Health status in patients awaiting hip replacement for osteoarthritis

P. Croft, M. Lewis, C. Wynn Jones¹, D. Coggon² and C. Cooper²

Primary Care Sciences Research Centre, University of Keele, Keele, Stoke-on-Trent, Staffordshire ST5 5BG, ¹The Orthopaedic Department, City General Hospital, Newcastle Road, Stoke-on-Trent, Staffordshire ST4 6QG and ²MRC Environmental Epidemiology Unit, University of Southampton, Southampton General Hospital, Southampton SO16 6YD, UK

Abstract

Background. Hip osteoarthritis is a major cause of pain and disability, especially in the elderly. As part of a study investigating factors that could be associated with advanced osteoarthritis of the hip, we compared the health status of patients awaiting arthroplasty for hip osteoarthritis with controls. We further investigated the interaction of hip osteoarthritis with other variables (age, gender, social class and concurrent pain) in relation to health status.

Methods. A case–control study was performed in two English health districts (Portsmouth and North Staffordshire) during 1993–1995. A total of 611 patients (210 men and 401 women) listed for hip replacement because of osteoarthritis over an 18-month period formed the case group and were compared with an equal number of controls selected from the general population and individually matched for age, gender and general practice. Cases and controls completed a structured interviewer-administered questionnaire, which included queries about their medical condition, occupation (from which a measure of social class was derived), and general health status using the SF36.

Results. Physical function ($t=32.1$, $P<0.001$), social function ($t=16.8$, $P<0.001$) and perceived general health ($t=4.1$, $P<0.001$) were worse in the case group, but energy/vitality and mental health showed little difference between cases and controls. Cases were more likely to report knee pain than controls, but case–control status was not associated with pain in the fingers or shoulders, or with social class. However, differences in physical and social function between cases and controls did vary with socio-demographic factors and concurrent knee pain status.

Conclusion. Patients awaiting hip-replacement because of osteoarthritis were more likely to be restricted in their physical and social life than adults in the general population, but mental state and vitality appear unimpaired in this group. This contrasts with findings from other chronic pain disorders. Manual social class is not linked to being on a waiting list for osteoarthritic hip replacement but does add to the burden on health status, particularly social functioning in those with osteoarthritis of the hip.

Key words: Osteoarthritis, Hip, Arthroplasty, Health status, Case–control study, Demographics.

Osteoarthritis is a clinical syndrome of joint pain and stiffness, accompanied by radiological changes of cartilage loss and changes in bone [1]. Its prevalence rises with age and its impact is determined by the extent of the disability that it causes, as well as by the severity of associated pain. Osteoarthritis of the hip joints is a major cause of restricted locomotor activity and functional disability [2]. It also has associated psychosocial implications, elderly subjects with chronic hip pain having a significantly lower quality of life [3, 4]. In addition older people are more likely to have multiple health problems, and psychological distress and physical dysfunctioning is greater in the context of such comorbidity [5].

Several studies of patients who have had arthroplasties have focused on the subsequent improvement in quality-of-life, particularly reduction in pain and improvement in physical and social functioning, but mental health has shown little change [6–8]. Furthermore, a recent UK study found that mental health, perceived general health and vitality were not significantly associated with hip pain among primary care consulters [9]. People who live in socially deprived areas have more musculoskeletal symptoms, and experience a greater
severity of hip and knee disease [10–12]. Although osteoarthritis has been studied in relation to different occupational groups, little is known about whether the impact of advanced lower-limb osteoarthritis varies with social class.

As part of a case–control investigation of factors associated with advanced osteoarthritis of the hip, we examined the health status of patients awaiting arthroplasty for osteoarthritis of the hip, and compared this with an age- and sex-matched sample of population controls. Interactions with age, gender, social class and other musculoskeletal pain were explored.

