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Musculoskeletal clinical assessment and treatment services at the primary-secondary care interface:

an observational study

Abstract

Background
Management of musculoskeletal conditions in the UK is increasingly delivered in multidisciplinary clinical assessment and treatment services (CATS) at the primary–secondary care interface. However, there is little evidence concerning the characteristics and management of patients attending CATS.

Aim
To describe the characteristics, investigation, and treatment of adults attending a musculoskeletal CATS.

Design and setting
Cross-sectional analysis of cohort study baseline data from a musculoskeletal CATS in Stoke-on-Trent Primary Care Trust, UK.

Method
All patients referred from primary care between February 2008 and June 2009 were mailed a pre-consultation questionnaire concerning pain duration, general health status, anxiety, depression, employment status, and work absence due to musculoskeletal problems. At the consultation, clinical diagnoses, body region(s) affected, investigations, and treatment were recorded.

Results
A total of 2166 (73%) completed questionnaires were received. Chronic pain duration >1 year (55%), major physical limitation (76%), anxiety (49%), and depression (37%) were common. Of those currently employed, 516 (45%) had taken time off work in the last 6 months because of their musculoskeletal problem; 325 (29%) were unable to do their usual job. The most frequent investigations were X-rays (23%), magnetic resonance imaging (18%), and blood tests (14%): 1012 (48%) received no investigations. Injections were performed in 282 (13%) and 492 (23%) were referred to physiotherapy.

Conclusion
Although most patients presented with musculoskeletal problems suitable for CATS, chronic pain, physical limitation, anxiety, depression, and work disability were commonplace, highlighting the need for a biopsychosocial model of care that addresses psychological, social, and work-related needs, as well as pain and physical disability.

Keywords
anxiety; depression; health services; musculoskeletal diseases; referral and consultation; work disability.

INTRODUCTION

Musculoskeletal disorders such as back pain and osteoarthritis are highly prevalent and frequently lead to consultation in primary care,[1,2] where most are managed. They comprised a considerable proportion of the £16.8 billion that sickness absence from work cost the UK economy in 2009, at an average of 6.4 working days lost per employee.[3] Back pain is the most common cause of long-term work absence in manual workers, followed by mental health problems, and other musculoskeletal disorders, and is the third most common cause of long-term work absence among non-manual workers.[3] Dame Carol Black's report *Working for a Healthier Tomorrow* advocates retention in, or return to, work to be a key indicator of the successful treatment of working-age people.[4] Achieving this for the large numbers of patients with musculoskeletal problems poses a major challenge.

For patients with musculoskeletal problems, referral for a specialist opinion has traditionally been to orthopaedic or rheumatology services in secondary care. Recent UK governmental policy has emphasised provision of patient-centred care in services designed around individuals' needs, which build partnerships between hospitals and general practice.[5] Management of musculoskeletal conditions has shifted away from secondary care towards multidisciplinary clinical assessment and treatment services (CATS) at the primary–secondary care interface.[6] CATS act as a 'one-stop shop' for efficient, rapid assessment, diagnosis, and treatment of patients, yet, crucially, they are also intended to provide holistic care, addressing patients' psychological, social, and physical needs to enable them to continue working.[6] However, there is limited evidence concerning the characteristics of patients referred to CATS, which is needed to inform appropriate resourcing. For example, it is not known whether the majority of patients have simple regional musculoskeletal complaints amenable to treatment with traditional biomedical approaches, or whether they are frequently complicated by chronic symptoms, widespread pain, and psychosocial distress.

Therefore, a prospective cohort study was carried out of patients referred to a musculoskeletal CATS in North Staffordshire, which were cited as an example of good practice in the Department of Health's Musculoskeletal Services Framework.[6] Using baseline data from this cohort, this article describes the musculoskeletal problems addressed in the CATS consultation and the prevalence of physical disability, anxiety, depression, and musculoskeletal-related work absence.

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How this fits in

Management of musculoskeletal conditions in the UK has shifted away from secondary care towards multidisciplinary clinical assessment and treatment services (CATS) at the primary–secondary care interface. Although most patients are referred with regional musculoskeletal problems that are appropriate for management in CATS, chronic pain, impaired physical function, anxiety, depression, and work disability are highly prevalent. Musculoskeletal CATS should provide a holistic biopsychosocial model of care that identifies and addresses psychosocial needs and work disability, in addition to pain and physical disability.

