

# How do patients referred to neurologists for headache differ from those managed in primary care?

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## ABSTRACT

### Background

Headache is the neurological symptom most frequently presented to GPs and referred to neurologists, but little is known about how referred patients differ from patients managed by GPs.

### Aim

To describe and compare headache patients managed in primary care with those referred to neurologists.

### Design of study

Prospective study.

### Setting

Eighteen general practices in south-east England.

### Method

This study examined 488 eligible patients consulting GPs with primary headache over 7 weeks and 81 patients referred to neurologists over 1 year. Headache disability was measured by the Migraine Disability Assessment Score, headache impact by the Headache Impact Test, emotional distress by the Hospital Anxiety and Depression Scale and illness perception was assessed using the Illness Perception Questionnaire.

### Results

Participants were 303 patients who agreed to participate. Both groups reported severe disability and very severe impact on functioning. Referred patients consulted more frequently than those not referred in the 3 months before referral ( $P = 0.003$ ). There was no significant difference between GP-managed and referred groups in mean headache disability, impact, anxiety, depression, or satisfaction with care. The referred group were more likely to link an increased number of symptoms to their headaches ( $P = 0.01$ ), to have stronger emotional representations of their headaches ( $P = 0.006$ ), to worry more ( $P = 0.001$ ), and were made anxious by their headache symptoms ( $P = 0.044$ ).

### Conclusion

Patients who consult for headache experience severe disability and impact, and up to a third report anxiety and/or depression. Referral is not related to clinical severity of headaches, but is associated with higher consultation frequency and patients' anxiety and concern about their headache symptoms.

### Keywords

headache; migraine disorders; neurology; primary health care; referral and consultation.

## INTRODUCTION

Headache is the most common neurological condition presented to GPs<sup>1</sup> and to neurologists, accounting for up to a third of new specialist appointments in the UK.<sup>2</sup> The social cost of headache is thought to be considerable, but there is no recent UK estimate.<sup>3</sup> Access to neurology specialists is limited in the UK as, relative to the population, there are ten times more neurologists in other western European countries compared with the UK.<sup>4</sup> Neurologists see patients mainly in hospital outpatient departments and spend a third of their new-appointment time on headache conditions, which reduces opportunities to see new referrals for other neurological conditions.

Future changes in government policy and specialist practice could increase demand for specialist advice on headache. For example, UK government policy is to increase patient choice, and referral is often at the patient's request.<sup>5,6</sup> One third of patients referred to specialists for headache are currently seen by other physicians in the UK,<sup>7</sup> but newly qualifying consultants are not general physicians: they choose to sub-specialise.

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Headache referrals are therefore increasingly likely to be directed, or redirected, to neurologists.

GPs traditionally provide reassurance to patients presenting with headache, and occasionally refer them for a specialist opinion and investigation.<sup>8</sup> Some patients have medically unexplained symptoms with high anxiety and depression levels.<sup>9,10</sup> Comorbid psychological distress may be associated with the finding that a third of patients with headache report disappointment with neurology consultations.<sup>11</sup> Patients with headache who have complex needs may benefit from additional services, for example, those provided by GPs with special training in neurology with direct access to tests including scans where necessary, and other therapists where symptoms are persistent, unexplained, or associated with psychological distress.

To inform revision of current approaches to the management of headache,<sup>12</sup> the aim of this study was to describe the usual pattern of referral by GPs, the social and functional characteristics of patients managed in general practice and those referred, and patients' direct service and lost employment costs. In addition, this study aimed to compare the social and functional characteristics of patients with primary headache managed in general practice with those referred to neurologists.

## METHOD

Eighteen practices with 150 GPs participated in the study. They were located in the south Thames region of England in metropolitan, suburban, and semi-rural areas. The population of registered patients aged 18–75 years was approximately 141 100. To recruit prospective patients managed in primary care without referral, a designated person at each practice identified patients who consulted their GPs for headache as a main problem (classified according to predefined Read Codes) for a period of 7 weeks, with phased practice recruitment throughout the year (September 2002 to August 2003). All 23 available Read Codes including the word 'headache' were included in the search as well as all 11 including the word 'migraine' except for 115E ('no history of migraine'), unless it was accompanied by another headache Read Code.

