

Prevalence and incidence of adults consulting for shoulder conditions in UK primary care; patterns of diagnosis and referral

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Objectives. To estimate the national prevalence and incidence of adults consulting for a shoulder condition and to investigate patterns of diagnosis, treatment, consultation and referral 3 yr after initial presentation.

Methods. Prevalence and incidence rates were estimated for 658469 patients aged 18 and over in the year 2000 using a primary care database, the IMS Disease Analyzer–Mediplus UK. A cohort of 9215 incident cases was followed-up prospectively for 3 yr beyond the initial consultation.

Results. The annual prevalence and incidence of people consulting for a shoulder condition was 2.36% [95% confidence interval (CI) 2.32–2.40%] and 1.47% (95% CI 1.44–1.50%), respectively. Prevalence increased linearly with age whilst incidence peaked at around 50 yr then remained static at around 2%. Around half of the incident cases consulted once only, while 13.6% were still consulting with a shoulder problem during the third year of follow-up. During the 3 yr following initial presentation, 22.4% of patients were referred to secondary care, 30.8% were prescribed non-steroidal anti-inflammatory drugs and 10.6% were given an injection by their general practitioner (GP). GPs tended to use a limited number of generalized codes when recording a diagnosis; just five of 426 possible Read codes relating to shoulder conditions accounted for 74.6% of the diagnoses of new cases recorded by GPs.

Conclusions. The prevalence of people consulting for shoulder problems in primary care is substantially lower than community-based estimates of shoulder pain. Most referrals occur within 3 months of initial presentation, but only a minority of patients are referred to orthopaedic specialists or rheumatologists. GPs may lack confidence in applying precise diagnoses to shoulder conditions.

KEY WORDS: Shoulder, Consultation, Prevalence, Incidence, Diagnosis, Referral, Primary care.

Shoulder problems are a significant cause of morbidity and disability in the general population. The overall prevalence of shoulder pain in the UK population is estimated to be around 7% [1], rising to 26% in the elderly [2]. Shoulder problems can lead to an inability to work and perform domestic and social activities, as well as leading to serious economic hardship for affected individuals and their families. During 1995, musculoskeletal disorders accounted for 9.9 million days of sick leave in the UK, of which 4.2 million (42%) were related to the upper limb and neck area [3].

Shoulder disorders constitute the third most common musculoskeletal presentation to general practice [4], yet many more patients do not consult their general practitioner (GP). Thus, in the UK, the estimated proportion seeking treatment is between 20 and 50% [2, 5, 6]. Outcomes are unimpressive in the medium term (1–2 yr following initial presentation) for the majority of people, with around 40–50% continuing to have symptoms and/or considerable functional impairment [7–9]. Symptoms are particularly persistent in elderly people, with most types of shoulder disorder still causing problems 3 yr after first presentation [2, 10].

There is a lack of information on patterns of referral for shoulder conditions in primary care in the UK. However, a Dutch study has reported a rate of 10% referral by GPs to a specialist [7,

and a US study has reported a rate of 41% referral by primary care physicians to a rheumatologist or orthopaedic surgeon [11], during the first year following presentation.

The aims of this paper are two-fold. The first is to estimate the national prevalence and incidence rates of consultation for shoulder problems using a UK primary care database, the IMS Disease Analyzer–Mediplus UK. The second is to investigate patterns of diagnosis, treatment, consulting behaviour and referral in cases identified from the database and followed-up for 3 yr after initial presentation.

Methods

The study obtained ethical approval from the Independent Scientific and Ethical Advisory Committee (ISEAC), IMS Health Ltd (no 2004/ISEAC/002).