METHOD

This study was undertaken using baseline data from a cohort study.[7] All participants provided written informed consent.

Study setting

Stoke-on-Trent Primary Care Trust (PCT) serves a population of more than 270 000 people. Since the mid-1990s, the PCT has run a multidisciplinary musculoskeletal service at the primary–secondary care interface, to which secondary care musculoskeletal referrals are triaged following clinical review of referral letters to musculoskeletal, rheumatology, and orthopaedic services. The musculoskeletal service is the preferred provider for patients with non-surgical, non-inflammatory musculoskeletal problems. The triage process aims to manage musculoskeletal conditions requiring non-surgical interventions in the community, while appropriate cases are directed to rheumatology or orthopaedic services.

Data collection

All adults aged ≥18 years seen at this musculoskeletal CATS between February 2008 and June 2009 were invited to participate in the study. Patients were mailed a health questionnaire 2 weeks before the CATS appointment and asked to bring the completed questionnaire with them when they attended clinic. All participants were seen by a research assistant when they attended for the CATS appointment and were given a further opportunity to participate in the study if they had not brought the baseline questionnaire with them. The clinician undertaking the CATS consultation did not have access to the completed health questionnaire.

The questionnaire contained validated health assessment instruments including the Medical Outcomes Study (MOS) Short Form-36 (SF-36) version 2,[8] Hospital Anxiety and Depression Scale (HADS),[9] and pain duration.[10] Data were collected regarding age, sex, postcode, marital status, self-reported height/weight, smoking history (categorised as current, previous, or never), current employment status, absence from work in the preceding 6 months because of musculoskeletal problems, and current work status (categorised as doing usual job, working fewer hours, doing lighter duties, on paid/unpaid sick leave).

Clinical diagnosis (including pain location) addressed during the CATS consultation, investigations requested, treatment prescribed, onward referral, and discharge/follow-up plans were recorded by the clinician conducting the consultation.

Analysis

Age, sex, and neighbourhood deprivation scores, based on the Index of Multiple Deprivation 2007,[11] were compared between study participants and non-participants. Non-participants included those who did not attend their CATS appointment and those who attended but did not wish to participate. Age, sociodemographic data, smoking status, and body mass index (BMI) were summarised for study participants as a whole.

Participants were categorised into four mutually exclusive groups according to the location(s) of the problem addressed in the CATS consultation: upper limb/neck only, spine only, lower limb only, or multiple sites. Pain was considered to be multisite when the clinician recorded either more than one location (upper limb/neck, spine, lower limb) or a diagnosis of fibromyalgia, chronic widespread pain, generalised osteoarthritis, or polymyalgia rheumatica.

Investigations requested, joint injections performed, referral to physiotherapy and pain clinics, and discharge/follow-up planning (discharged to GP, follow-up appointment made, follow-up appointment pending results of investigations) were summarised and compared by pain location (upper limb/neck only, spine only, lower limb only, or multiple sites), using χ^2 tests.

Pain duration was categorised as less than 3 months, 3–12 months, 1–2 years, 3–10 years, and >10 years. Mean scores and standard deviations (SDs) for the eight domains of the SF-36 were calculated and normalised, using the general population mean of 50 (SD = 10) and the conventional scoring.[8] Major physical limitation was

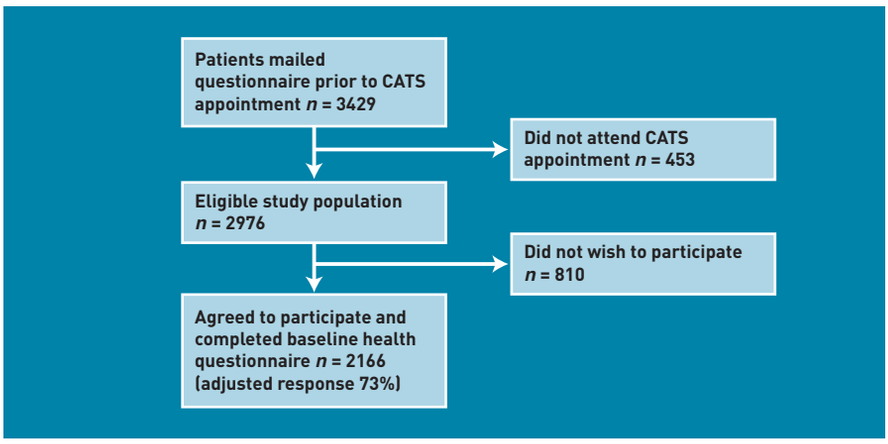

Figure 1. Flow of participants through the study.