Every week the researchers collected details for identified patients from each practice. To recruit referred patients, the administrator at each practice identified all patients who consulted for headaches and were referred to a neurologist over the whole year. The reason for this mixed method was to obtain a feasible sample size in the context of evidence that consultation for headache is exceedingly common compared with referral. It was estimated that,

## *How this fits in*

Headache is the neurological symptom most frequently presented to GPs and referred to neurologists, but little is known about how referred patients differ from those managed by GPs. Patients with headache seen by GPs and neurologists have severe symptoms and disability, but this is not increased in the 2% of patients referred. A third of patients with headache seen by GPs and neurologists have 'case' levels of anxiety or depression, but the 2% of referred patients do not experience more severe psychological distress. Patients with headache who are referred consult more frequently, attribute more symptoms to their headache, have stronger emotional representations, and are more worried and made anxious by their headache symptoms.

provided there was no seasonal bias, this strategy would recruit a large enough sample size of patients consulting a doctor during 13.5% of the study year (7 weeks) and a smaller group referred for headache over 1 year. The planned sample size was 260 consulting patients and 54 referred patients, giving 90% power to detect a difference of two points in Hospital Anxiety and Depression subscales and one point in the Illness Perception Questionnaire (IPQ) subscales.

Details of patients identified by administrators from each practice were collected. Exclusion criteria were secondary causes for headache, such as subarachnoid haemorrhage; other severe medical illness such as terminal cancer; psychosis; learning disability and/or cognitive deficit of a severity, such that they could not complete questionnaires; and not being able to read and/or write English. Informed written consent was obtained.

### **Baseline assessment**

Patients identified as having consulted or who had been referred for headaches management were invited to meet with a research worker at their own general practice and assessed using a self-report booklet of baseline questionnaires.

**Measures.** Migraine Disability Assessment Score (MIDAS) is a valid and reliable five-item questionnaire requiring responses to five questions about disability associated with headache in the previous 3 months. It examines the effect of migraine on work, chores, and social activities.<sup>13</sup> Responses to each question are scaled in units of days and reported as either the number of days missed (from work or school, household work, and non-work activities) or the number of days when productivity was reduced by half or more (from work or school, and household work) in the past 3 months. In addition MIDAS assesses severity of headache and days affected. Scores are graded as follows: 0–5 describes minimal

or infrequent disability; 6–10, mild or infrequent disability; 11–20, moderate disability, and  $\geq 21$ , severe disability.

The Headache Impact Test (HIT)–6 is a valid and reliable six-item questionnaire designed to assess the impact that headaches have on the ability to function.<sup>14</sup> It measures the impact of headache disorders on the person's ability to undertake everyday activities (including work), headache-related pain, tiredness, poor concentration, and feelings of irritability. It includes disability, but is a broad concept incorporating quality-of-life measures. Each question is on a five-point Likert scale. The six items are summed (possible range 36–78), and are each measured on a scale anchored at never (6) and always (13). A score  $>56$  is considered clinically important. Impact scores can be graded where a score  $\leq 49$  describes little or no impact; 50–55, some impact; 56–59, substantial impact; or  $\geq 60$  severe impact.

The Hospital Anxiety and Depression Scale (HADS) measures anxiety and depression on scales of 0–21; clinical importance or 'caseness' is considered for scores  $>10$  on each scale. The HADS has adequate sensitivity and predictive power for clinical anxiety and depression in the community context.<sup>15</sup> Beliefs or attributions about the cause of symptoms were measured on a five-point scale where a score of 1 denotes 'my problem is physical' and a score of 5 denotes 'my problem is psychological'.<sup>16</sup> The scale was dichotomised for analysis to 'purely or mainly physical' (1–2) and 'combined physical and psychological or purely psychological' (3–5).

