Effect of doctors' ethnicity and country of qualification on prescribing patterns in single handed general practices: linkage of information collected by questionnaire and from routine data

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Abstract

Objectives: To test whether Asian general practitioners who qualified in the Indian subcontinent prescribe items more often, more expensive items, and fewer generic drugs than their British trained Asian and non-Asian counterparts.

Design: Linkage study using data collected by questionnaire and from routine sources.

Setting: General practices in England.

Subjects: 155 single handed general practitioners: 42 Asian doctors qualified in United Kingdom (group 1), 58 white doctors qualified in United Kingdom (group 2), and 55 Asian doctors qualified in Indian subcontinent (group 3).

Main outcome measures: Prescribing cost (cost per ASTRO-PU), prescribing frequency (number of items per ASTRO-PU), and generic prescribing (percentage of drugs prescribed that are generic).

Results: Doctors in group 1 were significantly younger than those in the other groups and had a higher proportion of patients who were from deprived wards. There was no difference between the groups in the proportion of female doctors and total list size. After adjustment for confounding factors, there were no significant differences between the three groups for prescribing cost (16.58 (95% confidence interval 6.39 to 26.77) for group 1, 17.31 (6.92 to 27.69) for group 2, 17.80 (7.22 to 28.38) for group 3, $P=0.55$); prescribing frequency (6.58 (4.60 to 8.40), 6.45 (4.70 to 8.30), 7.89 (6.16 to 9.64), $P=0.34$); and generic prescribing (44.44 (38.95 to 49.93), 47.41 (42.12 to 52.70), 44.04 (38.75 to 49.33), $P=0.37$).

Conclusions: Asian doctors qualified from the Indian subcontinent did not differ from British trained doctors in their prescribing practice. This study refutes the common belief that Asian doctors are high volume and high cost prescribers.

Introduction

The issuing of prescriptions by general practitioners is a complex activity that depends on the interplay of many factors, including variables associated with the

doctor, the patient, doctor-patient interaction, and sociopsychological variables.¹ We know little about the effect of ethnic group and doctor's country of qualification on variations in prescribing patterns.

The evidence that Asian (from the Indian subcontinent) general practitioners prescribe more often and more expensively than non-Asian general practitioners seems to be anecdotal. Although there are studies reporting an association between a doctor's country of qualification and prescribing patterns, to date no study has reported an association between doctors' ethnicity and prescribing patterns. One of the earliest studies found that foreign trained doctors were more likely to be high cost prescribers than their British trained colleagues,² and two recent studies found that doctors who qualified outside the British Isles were more likely to issue a prescription.^{3,4} However, none of these studies took account of variables such as the age and sex of the patients.

The aim of this study was to test the hypotheses that single handed general practitioners who are Asian (of Indian, Pakistani, Bangladeshi, or Sinhalese ethnic groups as defined in the 1991 census) and who qualified in the Indian subcontinent prescribe more items, more expensive items, and fewer generic drugs than their British trained Asian and non-Asian counterparts.

Subjects and methods

Subjects

Sample frame

We obtained the sample frame of doctors for the study in four stages (see figure) in order to identify the following three groups of general practitioners: Asian doctors who qualified in the United Kingdom, non-Asian doctors who qualified in the United Kingdom, and Asian doctors who qualified in the Indian subcontinent.

We chose single handed general practitioners for study because their prescribing and analysis cost (PACT) data most closely reflect their own prescribing.⁵ In the first stage, the Department of Health categorised all single handed principals in England (2701) by their

Sampling strategy for selection of single handed general practitioners

country of qualification. Doctors who qualified outside the United Kingdom and the Indian subcontinent were excluded (242, 8.9%).

During stage II, we obtained the doctors' surnames and initials, as well as the medical school of those who qualified in Britain, from the Department of Health. We used the *Medical Register*⁶ to obtain the doctors' forenames and to validate their school of qualification, as the Department of Health database does not differentiate between doctors whose primary degree was in the Indian subcontinent and those who had requalified by sitting one of the licentiate exams.⁶ Furthermore, the Department of Health database does not include ethnic group. We then categorised the general practitioners into Asian (98) and non-Asian (974) groups by their forenames and surnames.⁷ This method was valid, as we found good agreement ($\kappa=0.95$) with doctors' self determined ethnic group when we sent them a questionnaire (see below).