defined as responding 'Yes, limited a lot', the worst response category, to any one of the 10 items comprising the SF-36 physical function scale (PF-10).[12] Probable anxiety and depression were defined as a score of >11 on the anxiety and depression subscales of the HADS respectively: scores 8–10 were considered borderline.[9]

Current employment was defined as either having a full-time or part-time paid job, or being employed but being currently off sick for 6 months or less. Among those in current employment, the proportions of participants who reported time off work during the preceding 6 months because of musculoskeletal problems, and currently not doing their usual job (working fewer hours, doing lighter duties, or being on paid or unpaid sick leave) were calculated.

The proportion of participants within each category of pain duration, and those reporting major physical limitation, anxiety, depression, and work absence were calculated for the whole study population, with 95% confidence intervals (CIs).

Table 1. Sociodemographic data, smoking status, and body mass index of the cohort

Characteristic, total *n* = 2166	
Age in years, mean (SD)	51.1 (15.2)
Age group, years, *n* (%)	
18–44	750 (35)
45–64	992 (46)
≥65	424 (20)
Female, *n* (%)	1238 (57)
Living arrangements, *n* (%)	
Married/cohabiting	1530 (71)
Living alone	322 (15)
BMI, *n* (%)[a]	
Normal/underweight (<25 kg/m^2)	631 (30)
Overweight (25–30 kg/m^2)	792 (38)
Obese (≥30 kg/m^2)	674 (32)
Smoking status, *n* (%)	
Never smoked	989 (46)
Previously smoked	682 (32)
Current smoker	493 (23)

BMI = body mass index. [a]BMI data were missing for 69 (3%) participants. Missing data for all other variables <1%.

Sample size

Sample size was based on the number of patients (approximately 3500) who are referred to the musculoskeletal and back pain interface clinics in Stoke-on-Trent PCT during the course of a year. Based on the authors' previous studies, it was expected that 75% of those invited to the study would participate.[13] The resulting sample size of 2500 would, for example, allow a 95% CI of ±2%, based on estimated prevalences of 50% for chronic pain and major physical limitation.

RESULTS

A total of 3429 patients were mailed the questionnaire; 453 (13%) did not attend their CATS appointment. Of the remainder, 2166 completed questionnaires were received (adjusted response 73%) (Figure 1).

Sociodemographics

There were no differences in mean age or median neighbourhood deprivation scores between those who participated and those who did not take part or did not attend. However, there was a lower percentage of males in the group who participated (43% versus 47%, $P = 0.011$).

The sociodemographic characteristics, smoking status, and BMI of participants are shown in Table 1.

Table 2. Most frequent diagnoses made at each joint site[a]

Neck, *n* (%)		**Shoulder, *n* (%)**		**Elbow, *n* (%)**		**Hand and wrist, *n* (%)**	
Total	183	Total	291	Total	68	Total	233
Neck pain without referral to the arm	151 (83)	Subacromial pathology	179 (62)	Epicondylitis	45 (66)	Carpal tunnel syndrome	95 (41)
Neck pain with referral to the arm	36 (20)	Glenohumeral OA/ frozen shoulder	78 (27)	Other	24 (35)	OA (nodal, radiocarpal, first CMCJ)	58 (25)
Other	9 (5)	Acromioclavicular OA	40 (14)			Tendon problems (trigger finger, de Quervains' tenosynovitis)	48 (21)
		Other	23 (8)			Other	45 (19)
Spine, n (%)		**Hip, *n* (%)**		**Knee, *n* (%)**		**Foot and ankle, *n* (%)**	
Total	615	Total	142	Total	514	Total	141
Low back pain without referral to the leg	286 (47)	OA	75 (53)	OA	289 (56)	Achilles pathology and plantar fasciitis	42 (30)
Low back pain with referral to the leg	233 (38)	Trochanteric bursitis	40 (28)	Menisceal pathology	114 (22)	Ankle problems (ligament injury, instability, tendonitis/tendinopathy)	38 (27)
Spinal stenosis	41 (7)	Other	31 (22)	Anterior knee pain	43 (8)	Mid-foot OA/flat feet	29 (20)
Other	79 (13)			Ligament pathology (cruciate, collateral)	41 (8)	Forefoot problems (Morton's neuroma, hallux valgus, first MTPJ OA)	23 (16)
				Other	75 (15)	Other	24 (17)