The revised IPQ (IPQ-R)<sup>17</sup> assesses nine key components of patients' perceptions of their illness. The measure has been validated and used in a range of chronic illnesses including asthma, psoriasis, and rheumatoid arthritis.<sup>17</sup> Responders indicated:

- which symptoms, of a list of 26 items, they experienced and considered to be connected with their headaches (illness identity);
- what they considered to be the cause of their headaches from a list of 20 possible causes (rated from 'strongly disagree' to 'strongly agree' and then dichotomised);
- how they rated their beliefs about the perceived likely duration of their headaches, both from an acute/chronic and a cyclical perspective (timeline acute/chronic, timeline cyclical);
- the severity of the consequences and expected effects on themselves and those around them (consequences);
- the extent to which they believed they or their treatments could control their headaches (personal control, treatment control);

- the extent to which their headaches made sense to them (illness coherence); and
- their emotional response to their headaches (emotional representations).

Patient satisfaction with the treatment provided by their general practice was measured using one item from a reliable questionnaire, which was developed for use in primary care.<sup>18</sup> Patients were asked to report whether they agreed that they were satisfied with the treatment provided by their general practice. This item scored from 1 ('strongly disagree') to 5 ('strongly agree').

### **GP contact rates, lost employment, and costs**

Contacts with GPs in the 3 months before assessment were recorded, as were complete days lost from work (measured by question 1 of the MIDAS). Costs were attached to the GP contact rates using a nationally applicable unit cost of £19.<sup>19</sup> Lost employment costs were estimated by multiplying the number of complete lost work days by national sex-specific wage rates.<sup>20</sup>

### **Data analysis**

The analysis was conducted using standard methods. Means of continuous measures with normal distributions were compared using linear regression. Questions with yes/no or agree/disagree outcomes were compared using logistic regression. Ordered category scales were summarised using medians and quartiles and compared using linear regression as above.

Results are expressed as estimates with 95% confidence intervals (CI). In all cases, estimates were corrected for sex and age (in decades) and robust standard errors were used to correct for clustering by GP. Differences in the number and cost of GP contacts and lost work days were compared using bootstrapping because of potential skewedness in the data. All analysis was performed using Stata version 8.2 (StataCorp, Texas).

## **RESULTS**

### **Recruitment and response rates**

Overall, practices identified 626 patients who had consulted a GP for headache ( $n = 533$ ) and/or consulted a GP and had been referred ( $n = 93$ ). Of these, 569 met recruitment criteria: 488 in the group recruited during the 7-week practice recruitment period who consulted and were not referred (consulting group) and 81 recruited in the 1-year referral identification period who were referred to specialists (referred group). The remaining 57 patients did not meet recruitment criteria for the following reasons: 36 had moved out of the area, 17

**Table 1. Clinical characteristics by patient group.**

	Headache consultants			Referred to neurologist			OR (95% CI) <sup>a</sup>	P-value <sup>a</sup>
	Total n	n	%	Total n	n	%		
Male	488	141	28.9	81	29	35.8	1.38 (0.90 to 2.10)	0.14
	Total n	mean	SD	Total n	mean	SD	Mean difference (95% CI) <sup>a</sup>	P-value <sup>a</sup>
Age	488	38.9	13.9	81	40.9	13.3	1.90 (−1.27 to 5.06)	0.24
MIDAS <sup>b</sup>	243	22.9	30.5	43	28.4	36.8	5.48 (−6.07 to 17.03)	0.35
HIT-6	237	61.3	7.9	42	61.9	8.8	1.12 (−0.86 to 3.10)	0.27
Anxiety (HADS)	241	7.6	4.4	42	6.9	4.7	−0.80 (−2.13 to 0.53)	0.24
Depression (HADS)	238	4.5	3.7	44	4.8	3.3	0.12 (−1.11 to 1.36)	0.85
Caseness	Total n	n	%	Total n	n	%	OR (95% CI) <sup>a</sup>	P-value <sup>a</sup>
Anxiety (HADS)	241	66	27.4	42	11	26.2	0.88 (0.52 to 1.48)	0.63
Depression (HADS)	238	17	7.1	44	4	9.1	1.13 (0.17 to 7.66)	0.89
Anxiety or depression	237	70	29.5	42	11	26.2	0.79 (0.46 to 1.35)	0.39
MIDAS	243	129	53.1	43	25	58.1	1.31 (0.58 to 2.94)	0.51
(moderate/severe)								
HIT-6 (substantial/ very severe impact)	237	191	80.6	42	33	78.6	1.06 (0.65 to 1.73)	0.85