Methods

The study area comprised two health districts in England (Portsmouth and North Staffordshire), with a combined population of around one million residents. These districts are each served by one secondary care orthopaedic centre and have a broad social and economic catchment population. All men and women, aged 45 yr and over, who were placed on the waiting list for primary total hip arthroplasty over an 18-month period were identified. After review of their medical records, patients were excluded if they had sustained a hip fracture within the past year; fulfilled ACR criteria for rheumatoid arthritis [13] or modified New York criteria for ankylosing spondylitis [14] or had a history of Perthes’ disease, congenital hip dislocation, slipped capital epiphysis or other established causes of secondary osteoarthritis.

For each case, a control of the same sex and age (to within 4 yr) was selected from the list of the same general practice held by the local health authority. In the UK, most people are registered with a general practitioner, so such lists provide a convenient sampling frame of a local population. Controls who had undergone previous hip surgery for osteoarthritis were excluded, and controls who declined to participate were replaced.

After giving informed consent, cases and controls completed a structured interviewer-administered questionnaire, enquiring about their medical history, lifestyle and leisure time physical activities. In addition, and relevant to the purpose of this paper, they completed a reduced version of the Short Form 36 (SF36) as a measure of health status [15]. This includes five of the original eight dimensions: physical functioning, social functioning, mental health, energy/vitality and general health perception. Questions on physical functioning asked about limitations to activities during a typical day: walking, running, sports, lifting, climbing stairs, bending, bathing and getting dressed. There were three additional items concerned with using the toilet, getting into and out of a car and sex life. Mental health was based on the five questions included in the SF36, addressing both anxiety and depression. Energy/vitality was based on the four items in the SF36, and enquired about energy levels and tiredness. Our question on social functioning was: ‘Has your health limited your social activities (like visiting friends or close relatives)?’ The general health perception question was: ‘In general, would you say your health is: excellent, very good, good, fair or poor?’ Rating scales were the same as those employed in the SF36, and our methods were the same as those detailed by Jenkinson et al. [16]. Each measurement scale ranges between 0 and 100, with 0 representing worst health or perception score for that dimension and 100 indicating the best score, i.e. the higher the score, the better the health status.

Participants were asked to give details of their most recent occupation (prior to retirement in the case of those who had already retired) from which a measure of social class was derived, using the classification procedure of the Office of National Statistics [17]. Other musculoskeletal pain complaints were represented by self-reported knee, hand and shoulder pain in the previous month.

In total, 726 cases and 1060 controls were approached. The analysis presented here focuses on 611 case–control pairs with complete questionnaire information. Mean scores of the different SF36 dimensions were compared between cases and controls, categorized separately by age group and gender and then by social class and concurrent pain complaints. Multivariate analysis of the association with concurrent pain was carried out using conditional logistic regression to compare cases and controls through estimates of odds ratios (OR) with 95% confidence intervals (CI) adjusting for BMI (weight measured by scales, height by portable stadiometer), occupational lifting and physical activity (from structured interviewer-administered questions) to take account of potential confounders. Data analysis was carried out using SPSS version 10.0 [18], and STATA version 6.0 for multivariate analysis [19].

Results

The median age for the case group was 70.9 yr [interquartile range (IQR) 63.8–76.4] and 71.1 yr (IQR 64.1–76.8) for the control group. Of the 611 pairs, 401 (65.6%) were women and 210 (34.4%) were men. Of those with a categorized social class, in the case group 298 (49.7%) were in the manual group and 302 (50.3%) in the non-manual group, compared with 305 (50.7%) manual and 296 (49.3%) non-manual classes in the control group.

The scores for the five dimensions of the SF36 are shown in Table 1, for cases and controls separately. The physical function score was substantially lower in cases compared with controls, as was the measure of social functioning. Perception of general health was also lower in cases, but the difference was less marked than for the function measures. Energy/vitality and mental health scores showed little difference between cases and controls.