CMCJ = carpometacarpal joint. MTPJ = metatarsophalangeal joint. OA = osteoarthritis. [a]Column totals add up to greater than 100% as some participants have more than one diagnosis recorded.

Table 3. Frequency of investigations, interventions, referrals, and follow-up by location of the problem

	Total	**Upper limb/neck**	**Spine**	**Lower limb**	**Multiple[a]**	***P*-value[b]**
n	2130	607	537	656	221	
Investigations, *n* (%)						
X-ray	475 (22)	146 (24)	45 (8)	174 (27)	74 (33)	<0.001
MRI	393 (18)	47 (8)	199 (37)	124 (19)	14 (6)	<0.001
Blood test	308 (14)	78 (13)	69 (13)	48 (7)	70 (32)	<0.001
Electrophysiological tests	138 (6)	108 (18)	5 (<1)	2 (<1)	17 (8)	<0.001
Ultrasound	96 (5)	62 (10)	3 (<1)	21 (3)	4 (2)	<0.001
No investigation	1012 (48)	281 (46)	276 (51)	328 (50)	86 (39)	0.009
Interventions and referrals, *n* (%)						
Injection	282 (13)	152 (25)	7 (1)	91 (14)	28 (13)	<0.001
Referral to physiotherapy	492 (23)	141 (23)	133 (25)	154 (23)	53 (24)	0.93
Referral to pain clinic	46 (2)	2 (<1)	15 (3)	0 (0)	29 (13)	<0.001
Follow-up, *n* (%)						
Discharge to GP	821 (39)	248 (41)	162 (30)	301 (46)	86 (39)	<0.001
Follow-up appointment	208 (10)	47 (8)	100 (19)	35 (5)	16 (7)	<0.001
Follow-up pending results	747 (35)	244 (40)	162 (30)	198 (30)	89 (40)	<0.001

MRI = magnetic resonance imaging. [a]More than one location (upper limb/neck, spine, lower limb) recorded or recorded diagnosis of fibromyalgia, chronic widespread pain, generalised osteoarthritis, or polymyalgia rheumatica. [b]Comparison across location of problem.

Pain location and diagnosis

Most patients were diagnosed with a musculoskeletal problem considered suitable for an interface service: rheumatological problems (such as inflammatory arthritis, connective tissue disease or polymyalgia rheumatica) and 'red flag' pathologies such as malignancy were infrequently encountered (58 patients, 3% and 11 patients, <1% respectively). The lower limb was the site most frequently addressed in the CATS consultation (656 patients, 31%, 95% CI = 29% to 33%), followed by the upper limb and neck (607

Table 4. Pain duration, physical limitation, anxiety, depression, and work absence

Characteristic	
Pain duration, *n* (%)	
Less than 3 months	310 (14)
3–12 months	650 (30)
1–2 years	424 (20)
3–10 years	510 (24)
>10 years	268 (12)
SF-36 domain, mean (SD)	
Physical function	36.5 (12.0)
Role limitations — physical	35.7 (12.1)
Bodily pain	34.4 (8.6)
General health	41.5 (11.3)
Vitality	41.5 (11.5)
Social functioning	38.3 (13.2)
Role limitations — emotional	40.0 (15.4)
Mental health	43.3 (12.3)
Major physical limitation, *n* (%)	1651(76)
Anxiety, *n* (%)	
Borderline (HADS 8–10)	441 (20)
Probable case (HADS ≥11)	619 (29)
Depression, *n* (%)	
Borderline (HADS 8–10)	420 (19)
Probable case (HADS ≥11)	380 (18)
Employment, *n* (%)	
Currently employed	1136 (53)
Time off work because of musculoskeletal problems in the preceding 6 months	516 (45)
Ability to perform usual job, *n* (%)	
Currently performing usual job	811 (71)
Working fewer hours	65 (6)
Doing lighter duties	125 (11)
On paid sick leave	108 (10)
On unpaid leave	27 (2)