During stage III, six general practitioners were randomly selected from each group for the pilot study. The remaining 92 Asian doctors who qualified in the United Kingdom (group 1) were included in the main study to achieve sufficient sample size as we expected the response to our questionnaire to be low.⁸ Further random samples of 92 general practitioners who were white and qualified in the United Kingdom (group 2) and 92 doctors who were Asian and qualified in the Indian subcontinent (group 3) were again supplied by the Department of Health (stage IV).

Questionnaire

We sent a questionnaire to these 276 general practitioners that asked for their demographic details. These included their ethnic group, using the categories given in the 1991 census; medical school; year of qualification; possession of the MRCGP diploma; length of time in current post and in general practice; employment of assistants or retainers; practice status (single handed, dispensing, training, or fundholding); and total number of consultations during March 1994.

For inclusion in the study, respondents had to be single handed principals; had to have been in their current practice for more than a year (as the PACT data obtained were for a whole year); and had to be Asian and qualified in the United Kingdom (group 1),

white and qualified in the United Kingdom (group 2), or Asian and qualified in the Indian subcontinent (group 3). These criteria resulted in the exclusion of 58 general practitioners: 35 from group 1, 13 from group 2, and 10 from group 3.

Sample size

We calculated that the necessary sample size was 40 doctors per group (120 in total) in order to detect a difference of two items per patient with a power of 80% and significance of 0.05.

Data collection

We used a linkage design to test the association between the general practitioners' ethnicity and country of qualification and their prescribing patterns. After getting consent, we obtained data from four sources: the questionnaire sent to the single handed general practitioners (see above), data from family health services authorities, data from the 1991 census, and data from the Prescription Pricing Authority.

Data from family health services authorities

These included:

- List size, to calculate cost based and item based ASTRO-PU⁹ (age, sex, and temporary resident originated prescribing units)⁹ using a specific computer program written for this study by the FHS Computer Unit, Exeter. This process accounted for all patients registered with a particular general practitioner even if they were residing in other health authorities (further details from PSG)
- Number of patients giving rise to deprivation payments on 31 March 1994
- Number of temporary residents on the doctor's list between 1 April 1993 and 31 March 1994.

Data from 1991 census

We calculated the Townsend score¹⁰ for each practice by, firstly, assigning the post code of the practice to ward and, secondly, retrieving the relevant variables from the files of the 1991 Census Local Base Statistics maintained at the Manchester Computing Centre by the Census Dissemination Unit using the SASPAC91 computer package.¹¹ For practices with branch surgeries, we used the mean Townsend index. In addition, we calculated the proportion of Asian patients (residents of Indian, Pakistani, Bangladeshi, and other ethnic groups from the Indian subcontinent) and the social class (mainly non-manual versus manual or equal) of all residents in each ward.¹²

Data from the Prescription Pricing Authority

These were the total number of items, net ingredient cost, and the percentage of drugs that were generic for all categories of drugs listed in the *British National Formulary* that were dispensed between 1 April 1993 and 31 March 1994.¹³

Prescribing outcome measures

We used the following prescribing variables as the outcome measures:

- Cost per cost based ASTRO-PU⁹
- Number of items per item based ASTRO-PU⁹
- Percentage of all drugs prescribed that were generic formulations.

Table 1 Corrected percentage response to questionnaire by 218 single handed general practitioners according to ethnicity and country of qualification

Group	% Response
1 Asian, qualified in United Kingdom	73.7 (42/57)
2 White, qualified in United Kingdom	73.4 (58/79)
3 Asian, qualified in Indian subcontinent	67.1 (55/82)
Total	71.1 (155/218)

Statistical analysis

We entered data from all four sources into a database and analysed them using SPSS for Windows.¹⁴ We compared the groups using χ^2 tests, analysis of variance, and Kruskal-Wallis H tests, and we used Bonferroni correction to adjust for multiple comparisons.