Average scores for the five dimensions of the SF36 are shown stratified by age and gender in Table 2. As expected, physical function, social function and general
Table 1. Association of hip osteoarthritis with health status dimensions of the SF36, in 611 cases awaiting operation compared with 611 age and sex-matched controls

| Dimension | Controls | Cases | Difference (95% CI) |
|-----------|----------|-------|---------------------|
| Physical function | 68.8 | 28.9 | 39.9 (37.4, 42.3) |
| Mental health | 64.5 | 62.9 | 1.6 (0.6, 2.6) |
| Energy/vitality | 60.1 | 60.4 | −0.3 (−1.6, 0.9) |
| Social functioning | 82.1 | 48.7 | 33.4 (29.5, 37.3) |
| General health perception | 63.1 | 56.2 | 6.8 (3.5, 10.1) |

*Scores for each dimension are based on a scale of 0–100: 0 indicates worst perceived health and 100 indicates best perceived health.

Overall, there was no evidence of a link between social class and case–control status: the OR for the association between hip osteoarthritis and manual as compared with non-manual work was 0.99 (95% CI = 0.77, 1.27). Within both case and control groups, there were lower SF36 scores in the manual compared with non-manual groups for physical functioning, social functioning and general health perception, but not for energy/vitality or mental health (Table 3). The differences in SF36 scores between case and control groups were of similar magnitude in the manual and non-manual groups except with respect to social functioning where there was a wider gap between cases and controls in the manual group than in the non-manual group.

We also investigated the association of symptoms at sites other than the hip with case–control status (Table 4). Pain in the shoulders and hands was not associated with hip osteoarthritis. In contrast, cases were significantly more likely than controls to report knee pain, even after adjustment for BMI, occupational lifting and physical activity. A similar association was also observed for stiffness of the knee, and to a lesser extent a recalled history of previous knee injury.

Table 2. Relationship between hip osteoarthritis and health status dimensions of the SF36, stratified by age and gender

| Dimension | <65 yr | 65–74 yr | ≥75 yr | <65 yr | 65–74 yr | ≥75 yr |
|-----------|-------|---------|--------|-------|---------|--------|
| Physical function | | | | | | |
| Controls | 80.3 (75.0, 85.7) | 78.4 (73.7, 83.1) | 65.6 (61.7, 69.4) | 81.6 (77.7, 85.6) | 66.4 (62.4, 70.4) | 51.8 (47.3, 56.2) |
| Cases | 35.9 (31.2, 40.6) | 32.1 (27.5, 36.7) | 26.4 (21.6, 31.3) | 28.8 (25.1, 32.5) | 28.3 (25.8, 30.8) | 24.6 (21.8, 27.5) |
| Difference | 44.6 (37.4, 51.7) | 46.4 (39.3, 53.4) | 39.9 (37.4, 42.3) | 52.4 (47.3, 57.6) | 37.5 (32.9, 42.1) | 27.6 (22.4, 32.7) |
| Mental health | | | | | | |
| Controls | 65.7 (63.7, 67.6) | 65.8 (64.4, 67.2) | 64.0 (62.8, 65.3) | 65.7 (63.6, 67.8) | 63.7 (62.4, 65.0) | 62.6 (61.0, 64.1) |
| Cases | 62.9 (60.8, 64.9) | 65.1 (63.8, 72.7) | 63.7 (61.0, 66.4) | 62.3 (60.0, 64.5) | 62.5 (60.9, 64.0) | 62.3 (60.5, 64.2) |
| Difference | 3.0 (0.2, 5.8) | 0.8 (−1.8, 3.5) | 2.3 (−0.6, 5.2) | 3.6 (0.5, 6.7) | 1.2 (−0.7, 3.1) | 0.4 (−2.0, 2.7) |
| Energy/vitality | | | | | | |
| Controls | 55.7 (53.6, 57.7) | 60.8 (58.6, 63.0) | 60.0 (58.3, 61.6) | 56.3 (53.8, 58.8) | 59.7 (58.0, 61.4) | 64.1 (62.5, 65.8) |
| Cases | 56.0 (53.2, 58.7) | 62.3 (59.6, 65.0) | 61.3 (57.9, 64.6) | 57.4 (55.2, 59.7) | 61.3 (59.5, 63.1) | 62.5 (60.6, 64.4) |
| Difference | −0.5 (−4.0, 3.0) | −1.1 (−4.4, 2.2) | 1.1 (−3.0, 5.2) | −1.0 (−4.4, 2.5) | −1.4 (−4.0, 1.1) | 1.9 (−0.7, 4.5) |
| Social functioning | | | | | | |
| Controls | 90.1 (84.6, 95.6) | 88.3 (82.2, 94.4) | 83.3 (78.6, 88.0) | 90.9 (85.8, 95.9) | 83.7 (79.0, 88.4) | 66.0 (59.6, 72.3) |
| Cases | 57.8 (49.4, 66.2) | 58.4 (50.3, 66.5) | 48.1 (36.2, 60.0) | 54.8 (47.0, 62.6) | 47.8 (41.6, 54.1) | 34.6 (28.2, 41.1) |
| Difference | 33.2 (22.6, 43.8) | 33.1 (23.2, 42.9) | 34.1 (19.6, 48.6) | 37.6 (28.7, 46.5) | 35.4 (27.5, 43.4) | 31.6 (22.5, 40.6) |
| General health perception | | | | | | |
| Controls | 63.8 (57.1, 70.4) | 65.8 (59.1, 72.5) | 61.5 (57.5, 65.5) | 73.8 (68.9, 78.7) | 62.4 (58.3, 66.4) | 56.0 (51.3, 60.7) |
| Cases | 62.7 (55.8, 69.5) | 54.7 (47.7, 61.7) | 61.5 (53.3, 69.8) | 57.5 (51.5, 63.5) | 54.5 (49.8, 59.2) | 52.5 (47.3, 57.6) |
| Difference | 0.8 (−8.7, 10.4) | 12.2 (2.8, 21.7) | −0.7 (−13.2, 11.8) | 17.6 (9.5, 25.7) | 8.0 (1.7, 14.4) | 4.4 (−2.9, 11.7) |

