.
**Significant differences from the White groups at the 99% confidence level.
CI is the confidence interval.

White group, irrespective of gender. Particular differences were observed for Indian and Bangladeshi men and women aged 65 years or over, while rates among the Black group were similar to those for Whites. For children under 5 years, admission rates for all Black and minority ethnic groups were higher than in the White group, although less so among females. Rates were very significantly elevated for Indian and Pakistani males of this age.

Discussion

The HES database, despite imperfections, deserves to be more widely utilized by the healthcare research community, as the data are routinely collected, comprehensive and readily available. The new ethnic dimension enhances their value to researchers and healthcare commissioners alike. However, the data will only be of value in research if their quality is good, and quality will only improve and be maintained if the data are used. This study addresses this circular dilemma specifically for ethnic monitoring by providing our first insight into the value of these data in examining variations of secondary healthcare resource utilization for patients from Black and minority ethnic communities. Although the new data item was frequently not recorded, our preliminary findings are supported by earlier results of an audit of the West Midlands database that found no evidence of bias in the recording of the ethnic background variable for asthma-related admission (43). It is hoped that this and future studies encourage greater completeness in the collection of this variable as its value in research is realized.

There are several limitations to the study. An important factor when interpreting differences in asthma hospital admissions is the re-admission rate (19,21). In the U.K., however, current hospital inpatient databases do not uniquely identify individuals where associated with repeat
inpatient episodes. This makes the analysis of re-admission within routine hospital data very difficult without recourse to patient records. However, other studies have shown that higher utilization rates are not generally related to repeat attendance (4,14,49). It is also impossible to assess personal behavioural characteristics, or previous disease history, as all these are not recorded within HES. Linking HES data to primary care information would go a long way to resolve some of these issues, but this is again not yet possible, and detailed primary care data are not as extensively collected in electronic format at present. Routine data cannot measure a greater tendency to present to hospital for acute treatment rather than to use primary care services. However, very severe asthma attacks would probably result in hospitalization, even if presented through primary care services, and the object of this study is to examine specifically the variation in secondary care utilization for emergency admission for asthma. There is no true measure of case severity within routine data, although length of stay may be considered a proxy, but this variable can be difficult to interpret across many different hospitals, with so many consultants involved. Within this study mean length of stay varied from 3-32 days per admission (sd=2.94 days) among the Pakistani community to 4-15 days (sd=5.27 days) among the Indian group, but no significance was placed on this data item.

Another problem to consider is the population information from the 1991 census. This period of enumeration suffered the blight of the Poll Tax 'rebellion' where it is reported that a million people were not included and that these were generally younger adults, particularly males, and came from more deprived socioeconomic backgrounds (50). The importance of this is two-fold: first, underenumeration among highly deprived communities, often experienced by Black and minority ethnic groups, leads to elevated estimates of hospital admission rates for these groups; second, the socioeconomic indicators used to account for the effects of deprivation also rely on the accurate enumeration of the local populations. Combined, these two factors could lead to overestimates of asthma admission rates for Black and minority ethnic groups and correspondingly unrealistic confidence intervals. However, this would have to have a severe impact to alter the overall conclusion that Black and minority ethnic groups generally experience significantly elevated rates of emergency asthma admission.

With all things considered, our initial findings appear to support previous studies which suggest that hospital utilization rates for asthma among people from different minority ethnic groups might be high compared with the White group (4,5,17,51). In particular, Ormerod observed that admission rates were higher for Indian subcontinent minorities, except among females aged 15–19 years (14). This study revealed that for the slightly younger age group, 5–14 years, the Indian and Pakistani communities demonstrated elevated admission rates compared with the White group, although this was only significant for Indian males and Pakistani females, and for the latter this difference remained consistent for those aged 15–44 years.

Higher asthma-related death rates in Black teenagers have been noted in the U.S. (34,35). This study demonstrated high rates of admission to hospital for asthma among older Black children aged 5–14 years, a finding not previously described in the U.K. Also, although elevated admission rates among Indian males and Pakistani females were observed for the same age group, the reduction in asthma admissions between the ages of 0–4 years and 5–14 years was considerably less among the Black community. This was in contrast to the small differences between older Black and White adults (45+ years) and large differences observed between Indian and Pakistani communities and White older adults. These variations by age and ethnic background require further exploration.

By combining HES data with sociodemographic information from the 1991 census this study confirms a previous observation that socioeconomic deprivation has an impact on asthma admission rates, with greater utilization of secondary healthcare from the more deprived communities (36). However, we further observed that this impact was most acute among those from Black and minority ethnic communities, and there was less effect amongst the White population (Fig. 2). The relationship between deprivation and admissions that do not report patients' ethnic background was similar to that for admissions with ethnic background. This adds credence to the earlier statement that the ethnic background variable was not biased for Black and minority ethnic groups. Finally, it should be noted that all associations, except the one between deprivation and the White patient group, were formally significant. However, such measures based on banded values of grouped electoral wards overstate statistical significance and have therefore little meaning.

It is important to understand why differences exist in the emergency admission rates for asthma by ethnic background. Earlier studies suggest that ethnic differences in secondary care utilization are unlikely to be associated with differing levels of prevalence but are more likely to relate to socioeconomic background and differences in access to and use of primary care services, including the prescription and use of preventive medication (6,28–30,52–56). Within this study, there were generally fewer patients from Black and minority ethnic backgrounds (40/881) resident in the two most affluent population bands, compared with White patients (1262/3115). This reflects the extent to which Black and minority ethnic communities are generally also those that experience high levels of socioeconomic deprivation. Deprivation has often been credited with the cause of many differences within minority ethnic groups. However, this study shows that, although deprivation was observed to be significant with respect to asthma admissions, ethnic differences still exist and deprivation has much less impact among Whites. Deprivation may therefore be confusing the issue because so often minorities are also highly deprived. Deprivation per se may not as significantly influence hospitalization rates for asthma as much as the disadvantage within (primary) healthcare provision that is experienced by Black and minority ethnic communities. There is no clear evidence, beyond some environmental influences, that there are generally higher levels of asthma prevalence among minority ethnic groups. Indeed, most recent evidence in the U.K. suggests that asthma-related symptoms
are lower for these groups (24). This study shows that there are, however, higher levels of utilization of secondary healthcare services for asthma, and this may not be due to the much sought after differences in prevalence but due to differences in preventive treatment for these groups. This raises serious concerns on the appropriateness, level and quality of asthma care for these patient groups within our society.

Future studies need to examine the pathways to care, that is the health-seeking behaviour of Black and minority ethnic groups, the type of treatment received at the primary care level and the referral patterns to secondary care. Only once specific treatment problems are identified in this way could healthcare commissioners modify treatment pathways for patients from these communities and secure an improved role in the asthma care of their residents from Black and minority ethnic groups.

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References