Data

The Mediplus database has been collated by International Medical Statistics (IMS Health Ltd) since 1991 and uses the Torex-Meditel

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TABLE 1. Inclusion and exclusion criteria for the selection of cases

Inclusion criteria	Substring search of all level 4 and level 5 Read codes using the terms: 'shoulder', 'impingement', 'rotator cuff', 'adhesive capsulitis', 'painful arc', 'upper limb', 'upper arm', 'humerus', 'glenohumeral', 'scapul', 'clavic', 'acromi', 'glenoid', 'spinatus', 'teres', 'deltoid', 'brachial'. Search results: 832 Read codes
Exclusion criteria	Congenital abnormalities/codes describing morphology (e.g. upper limb spasticity) Conditions affecting the skin/surface of the shoulder (e.g. malignant melanoma, bruise) Accidental injuries (e.g. burns, crush injuries, nerve injuries) Birth or fetal related codes (e.g. dystocia) Codes pertaining to the circulatory system (e.g. arteriogram, venogram) Codes pertaining to the nervous system (e.g. radial nerve—upper arm) Cancers/malignant and benign neoplasms Amputations, replantations and transplantations Humerus codes not referring to the upper end/head of the humerus Upper arm codes not pertaining to disorders of the joint Shoulder pain from abdomen Mononeuropathy multiplex Results: 370 definite inclusion codes, 56 possible inclusion codes

System 5 computer package. It contains the anonymized medical records of approximately 1700000 patients from 211 general practices in the UK. The data in Mediplus are recorded individually by date, providing longitudinal records of patients for the period of time they remain within the database. Each item of data can be a diagnosis, symptom, referral, procedure or a prescription and these are coded using the Read code system [12], plus other codes employed by IMS.

In Mediplus chronic conditions are coded as 'Problems' and each time a treatment or procedure is performed that relates to the condition the problem code is repeated and linked to a 'Note' code that contains details about the treatment/procedure. In the analysis, great care was taken to only count shoulder consultations once for each date wherever multiple records related to the same problem occurred.

GPs are instructed to keep a record of every patient consultation, and entering a patient's details on the system is the only way of generating prescriptions, referrals, tests etc. so they are forced to enter a code. GP practices that use Mediplus have been fully electronic since the beginning of the study period and rely on these systems as their sole source of medical records, hence consultation data are likely to be complete. Fifty-eight practices introduced the five digit Read code system during 2002, allowing for a more precise diagnosis to be recorded, and had all their back data converted from the old four-digit Read format. All practices and all formats of Read code were included in the current analysis. The data are representative of the general UK population regarding age and sex and have a similar regional distribution, except that Scottish and Northern Irish practices are somewhat under-represented.

Study population

The prevalence and incidence of people consulting for a shoulder problem were calculated for the year 2000. Assuming that the true population prevalence is about 7% [1] and 20% of people consult [5], a sample size calculation had determined that about 588208 patients would be required to estimate the true rates to within less than 0.05% (with 90% power and 95% confidence).

The denominator included all patients who satisfied the following conditions: (i) aged 18 yr and over on 1 January 2000; (ii) still registered with a practice in the database on 31 December 2003 [in order to enable 3 yr follow-up of records beyond their first GP consultation for a shoulder problem ('index consultation')]; (iii) the existence of records 3 yr prior to the index consultation to determine whether the shoulder problem in 2000 was incident (patient had to be symptom free for at least 3 yr).

Any patient with a Read code between 1 January and 31 December 2000 that was indicative of a symptomatic shoulder, which also satisfied the inclusion and exclusion criteria listed in Table 1, was initially included as a case. The 426 Read codes identified as inclusion criteria were divided into 'definite' (370 codes) and 'possible' criteria (56 codes). Each case with only 'possible' criteria was considered for inclusion, on an individual basis, according to their other medical records within 6 months either side of the index consultation. Two assessors (LL and JD) reviewed the records independently and any disagreements were resolved by a third assessor (AC).

All cases identified were included in the annual prevalence rate. Annual incidence was estimated as the number of new cases during 2000 as a proportion of the population at risk at the start of 2000. Cases with records 3 yr prior to their index consultation containing a Read code from the list of 370 'definite' inclusion criteria were excluded from the incidence calculations. The cohort of incident cases was followed for 3 yr beyond their index consultation regarding referral and frequency of consultation. We applied the full range of Read codes to identify follow-up consultations to ensure that all events were detected.