To adjust for potential confounding, we developed parsimonious models for each of the outcome variables using analysis of covariance,¹⁵ and we examined assumptions underlying the model using standard residual plots and Levene's test for homogeneity of variances.¹⁴

All statistical tests were performed with and without outliers, and we found no difference. We identified and included the following variables in the model: doctors' age, sex, country and year of qualification, length of time in current practice and general practice, MRCGP diploma, and number of consultations a year; status of practice (dispensing, fundholding, or training); social class of patients; Townsend index; percentage of patients attracting deprivation payments; and percentage of patients belonging to an Asian ethnic group.

We chose the Townsend score as a proxy for morbidity because it has been shown to perform well when explaining variation in a range of health measures and it adheres closely to the concept of material deprivation.¹⁶ We used the proportion of patients attracting deprivation payments as a proxy measure for deprivation: despite criticism of the

Jarman score on methodological grounds, this was a pragmatic decision as general practitioners are paid for patients who reside in deprived wards.¹⁷

Results

Characteristics of responders and non-responders

Table 1 shows the numbers of general practitioners who responded to our questionnaire. Using two sample *t* tests, we found no difference between the doctors who responded and the non-responders in terms of age (mean difference -1.7 (95% confidence interval -4.5 to 0.9)), Townsend score for the practice ward (mean difference 0.6 (-0.6 to 1.8)), and sex (χ^2 test, *df* = 1, *P* = 0.87). Compared with all general practitioners in England, the responders were older, were more likely to be male, practised in more deprived areas, and had larger list sizes (table 2).

Characteristics of responders by group

Table 3 shows that Asian doctors who qualified in the United Kingdom (group 1) were significantly younger than doctors in the other groups and had a higher proportion of patients who were from deprived wards. There was no difference between the three groups in the proportion of female doctors and total list size.

Prescribing practice

Table 4 shows the mean prescribing variables for the three groups before and after adjustment for confounding factors. There were no significant differences between the groups for total cost (cost per ASTRO-PU), frequency of prescribing (number of items per ASTRO-PU), and rate of prescribing of generic drugs.

Discussion

Doctors' ethnicity and country of qualification

Our study shows that, for all the drugs issued, the Asian doctors who had qualified in the Indian subcontinent did not issue significantly more items, more expensive items, or fewer generic drugs than Asian and white doctors who had qualified in the United Kingdom. This refutes the myth of Asian doctors being high cost prescribers.

It is hardly surprising that, for those Asian doctors who qualified from British medical schools, their ethnicity had no effect on their prescribing. The medical school of qualification, and hence country, would be more likely to affect prescribing through secondary socialisation, which occurs over five to six years.^{2 18} Socialisation through medical school, specialty, and practising in a group practice changes prescribing behaviour.¹⁹

The models we used in this study explained only a small part of the variation in prescribing patterns that we found (23-37%): a large part was due to other, unmeasured factors. This is in line with a study that used routine statistics on general practices in one family health services authority: the authors found that their model explained only 42% of prescribing costs.²⁰ It must be emphasised that, as we did not study appropriateness, the differing levels of prescribing by general practitioners might have been appropriate for their patients.

Table 2 Characteristics of single handed general practitioners who responded to questionnaire and those who did not respond, and of all general practitioner principals in England. (Values are mean (SD) unless stated otherwise)

	Responders (n=155)	Non-responders (n=63)	All principals in England*	
			Single handed	All
Age (years)	47.3 (7.9)	49.02 (9.6)	50.2 (7.9)	43.79 (89.8)
Sex ratio (male: female)	6.4:1	6.9:1	5.9:1	2.8:1
Practice ward:				
Townsend index	2.9 (4.1)	2.3 (4.1)		0
List size	2261 (673)		2133 (893)†	1915

*Data from Department of Health for 1 April 1993.

†Data from Prescription Pricing Authority for December 1993.