<sup>a</sup>Estimates adjusted for age and sex; CIs and P-values adjusted for clustering by GP. <sup>b</sup>Median (interquartile range) for MIDAS: 12 (3–28) for consultants, 15 (2–38) for referred. HADS = Hospital Anxiety and Depression Scale. HIT = Headache Impact Test. MIDAS = Migraine Disability Assessment Score. OR = odds ratio.

did not speak English, three had learning difficulties or had serious medical problems, such as stroke or subarachnoid haemorrhage, and one had died.

Mean age of the 569 patients who were eligible was 39 years, and of these 399 (70%) were women. Eligible patients were invited to enter the study and 303 (53%) consented. Of the 303, 255 were consulting patients and 48 were referred patients. Patients agreeing to participate were significantly older than those who declined the offer (mean age 41 years versus 36 years,  $P < 0.001$ ), and men were less often recruited (79/170; 46%) compared with women (221/399; 56%,  $P = 0.035$ ).

#### Demographic differences between referred and non-referred patients

There was no significant difference between the mean age of patients in the consulting and referred groups (38.9 and 40.9 years respectively; Table 1). Proportionately more men were recruited to the study from the referred group: 141/488 (28.9%) and 29/81 (35.8%). Although adjusted for age and sex, this difference was not statistically significant.

#### The impact of headache on functioning and disability

Severe disability as assessed by MIDAS (score  $\geq 21$ ) was not significantly greater in the referred patients, with mean scores of 22.9 in the consulting group and 28.4 in the referred group (mean difference = 5.48; 95% CI = −6.07 to 17.03;  $P = 0.35$ ). Categorising MIDAS scores into minimal, mild, moderate, and severe subcategories also showed

no significant difference between groups.

Using HIT-6, mean scores for headache were compatible with very severe impact (score  $\geq 56$ ) in both groups (referred = 61.9 and consulting = 61.3). Headache impact was not significantly different between the groups (Table 1).

#### Psychological distress

Nearly 30% of all patients were estimated to have either anxiety or depression or both of these conditions, as assessed by a score of  $\geq 10$  on the HADS. Patients were three times more likely to be anxious than depressed. Patients in the group referred to specialists did not have significantly different mean anxiety and depression scores from those managed in general practice, nor was there a significant difference in estimated caseness between the two groups (Table 1).

#### Patients' attributions about their headaches

Referred patients were more likely to state that their illness had a physical cause (67 versus 51%). This difference was not statistically significant. To investigate in greater depth whether there were differences between the consulting and referred groups, the IPQ, which measures patients' beliefs about their headaches, was analysed (Table 2). Referred patients had significantly higher scores on the component 'emotional representations', which measures patients' emotional responses to their symptoms (adjusted difference 0.34, CI = 0.10 to 0.59,  $P = 0.006$ ). Six individual items of the emotional representation subscale were analysed and it was