Statistical analysis

Prevalence and incidence rates between age groups and sex were examined using Pearson's χ^2 test and the score test for trend. These tests were also used to investigate differences in treatment, referral and consultation rates between age groups during the third year of follow-up. Treatment and referral codes were only counted as related to the shoulder problem if they were linked with one of the 426 inclusion codes for shoulder problems within the database. However, GPs sometimes failed to link treatment codes to the relevant diagnostic code, so we repeated the analysis including the 'unlinked' codes and compared it with our original estimates. Analyses were conducted using Stata 8.0 and IMS Disease Analyzer—Mediplus.

Results

Prevalence and incidence

From the database, 658469 actively registered patients aged 18 yr and over on 1 January 2000 were identified for inclusion in the denominator. The age and sex distribution of these patients was virtually identical to that of the UK population when compared with 2001 census data from the Office of National Statistics [13]. We identified 15534 cases who had consulted for a shoulder problem during 2000, and amongst these 9215 incident cases

TABLE 2. Prevalence of people consulting their GP with a shoulder problem during 2000 by age group and sex

Age group (yr)	Males		Females		Total	
	<i>n</i>	Prevalence (%) (95% CI)	<i>n</i>	Prevalence (%) (95% CI)	<i>n</i>	Prevalence (%) (95% CI)
18–29	55324	1.13 (1.04–1.22)	56643	0.77 (0.70–0.84)	111967	0.95 (0.89–1.00)
30–39	60566	1.48 (1.39–1.58)	70138	1.23 (1.15–1.32)	130704	1.35 (1.29–1.41)
40–49	58834	2.07 (1.95–2.18)	64961	2.17 (2.06–2.29)	123795	2.12 (2.04–2.20)
50–59	58059	2.79 (2.66–2.93)	61903	3.13 (3.00–3.27)	119962	2.97 (2.87–3.07)
60–69	39923	3.53 (3.35–3.71)	44258	3.78 (3.61–3.96)	84181	3.66 (3.54–3.79)
70–79	26468	3.55 (3.33–3.78)	35511	4.15 (3.94–4.36)	61979	3.89 (3.74–4.05)
80+	8235	3.78 (3.38–4.21)	17643	4.09 (3.80–4.39)	25878	3.99 (3.75–4.23)
Total	307409	2.28 (2.23–2.34)	351057	2.43 (2.38–2.48)	658469	2.36 (2.32–2.40)

TABLE 3. Cumulative incidence of people consulting their GP with a shoulder problem during 2000 by age group and sex

Age group (yr)	Males		Females		Total	
	<i>n</i>	Cumulative incidence (%) (95% CI)	<i>n</i>	Cumulative incidence (%) (95% CI)	<i>n</i>	Cumulative incidence (%) (95% CI)
18–29	54016	0.88 (0.80–0.96)	55711	0.59 (0.53–0.66)	109727	0.73 (0.68–0.78)
30–39	58642	1.05 (0.97–1.14)	68285	0.87 (0.81–0.95)	126927	0.96 (0.90–1.01)
40–49	56364	1.48 (1.39–1.59)	62127	1.49 (1.39–1.58)	118491	1.49 (1.42–1.56)
50–59	54654	1.83 (1.72–1.95)	57801	2.04 (1.92–2.16)	112455	1.94 (1.86–2.02)
60–69	36989	1.95 (1.81–2.09)	41000	2.21 (2.07–2.36)	77989	2.09 (1.99–2.19)
70–79	24675	1.89 (1.72–2.07)	32812	2.18 (2.02–2.34)	57487	2.05 (1.94–2.17)
80+	7623	1.81 (1.52–2.14)	16336	1.92 (1.72–2.14)	23959	1.93 (1.72–2.07)
Total	292963	1.45 (1.41–1.50)	334072	1.49 (1.44–1.53)	627038	1.47 (1.44–1.50)

who were followed up for 3 yr beyond their index consultation. Some 31431 patients were excluded from the denominator in the incidence calculations because their medical records contained evidence of an existing shoulder problem up to 3 yr prior to 2000 and therefore could not be included in the population at risk.