Table 3 Characteristics of 155 single handed general practitioners who responded to questionnaire by ethnicity and country of qualification

	Group 1 (n=42)*	Group 2 (n=58)†	Group 3 (n=55)‡	Difference (P value)
Mean (SD) age (years)	42.2 (7.1)	47.1 (8.4)	51.3 (5.6)	<0.0001§
Sex ratio (male: female)	5:1	8.7:1	5.9:1	0.64¶
Mean (SD) list size	2274 (574)	2336 (687)	2174 (728)	0.44§
Median % of patients attracting deprivation payments	0.34	0	1.10	0.02**

*Asian, qualified in United Kingdom.

†White, qualified in United Kingdom.

‡Asian, qualified in Indian subcontinent.

§Analysis of variance. ¶ χ^2 test, *df*=2. **Kruskal-Wallis H test, $\chi^2=7.41$, *df*=2.

Table 4 Prescribing variables of 155 single handed general practitioners who responded to questionnaire by ethnicity and country of qualification. (Values are means (95% CI) unless stated otherwise)

Variable	Group 1 (n=42)*	Group 2 (n=58)†	Group 3 (n=55)‡	Difference	
				Adjusted R ²	P value
Prescribing cost (cost per ASTRO-PU)					
Unadjusted	16.61 (15.29 to 17.93)	17.11 (16.05 to 18.16)	17.64 (16.52 to 18.73)		0.46
Adjusted§	16.58 (6.39 to 26.77)	17.31 (6.92 to 27.69)	17.80 (7.22 to 28.38)	0.33	0.55
Prescribing frequency (No of items per ASTRO-PU)					
Unadjusted	6.61 (5.98 to 7.25)	6.37 (5.90 to 6.84)	7.96 (7.27 to 8.65)		0.0003
Adjusted§	6.58 (4.60 to 8.40)	6.45 (4.70 to 8.30)	7.89 (6.16 to 9.64)	0.37	0.34
Generic prescribing (% of drugs that were generic)					
Unadjusted	46.26 (42.73 to 49.78)	48.47 (45.07 to 51.87)	43.49 (40.97 to 46.02)		0.07
Adjusted§	44.44 (38.95 to 49.93)	47.41 (42.12 to 52.70)	44.04 (38.75 to 49.33)	0.23	0.37

*Asian, qualified in United Kingdom.

†White, qualified in United Kingdom.

‡Asian, qualified in Indian subcontinent.

§Adjusted for appropriate variables mentioned in the text.

This is the first study which specifically addresses the effect of doctors' ethnicity and country of qualification on prescribing patterns. Other studies have found that doctors who were foreign trained were high cost and high volume prescribers.²⁻⁴ These studies did not, however, account for other confounding factors, particularly patient demography.

Limitations of study

Chance

We calculated the power of this study from the number of issued items as the outcome measure. After the study, we found that power calculation for all other outcome measures, such as cost and rate of generic prescribing, was above 90%. This indicates that chance is an unlikely explanation for these results.

Bias

The results could have arisen from inaccuracies in list sizes—that is, more patients listed on a health authority register than were actually registered with the general practice.²¹ Such list inflation could reduce cost of prescribing per patient in inner city areas so that comparison with other practices is invalid.⁵ However, we attempted to account for all patients by using a unique program to extract data from health authority computers (FHS Computer Unit, Exeter). Furthermore, the general practice contract, which needs accurate denominators for payment for achieving certain targets, has probably reduced inaccuracies of health authority registers. The increasing use of computers within general practice²² may also have contributed to increased accuracy of practice registers of patients' age and sex, from which patient information is passed onto the responsible health authority.

Using data from the 1991 census, we estimated the proportion of Asian residents and social class in each ward to minimise bias, but the census data contain errors because of underenumeration.²³ Also, because of the selective way in which patients choose practices, errors are present in census derived variables for general practices.²⁴ However, these derived variables are currently the best measures that are available of the socioeconomic characteristics of practice populations.²⁵

Confounding

Confounding variables might be an alternative explanation for the results. We identified a number of

factors from the literature, which, where feasible, we measured and included in the analysis. These adjusted models still explained little of the variation in the prescribing dependent variables (17-32%), with the rest due to other factors. This should be interpreted with caution as it was not the objective of this study to determine which factors explain variation in prescribing outcomes.