**Table 2. Psychological characteristics by patient group.**

	Headache consultants			Referred to neurologist			OR (95% CI) <sup>a</sup>	P-value <sup>a</sup>
	Total n	n	%	Total n	n	%		
Illness beliefs								
Purely or mainly physical	240	123	51	45	30	67	1.91 (0.86 to 4.23)	0.11
Beliefs about headaches (IPQ-R)								
	n	mean	SD	n	mean	SD	Mean difference (95% CI) <sup>1</sup>	P-value <sup>a</sup>
Timeline (acute)	232	20.0	0.3	40	20.7	0.8	0.10 (−0.27 to 0.48)	0.590
Timeline (cyclic)	231	12.3	0.2	41	12.4	0.4	0.09 (−0.11 to 0.28)	0.380
Consequences	237	17.9	0.3	40	19.2	0.8	0.23 (−0.03 to 0.48)	0.079
Personal control	227	18.3	0.3	41	18.8	0.6	0.09 (−0.12 to 0.30)	0.390
Treatment control	229	16.6	0.2	40	17.4	0.5	0.16 (−0.03 to 0.35)	0.098
Illness coherence	228	16.4	0.3	39	16.5	0.8	0.06 (−0.30 to 0.42)	0.743
Emotional representation	237	17.8	0.3	41	19.7	0.7	0.34 (0.10 to 0.59)	0.006
Emotional representations (IPQ-R)								
	n	median	IQR	n	median	IQR	Mean difference (95% CI) <sup>a</sup>	P-value <sup>a</sup>
I get depressed when I think about my headaches	239	3	2–4	41	3	2–4	0.32 (−0.08 to 0.72)	0.120
When I think about my headaches I get upset	241	2	2–4	43	3	2–4	0.38 (−0.03 to 0.78)	0.068
My headaches make me feel angry	242	3	2–4	43	3	2–4	−0.01 (−0.48 to 0.46)	0.968
My headaches do not worry me <sup>b</sup>	241	4	3–4	43	4	4–5	0.44 (0.26 to 0.63)	<0.001
Having headaches makes me feel anxious	240	3	2–4	43	4	3–4	0.30 (0.01 to 0.60)	0.044
My headaches make me feel afraid	239	2	2–4	43	3	2–4	0.43 (−0.03 to 0.88)	0.064
Illness identity (IPQ-R)								
Headache-related symptoms	232	7.1	4.91	40	8.8	5.0	1.84 (0.42 to 3.27)	0.011

<sup>a</sup>Estimates adjusted for age and sex; CIs and P-values adjusted for clustering by GP. <sup>b</sup>Scale reversed so that higher values indicate greater emotional response. IPQ-R = Illness Perception Questionnaire (revised). IQR = interquartile range. OR = odds ratios.

found that referred patients reported being significantly more worried about ( $P \leq 0.001$ ) and were made anxious by their headaches ( $P = 0.044$ ). It was mainly these items that explained the difference in the emotional representations scores between the two groups.

The referred group also reported significantly more symptoms related to their headache (8.8 compared to 7.1; difference 1.8, 95% CI = 0.42 to 3.27,  $P = 0.011$ ) (Table 2).

Of the 20 causes included in the IPQ, four were related to referral status after adjusting for age and sex of patient. Patients were less likely to be referred if they blamed family problems or worries for their headache (14 versus 33%, odds ratio [OR] = 0.32, 95% CI = 0.20 to 0.53,  $P < 0.001$ ); overwork (23 versus 39%, OR = 0.50, 95% CI = 0.28 to 0.89,  $P = 0.018$ ); or altered immunity (2 versus 14%, OR = 0.15, 95% CI = 0.04 to 0.63,  $P = 0.010$ ). There was a suggestion that patients were more likely to be referred if they attributed their headaches to smoking (18% of referred patients versus 8% of the non-referred group; OR = 2.79, 95% CI = 1.11 to 7.01,  $P = 0.029$ ). The other 16 possible causes showed no such relationship.

### Consultation rate

The mean number of consultations with a GP for all patients for any reason over a 6-month period (3 months before and 3 months after entry to the study) was 3.79 (standard deviation [SD] = 3.15).

Women consulted significantly more frequently (mean = 4.03; SD = 3.22) than men (mean = 3.12 consultations; SD = 2.83) (mean difference = 0.91; CI = 0.102 to 1.72;  $P = 0.027$ ).

Patients who consulted a GP and who were referred to a neurologist consulted their GP significantly more frequently for headache in the 3 months before being referred to the study (Table 3); the difference between groups was reduced but remained significant when all reasons for consultation were considered (Table 3). In 6 months, consisting of 3 months before and 3 months following a consultation that led to referral to a neurologist, patients consulted their GP significantly more frequently for headaches.

### Satisfaction with consultations

Median level of satisfaction was 4 (interquartile range = 3–4) on a scale anchored at 1–5. On average patients agreed that they were satisfied with the care they received from their general practice; there was no difference in patients' satisfaction with the care received from their GPs between patients who consulted a GP and were not referred, and referred patients ( $P = 0.74$ ) (Table 3).