The prevalence and incidence of people consulting their GP with a shoulder problem during 2000 are presented in Tables 2 and 3, respectively. The overall prevalence rate was 2.36% [95% confidence interval (CI) 2.32–2.40%] and there was a significant increase in rates from 0.95% in 18–29-yr-olds to 3.99% in those aged ≥ 80 yr (χ^2_{trend} ; $P < 0.001$). Prevalence was also higher in females compared with males (χ^2 ; $P < 0.001$). The overall incidence rate was 1.47% (95% CI 1.44–1.50%) with rates rising from 0.73% in 18–29-yr-olds to about 2% in those aged ≥ 50 yr (χ^2_{trend} ; $P < 0.001$). There was no evidence to suggest that overall incidence was dissimilar for males and females (χ^2 ; $P = 0.28$). The cohort of incident cases ($n = 9215$) consisted of 46.2% (4254) males and the age distribution was as follows: 18–39 yr, 21.9% (2017); 40–59 yr, 42.8% (3939); ≥ 60 yr, 35.4% (3259).

Consultations

The proportion of GP consultations in 2000 related to a shoulder problem was 0.73% of the total number of consultations for that year (22904/3141845 consultations) amongst those included in the denominator ($n = 658469$). Amongst the cohort of incident cases ($n = 9215$), 52.1% did not visit their GP again regarding the shoulder problem following the initial presentation and the mean number of visits related to the shoulder problem during the 3 yr follow-up was 3.2 (s.d. 5.0). Figure 1a shows the proportion of cases still consulting for their shoulder problem after 3, 6, 12 and 24 months following the first consultation by age group. After 24 months, 13.6% of all patients continued consulting their GP for their shoulder problem. Older patients were most likely to consult for a longer period of time than younger patients; 17.5% of those aged > 60 yr had at least one further consultation after

24 months, compared with 13% in the 40–59 yr age group and 8.7% of those aged 18–39 yr (χ^2_{trend} ; $P < 0.001$).

Referrals

Following initial presentation, 1572 (17.1%) of patients were referred to secondary care within 3 months, and this rose to 2061 (22.4%) by the end of 3 yr. Secondary care was defined as: physiotherapy; an orthopaedic, rheumatology or pain clinic; referral for imaging or X-ray; general surgical referral; or complementary medicine, e.g. acupuncture or osteopathy. The largest proportion of referrals was to a physiotherapist (63.9%), followed by referral to an orthopaedic or rheumatology clinic (26.9%) and the remainder (9.2%) represented referral to one of the other types of secondary care. When we included referrals 'unlinked' to a diagnostic shoulder code, the proportion of incident cases referred to secondary care within 3 months of presentation was 1661 (18.0%), rising to 2577 (28.0%) by the end of 3 yr.

The mean number of days between initial presentation and the date on which the patient was referred by their GP was 114 days (s.d. 214 days). Patterns of referral by age group are presented in Fig. 1b. The middle-aged group (40–59 yr) had the highest rates of referral throughout the follow-up period. By the end of 3 yr, 25% of 40–59-yr-olds had been referred, compared with 20.2% of those aged > 60 yr and 20.8% of 18–39-yr-olds (χ^2 ; $P < 0.001$). For specialist referral only, the proportions were: 18–39-yr-olds (4.9%); 40–59-yr-olds (7.3%); > 60 yr (5.2%).

Diagnosis

Of the 426 Read codes used to define the inclusion criteria, just five codes accounted for 74.6% of the diagnoses recorded by the GP at the index consultation. The 10 most frequently used codes are shown in Table 4. The most common code used in the 18–39 yr age group was 'P2D. sprained shoulder' (23.6%), whereas 'M421 shoulder syndrome' was the most frequently recorded diagnosis at initial presentation for the older age groups (40–59 yr, 25.2%;