Validity and generalisability

The excellent response rate (71%) from the general practitioners is worthy of comment—single handed general practitioners are generally less likely to respond to questionnaires.⁸ All non-responders were accounted for and did not differ in terms of age, sex, or practice ward deprivation from the other single handed general practitioners. As single handed practitioners are different from those that are in partnerships,²⁶ these results cannot be generalised to other general practitioners.

Conclusions

This study refutes beliefs that Asian doctors are high volume and high cost prescribers. We hope that this lays another myth to rest. It is important to bear in mind that the issuing of a prescription does not occur in a vacuum: it involves a complex interplay of factors, many of which have not been measured in this study.

Key messages

- There is anecdotal evidence that doctors from the Indian subcontinent issue more prescriptions and more expensive items that do non-Asian doctors
- We examined this claim by means of a linkage study using data from 155 single handed general practitioners and routine data sources
- There was no significant difference between Asian doctors qualified in the Indian subcontinent and British trained Asian and white doctors for prescribing costs, the number of items prescribed, and the percentage prescribing of generic drugs
- These results refute the myth that Asian doctors are high volume and high cost prescribers

We do not yet know how the prescribing patterns of different groups of doctors vary with different groups of patients in different settings.

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Two doctors who changed my practice We can all try that little bit harder

It had been a long night, the first stage of labour had been difficult, the second stage seemed somehow worse. As quickly as the epidural had taken its effect it started to ebb. My wife had reached the end of her tether. In view of the fact we were both doctors the senior registrar was called.

Minutes later I heard footsteps down the corridor. He knocked on the door and paused momentarily before entering. Despite the early hours of the morning he was clean shaven and looked extremely presentable; he introduced himself with a smile and calmly told us what he was going to do. He told us not to worry, that everything was going to be all right. There was no hint of sarcasm, stifled yawns, arrogance, or signs of annoyance for being disturbed for what should really be a more junior procedure. The anaesthetist quickly topped up the epidural and minutes later my beautiful daughter was born by forceps. The senior registrar closed the episiotomy, offered congratulations to everyone, and left quietly for a few more hours' sleep.

The following morning, after transfer to the maternity ward, the door to the room opened without a knock. Luckily my wife had just finished breastfeeding and was no longer exposed. The paediatrician entered the room. She didn't bother to introduce herself, or tell us what she was going to do. She grudgingly picked Amy up and conducted an examination, making it blatantly obvious that she would rather be somewhere else. I asked her if she had many babies to see, and without making any attempt at eye contact she sighed "Hundreds." I couldn't possibly tell her that we were both doctors and more senior than she was. Minutes later she said everything was okay and left without further comment.

The experience has helped me in my own practice. Although you can never be the perfect doctor you can always try that little bit harder. Now when I'm woken in the early hours I try and remember that first doctor. I wash my face and make an effort to control my hair, brush my teeth, and put on some clean theatre blues. If the patient is in a room I always knock on the door or if behind a curtain I inquire if I can enter. I look the patient and every relative in the eyes before introducing myself with a smile and a handshake. I try and remember that although it may be the sixth appendicitis that day it is the first time for the patient and he or she is scared and anxious.

A smiling, confident, courteous, and well presented doctor can alleviate many fears and create a strong relationship between doctor and patient. Try it for yourself. When you step outside the curtain hang around for a second or two and listen to the relatives' comments; they'll let you know if you've done the job properly.

I thank both doctors concerned, the first for reminding me how to do it and the second how not to.

James Francombe, *surgical registrar, Liverpool*

We welcome filler articles up to 600 words on topics such as *A memorable patient*, *A paper that changed my practice*, *My most unfortunate mistake*, or any other piece conveying instruction, pathos, or humour. If possible the article should be supplied on a disk. Permission is needed from the patient or a relative if an identifiable patient is referred to. We also welcome contributions for "Endpieces," consisting of quotations of up to 80 words (but most are considerably shorter) from any source, ancient or modern, which have appealed to the reader.