### Economic impact

Due to the higher consulting frequency in the group of patients who consulted a GP and who were referred to a neurologist, the mean cost of seeing a GP for all reasons in the 3 months before referral was



**Table 3. Consultations, work absence and satisfaction by patient group.**

	Headache consultants			Referred to neurologist			Mean difference (95% CI) <sup>a</sup>	P-value <sup>a</sup>
	n	mean	SD	n	mean	SD		
Number of headache consultations								
3 months before	254	0.36	0.78	47	0.91	1.16	0.54 (0.18 to 0.90)	0.003
3 months after	254	0.48	0.86	47	0.89	1.52	0.43 (−0.03 to 0.88)	0.066
6 months (3 months before/3 months after)	254	0.84	0.84	47	1.81	2.36	0.97 (0.25 to 1.69)	0.008
Number of consultations for all causes								
3 months before	254	1.70	1.75	47	2.32	2.22	0.72 (0.04 to 1.40)	0.037
3 months after	254	1.89	1.63	47	2.53	3.01	0.71 (−0.20 to 1.63)	0.127
6 months (3 months before/3 months after)	254	3.59	2.73	47	4.85	4.73	1.43 (−0.01 to 2.87)	0.052
Number of days absent from work								
In last 3 months	227	2.88	7.47	37	3.73	9.52	0.85 (−1.43 to 3.93)	0.560
Satisfaction with treatment from GP	240	3.55	1.05	44	3.50	1.15	−0.07 (−0.46 to 0.33)	0.740

<sup>a</sup>Estimates adjusted for age and sex; CIs and P-values adjusted for clustering by GP.

significantly greater in this group (£44 versus £32; 95% CI = £2 to 28) (Table 4). Mean costs for headache-specific consultations were £7 in the non-referred group versus £17 in the referred group (95% CI = £4 to 18).

The number of patients who reported they had lost days due to their headaches was 101 (39.6%) in the non-referred group and 16 (33.3%) in the referred group. The mean number of lost work days was greater in the referred group, but not significantly (Table 3). The mean (SD) costs of lost employment were £246 (£667) in the non-referred group and £316 (£783) in the group referred to a neurologist (95% CI = −£163 to 382), because those who had time off work in the referred group, lost more days than those in the consulting group (8.6 versus 6.5).

## DISCUSSION

### Summary of main findings

Headache is one of the most frequent symptoms reported in the community.<sup>21</sup> Adults who consulted for headache were likely to be of working age, and three-quarters were female. Their symptoms generally had a substantial impact and caused severe disability. Twenty-nine per cent had clinically important levels of anxiety or depression, with anxiety symptoms being more frequently a problem than symptoms of depression. Mean anxiety and depression scores were higher than expected for consultants in general practice, and comparable to patients with medically unexplained symptoms.<sup>22</sup> Over half of headache consultants perceived their problem as physical. Referred patients linked more symptoms to their headache, and had stronger emotional representations, being more worried about and made more anxious by their headache symptoms. Referred patients consulted more frequently than the 98% of patients managed without

referral to a neurologist. By extrapolating and weighting for the proportion of women consulting it was determined that headache consultants (non-referred and referred) attend their GP more frequently each year (6.7) than average in the UK (5.0).<sup>23</sup>

### Strengths and limitations of the study

Due to the parallel group design of this study it is possible that there were differences between the groups due to the different time periods for patient recruitment. However, the most obvious sources of differences were controlled for during recruitment: analysis showed no seasonality and the same standardised instruments were administered in the same way for both groups. The researchers worked closely with practices during recruitment. Clear and consistently applied definitions were used to select patients. There was also a higher proportion of men recruited to the referred group, and subsequent analyses were therefore adjusted by age and sex. However, those taking part in this study may not be representative of all patients with headache, most of whom do not consult a doctor.