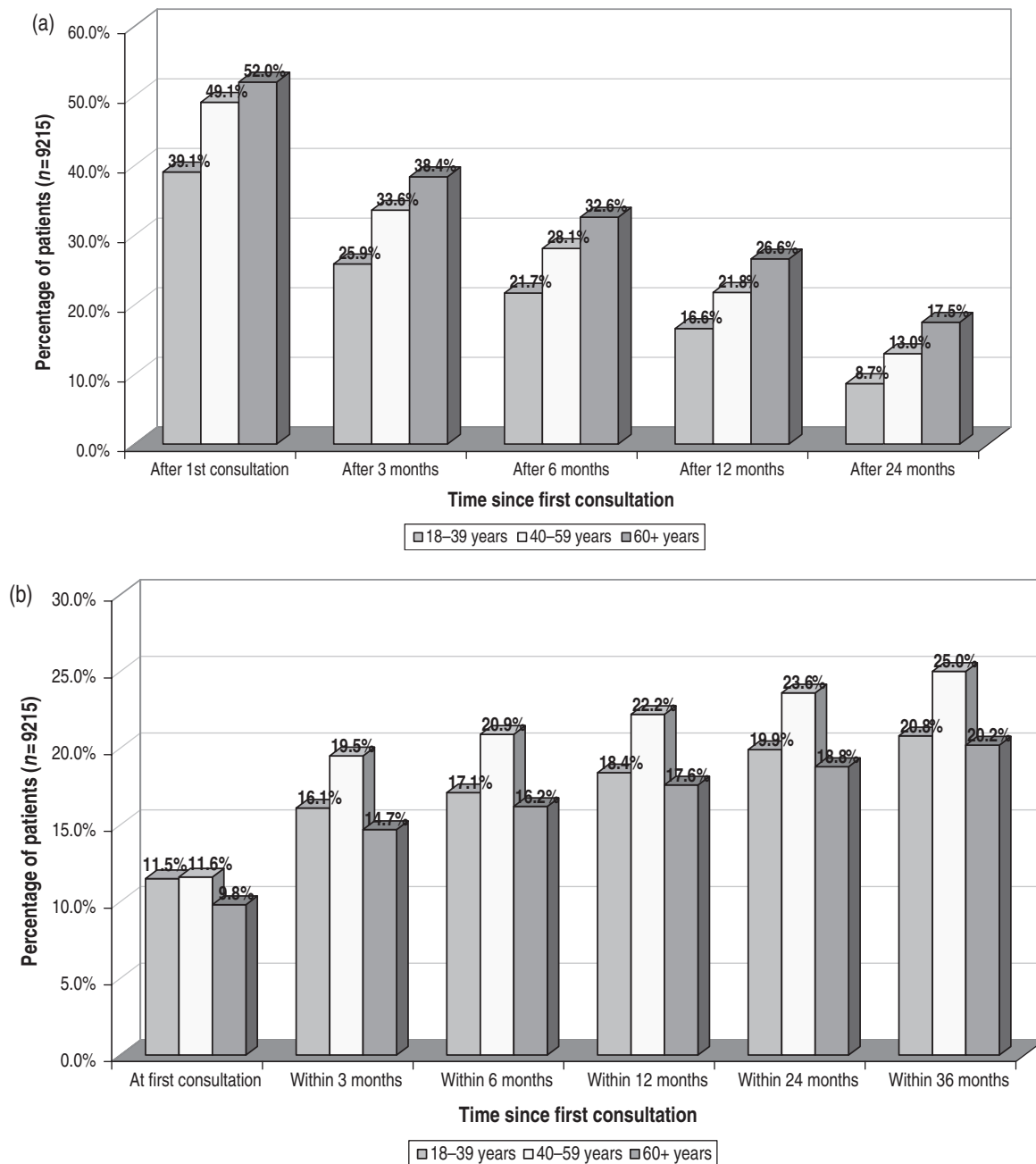


FIG. 1. (a) Percentage of patients still consulting their GP at 3 yr following initial presentation by age group. (b) Percentage of patients referred by their GP at 3 yr following initial presentation by age group.

>60 yr, 25.7%). The patients most likely to be referred within 3 yr of initial presentation were those with the codes; ‘.M421 shoulder syndrome’ (27.4%), ‘.P22. dislocated shoulder’ (26.2%) and ‘.M212 shoulder joint pain’ (24.5%).