Missing data for all variables <1%.

patients, 29%, 95% CI = 27% to 31%), spine (537 patients, 25%, 95% CI = 23% to 27%), and multiple sites (221 patients, 10%, 95% CI = 9% to 12%). The remaining patients were generally given specific diagnoses with no site specified, such as gout, inflammatory arthritis, and joint hypermobility.

The most common diagnoses at each site are shown in Table 2. Combining diagnoses across all joint sites, 487 participants (23%, 95% CI = 21% to 25%) received a diagnosis of osteoarthritis.

Investigations, interventions, referrals, and follow-up

Investigations requested, interventions undertaken, onward referral, and plans for discharge and/or follow-up are shown in Table 3. One thousand and twelve participants (48%, 95% CI = 45% to 50%) did not receive any investigations. X-ray was performed least frequently in the spine only group (8% of the spine group received X-ray), whereas magnetic resonance imaging (MRI) scans (37%) were most frequently requested in this group. Blood tests were most frequently requested in the multiple site group (32%). Both electrophysiological tests and diagnostic ultrasound were most frequently requested in the upper limb/neck only group. Corticosteroid injections were performed in 282 participants (13%, 95% CI = 12% to 15%) and were most frequent in the upper limb/neck only group (25%). Four hundred and ninety-two participants were referred to physiotherapy (23%, 95% CI = 21% to 25%) but this did not appear to differ by pain location ($P = 0.93$). Referrals to pain clinics were infrequent (2%) but were most frequent in those with pain at multiple sites ($P<0.001$). Referral rates to orthopaedics and rheumatology were low (151 [7%] and 60 [3%] respectively).

Eight hundred and twenty-one participants were discharged to the care of their GP at this appointment (39%, 95% CI = 37% to 41%). Discharge was highest in the lower limb group (46%) and

lowest in the spine group (30%). A follow-up appointment in the interface service was arranged for 208 participants at this appointment (10%, 95% CI = 9% to 11%), with the decision to discharge or follow-up awaiting the results of investigations in a further 747 participants (35%, 95% CI = 33% to 37%).

Health status and work absence

Pain duration, physical limitation, anxiety, depression, and work absence are shown in Table 4. Pain duration was greater than 1 year in 1202 participants (55%, 95% CI = 53% to 58%). Individual SF-36 domain scores were below the general population norm of 50 for all eight domains. The largest deviations from the population norm were seen for the physical function, role limitations (physical), bodily pain, and social functioning domains. Major physical limitation was reported by 1651 participants (76%, 95% CI = 75% to 78%). One thousand and sixty participants (49%, 95% CI = 47% to 51%) had symptoms of anxiety: 619 probable cases (29%), with a further 441 borderline cases (20%). Eight hundred (37%, 95% CI = 35% to 39%) had symptoms of depression: 380 probable cases (18%) and 420 borderline cases (19%). One thousand one hundred and thirty-six participants were in current employment (53%), 95% CI = 51% to 55%). Of these, 516 (45%, 95% CI = 43% to 48%) had taken time off work in the last 6 months because of their musculoskeletal problem, and 325 (29%, 95% CI = 26% to 31%) were unable to do their usual job.