### Comparison with existing literature

A definitive review by Roland and Coulter called for more studies of referral to specialists.<sup>24</sup> From the

**Table 4. Comparison of mean economic costs between headache consultants and patients referred to neurologists (2003–2004).**

	Cost, £		
	Headache consultants (SD)	Referred to neurologist (SD)	Bootstrapped 95% CI
GP (all reasons)	32 (33)	44 (42)	2 to 28
GP (for headache)	7 (15)	17 (22)	4 to 18
Lost employment	246 (667)	316 (783)	−163 to 382

current study's data, and assuming an average practice list size of approximately 1700,<sup>25</sup> it is estimated that 26 out of 1000 patients each year report to their GP during their consultation that they experienced headaches, and of these 2.2% are referred to neurologists. This finding in a prospective study supports findings from a retrospective analysis of computer records on the General Practice Research Database (GPRD) with 13 million patients years of observation.<sup>7</sup> It was found that 2% of patients consulting a GP for headache were referred to neurologists, and 1% to other specialists.

Patients consulting doctors for headache reported severe functional impact and disability, but the referred group were not more severely affected in terms of self-assessed impact or disability. Twenty-nine per cent of patients reported symptoms of anxiety or depression, mostly anxiety, and patients referred to specialists were no more severely affected by psychological symptoms. Studies of patients in neurology clinics have found that anxiety, depression, and somatoform disorders are common, especially in patients with a lower organicity rating<sup>26,27</sup> and those with chronic daily headache.<sup>10</sup> Evidence reported by Carson *et al*,<sup>26</sup> and Page *et al*,<sup>10</sup> suggests that patients with headache and chronic daily headache have more psychological distress than those seen by neurologists for other conditions. However, the current study's evidence suggests that patients with headache referred to neurologists are not necessarily more distressed than those who consult a GP for headache and who are managed without referral.

The proportions of men and women referred were not significantly different. This prospectively-derived evidence is at variance with evidence from the GPRD, which showed that proportionately more men were referred to specialists.<sup>7</sup> Referred patients were more likely to report headache-related symptoms, to acknowledge that their headache worried them and made them anxious, and to consult more frequently for headache. Patients who were not referred were more likely to agree that their symptoms were due to family problems or worries. It is evident that in general practice eliciting patients' ideas, concerns, and expectations is important,<sup>28</sup> but this is the first quantitative study to show that patients' beliefs are associated with GPs' decisions to refer for headache. This has been explored further with interviews.<sup>6</sup>

#### Implications for future research

Differences in patients' perceptions and understanding may be important in determining management with referral, and suggest new approaches to therapy. A previous study examined the

beliefs of patients with fatigue and found that those managed in primary care were more likely to attribute their fatigue to a physical cause rather than a psychological one.<sup>29</sup> A study on fatigue demonstrated that referred patients were even more likely to believe their problem was physical.<sup>30</sup> Subsequently, the effectiveness of cognitive behaviour therapy (CBT), counselling, and graded exercise therapy for fatigue in primary care was examined.<sup>31</sup> There may be a parallel opportunity here, which justifies a trial of a CBT for headache in primary care.

It was estimated in this study that referred patients cost their practice an excess of just £12 before referral (although small, this difference was significant). Other data reveal that a referral itself requires an extra health service input of around £214 (that is, the cost of a first outpatient visit to a neurologist).<sup>32</sup> The impact on cost raises questions about the use of scarce resources and equity between patients. Until recently the commissioning of services in UK primary and secondary care was separated, and this did not encourage analysis of the alternative use and costs of services provided. In the light of this information, those who purchase health care may consider commissioning more training for all GPs who manage 97–98% of patients with headache; this could be provided by GPs with a special interest in headache.

Linking the current study's evidence with evidence from a nested qualitative study on GPs' reasons for headache referral,<sup>6</sup> healthcare commissioners may also evaluate the cost-effectiveness of open access to scanning services, particularly computer tomography. Finally, with quantitative and qualitative evidence that referral is linked to patients' worries and fears,<sup>6</sup> it is important to test other therapies, such as relaxation and CBT,<sup>33</sup> for patients with headache in the UK.

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#### Ethics committee

The study had ethical approval through the south-east Multi-Centre Research Ethics Committee (MREC01/01/032).

#### Competing interests

The authors have stated that there are none

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