Treatment

Table 5 shows the proportion of patients prescribed non-steroidal anti-inflammatory drugs (NSAIDs) and given an injection (corticosteroid, NSAID or local anaesthetic) by their GP during the 3 yr following initial presentation. Overall, 30.8% of patients received a prescription for an oral NSAID and these were more likely to be prescribed to patients under the age of 60 yr (χ^2 ; $P < 0.001$). Around 3% of patients were treated with Cox II selective inhibitors, and these were more commonly prescribed in patients aged over 40 years (χ^2 ; $P < 0.001$). Injections were administered by

the GP in 10.6% of cases, and these were also more likely to be given to patients aged over 40 years (χ^2 ; $P < 0.001$). When we included treatments ‘unlinked’ to a diagnostic shoulder code, the proportion of incident cases prescribed oral NSAIDs and Cox II inhibitors was 3065 (33.3%) and 306 (3.3%), respectively. The proportion of patients receiving injections when unlinked codes were included was 1015 (11.0%).

Discussion

Summary of main findings

This study is the first to provide estimates of the prevalence and incidence of people consulting for a shoulder problems in UK primary care based on a large, nationwide sample. The overall annual prevalence and incidence for adults aged 18 yr and above

TABLE 4. Shoulder codes most frequently used at initial presentation in primary care for the cohort of incident cases

Read code	Description of shoulder problem	Number (%) of cases with code recorded at initial presentation (<i>n</i> =9215)		% Referred within 3 yr of initial presentation	
				All referrals	Specialist referrals
.M421	Shoulder syndrome	2115	(23.0)	27.4	7.7
.P2D.	Sprained shoulder	1470	(16.0)	20.8	4.2
N211.	Rotator cuff shoulder syndrome	1266	(13.7)	19.8	6.3
.M212	Shoulder joint pain	1196	(13.0)	24.5	6.7
S50.	Sprain shoulder/upper arm	822	(8.9)	21.3	3.4
N0941	Arthralgia—shoulder	404	(4.4)	19.3	4.5
.528.	Plain X-ray shoulder/arm	246	(2.7)	15.0	4.1
.2H23	O/E—shoulder joint abnormal	206	(2.2)	20.4	8.7
.M343	Brachial (cervical) neuritis	206	(2.2)	19.4	2.4
.P22.	Dislocated shoulder	141	(1.5)	26.2	9.2
	All other shoulder codes	1143	(12.4)	19.4	6.9

TABLE 5. Percentage of patients treated with NSAIDs or injections by their GP during 3 yr following initial presentation by age group

Age group (yr)	All oral NSAIDs (including Cox II selective inhibitors)		Cox II selective NSAIDs		Injections (corticosteroids, NSAIDs and local anaesthetic)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
18–39	635	31.5	28	1.4	74	3.7
40–59	1356	34.4	119	3.0	446	11.3
60+	851	26.1	131	4.0	454	13.9
Total	2842	30.8	278	3.0	974	10.6

was 2.36 and 1.47%, respectively, with rates increasing linearly with age. Around half of new consulters only visited their GP once, at initial presentation, while around 14% continued consulting beyond 2 yr, particularly the elderly. During the 3 yr following initial presentation, around 22% of patients were referred to secondary care, 31% were prescribed NSAIDs and 11% were given an injection by their GP. With over 400 shoulder-related Read codes to select from including a number of very precise ones (e.g. frozen shoulder, rotator cuff tear), GPs tended to use only a limited number of fairly general codes when recording the diagnosis of new shoulder conditions.

Strengths and limitations

General practice databases, such as Mediplus, are commonly used in the field of pharmacoepidemiology and to examine prescribing practices in the UK [14–16]. A study has previously concluded that the Mediplus database is generally reliable and consistent [17] and the system whereby GPs have, since 1992, received regular feedback of data quality markers has been shown to significantly improve the quality of its data [18]. Nevertheless, limitations inherent in all primary care databases need to be borne in mind.

These limitations are: (i) the amount of detail with which diagnoses and symptoms are coded is left mainly at the discretion of the GP; and (ii) the population registered represents a dynamic rather than a static group since practices and patients can enter and leave the database at any time. Bearing in mind these limitations, the Mediplus database has nevertheless been used successfully in a number of epidemiological studies [19–21].