DISCUSSION

Summary

This is the first study highlighting the complexity of patients referred from primary care to multidisciplinary musculoskeletal CATS. The findings demonstrate the significant impact of musculoskeletal problems, with over three-quarters of patients reporting major physical limitation. The infrequency of 'red flag' pathologies emphasises the importance of effective clinical triage of referral letters, which, in the CATS used here, is carried out by clinically trained personnel. The underlying principle of this model of care, that most patients with musculoskeletal pain can be managed in a 'one-stop shop' without referral to expensive secondary care services, appears to be borne out by the small proportions requiring follow-up or referral to orthopaedics or rheumatology. However, this approach might be open to question, given the complexity of these patients, with high prevalences of chronic pain, impaired quality of life, and anxiety and depressive symptoms. More than half of patients required further investigation, 13% received local corticosteroid injections, and 23% were referred to physiotherapy. Despite high prevalences of chronic pain, anxiety, and depression, only 2% were referred to specialist pain clinics, suggesting that psychosocial issues are under-recognised and under-treated, and that CATS clinicians need to be appropriately trained in the biopsychosocial model of pain. Importantly, substantial absence from work was identified. Of those in current employment, almost half had taken time off work because of musculoskeletal problems in the preceding 6 months, and 29% were unable to perform their usual job.

Strengths and limitations

The study had a high response rate, with 73% of persons who attended their CATS appointment agreeing to participate. An additional strength is that it included consecutive adults attending the CATS, aged ≥18 years, irrespective of their presenting musculoskeletal problems. This study demonstrates the feasibility of collecting outcome data for research purposes in routine clinical practice, supporting the collection of patient-reported outcome measures described in recent healthcare policy documents.[5,14]

There are two main limitations of the study. First, the study population was derived from one locality, so the findings might not be representative of patients attending CATS in other geographical regions. This locality is one of fairly high socioeconomic deprivation. Rates of obesity, anxiety, depression, and work disability might therefore reflect trends in the local population rather than being specific to this cohort. The prevalence of obesity in this cohort is above the UK national average, whereas the prevalence of smoking is consistent with the national picture.[15] Differences between the configuration of CATS services and referral pathways in different areas might limit the generalisability of the study findings. Nevertheless, the CATS used was highlighted in the Musculoskeletal Services Framework as a successful model of interface care,[6] and is broadly consistent with the design of musculoskeletal services proposed therein. Secondly, the study did not include a comparator cohort that would allow this musculoskeletal CATS to be compared to more traditional musculoskeletal services such as orthopaedics and rheumatology. Although this musculoskeletal CATS is the preferred local provider for patients with non-surgical, non-inflammatory musculoskeletal problems, at the time of the study, direct

referrals into rheumatology and orthopaedic clinics were possible, potentially reducing the generalisability of the findings. One further caveat is that the study did not collect data pertaining to waiting times to the first CATS appointment, which might influence attendance and psychosocial issues.

Comparison with existing literature

Owing to the novelty of musculoskeletal CATS in the UK, there are no suitable cohorts based at the primary–secondary care interface with which the study findings can be compared. A recent evaluation of a physiotherapist-led musculoskeletal clinical assessment service did not assess anxiety, depression, or work absence.[16] The prevalences of anxiety and depression in the study cohort are higher than those reported in general population samples,[17,18] and in those suffering from neck/upper limb pain.[19] They are similar to studies of people consulting with musculoskeletal problems in primary care,[20,21] and with musculoskeletal problems (including inflammatory arthritis) in secondary care.[22–24] The findings are consistent with previous studies showing high levels of work absence in those consulting in primary care in the UK for back pain,[20,25] and those suffering from low back pain in the Netherlands who are referred to rehabilitation centres.[26] Overall, the study provides empirical evidence about the high frequency of anxiety, depression, and work absence in patients consulting with non-inflammatory musculoskeletal problems at the primary–secondary care interface, highlighting the importance of recognising and tackling these important issues in this setting.

Implications for research and practice

The high prevalences of chronic pain, anxiety, depression, and work disability provide insight into the nature and range of support services needed, and, crucially, the importance of providing appropriate training for health professionals to deliver a biopsychosocial model of care. The prevalence of work absence due to musculoskeletal problems supports the need for healthcare professionals to recognise retention in, or return to, work as a key indicator of the successful treatment of working-age people advocated by *Working for a Healthier Tomorrow*,[4] and raises the question as to whether specific vocational rehabilitation programmes should be incorporated into care pathways at the primary–secondary care interface.

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Ethical approval

South Staffordshire Local Research Ethics Committee (REC reference number: 07/H1203/86) approved the study.

Provenance

Freely submitted; externally peer reviewed.

Competing interests

The authors have declared no competing interests.

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