We minimized any problems associated with variability in the use of codes by GPs by using an extensive selection of codes for inclusion criteria, and for codes that were less specific we examined individual patient records in detail. In fact, GPs only used a limited number of codes to diagnose shoulder problems (10 out of a possible 426 codes in nearly 90% of the cases identified), and we believe that the likelihood of undetected cases was low.

The recorded referral codes were not always linked to the problem for which the patient was referred; however, we performed two separate analyses including and excluding unlinked referral codes to examine the variability in results. The difference in rates was around 6%, indicating that our initial estimate of the referral rate at 3 yr may be slightly conservative. In the absence of a validation study, in which hospital records are checked against recorded referrals, the estimates related to referrals may be underestimates. The difference in estimates for NSAID prescriptions and injections was negligible when we included unlinked codes.

Relationship to other research

Previous studies with smaller samples have suggested that new episodes of shoulder pain account for around 1% of all consultations in primary care each year [22, 23], which is comparable with our own estimates. The prevalence and incidence of people with shoulder conditions presenting to primary care is substantially lower than community-based estimates of shoulder pain, providing further evidence that many people manage their shoulder problem without consulting a GP. Some studies suggest that improvement in pain and physical function is no better for consulters versus non-consulters [5], and that the outcome is no different between those referred versus the non-referred [11]. However, these observations are based on non-randomized allocation, and it is highly likely that selection factors related to consultation and referral behaviour are also associated with outcome.

It has been recommended that referral is appropriate if a patient has not responded after 3 months of treatment [24]. This would seem to be broadly consistent with GPs' referral behaviour in our study to the extent that 76.3% of referrals were recorded within the first 3 months of presentation. However, the majority of patients were not referred, and only a minority were referred to a specialist. A recent study reported that referrals to musculoskeletal services are often misdirected to an orthopaedic clinic when non-surgical interventions are more appropriate [25]. However, in our

study only 6% of patients were referred to a specialist over the 3-yr period following initial presentation (representing around 27% of all referrals), so it appears that GPs are quite selective when referring shoulder problems to a specialist. Despite this finding, a sizeable proportion of patients were still consulting up to 3 yr later, an observation that has previously been reported by studies within primary care [2, 7–10].

This study has shown that GPs tend not to record a specific diagnosis when a patient presents with a shoulder condition and that they describe the symptoms in fairly general terms. This finding is probably not surprising for a number of reasons. The shoulder joint has a complex structure, and there is a lack of agreement associated with diagnostic criteria for problems intrinsic to the shoulder, which makes a precise diagnosis difficult to reach [26–28]. This is compounded by a considerable overlap between specific disorders of (and external to) the shoulder, as well as the tendency for diagnostic categories to change over time [6, 9]. An additional reason may have to do with GPs' lack of confidence and expertise in relation to the diagnosis of musculoskeletal conditions generally, which in turn relates to the quality of their training [29]. Indeed, Speed and Crisp [25] recently reported that in 63.4% of GP referral letters to musculoskeletal services no diagnosis was offered at all.

Implications of this research

The difference between population-based estimates of prevalence and the prevalence of shoulder problems presenting to primary care is considerable, but little is known about the factors that influence the decision to consult a GP, self-treat or delay presentation. The criteria used by GPs to decide on which patients to refer to a specialist are unclear and guidelines could prove useful to help prevent misdirected referrals. The influence of GP consultation and specialist referral on outcome is uncertain, as is the effect of an early and correct diagnosis; randomized control trials may be required to address these issues properly.

<i>Rheumatology</i>	Key messages
	<ul style="list-style-type: none"> • The prevalence of people consulting for shoulder problems in primary care is substantially lower than community-based estimates of shoulder pain, suggesting many people do not consult their GP. • Patients are most likely to be referred for a shoulder problem within the first 3 months of presentation, but only a minority of these referrals are to a specialist. • GPs do not generally record a specific diagnosis for shoulder problems.

The authors have declared no conflicts of interest.

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