*Scores for each dimension are based on a scale of 0–100: 0 indicates worst perceived health and 100 indicates best perceived health.

**Differences are based on the matched pairs for which both the case and control belonged to the same age category: males <65 yr (79 pairs), 65–74 yr (72 pairs), ≥75 yr (51 pairs); females <65 yr (91 pairs), 65–74 yr (162 pairs), ≥75 yr (133 pairs).
We found that both physical and social functioning were substantially restricted in patients awaiting hip replacement compared with similarly aged controls selected from the general population. However, such patients’ own perceptions of their health status showed much less contrast between those with and without hip osteoarthritis than did the actual function scores. Mental health, energy and vitality seemed unaffected by the presence of advanced hip osteoarthritis.

Case series of patients awaiting hip and knee replacement have made similar observations. Jones et al. [6], for example, noted that bodily pain and physical function scores in patients listed for hip or knee replacement were lower than population normal values, whereas scores on other dimensions were similar to the norms for the relevant age group. Furthermore, there is evidence that the general decline in physical health with advancing age is independent of mental health, which by contrast remains relatively stable [20, 21]. These studies all used the SF36, and it may be that the mental health dimension of this instrument is insensitive to psychological problems in older people or in those with chronic physical illness. However, studies of other chronic illnesses suggest that this is not the explanation. Reduction in mental health status scores using the SF36 have been observed in studies of hospital attenders with, for example, type 2 diabetes [22], coronary heart disease [23] and chronic renal failure [24]. In the coronary heart disease study [23] the SF36 performed in a similar fashion to the GHQ28, an instrument designed more specifically to identify symptoms of anxiety and depression [25]. Chronic illness in the general population is also associated more generally with lower mental health scores on the SF36 [26].

The apparent well being of those awaiting hip replacement may have a number of explanations. It

Table 3. Association of hip osteoarthritis with health status dimensions of the SF36, stratified by social class

| Dimensiona | Controls | Cases | Differencesb |
|------------|----------|-------|--------------|
| **Physical function** | | | |
| Non-manual | 72.6 (69.7, 75.6) | 32.5 (30.4, 34.7) | 38.9 (34.3, 43.4) |
| Manual | 65.2 (62.1, 68.3) | 25.0 (23.1, 27.0) | 38.6 (33.9, 43.4) |
| **Mental health** | | | |
| Non-manual | 65.5 (64.5, 66.5) | 64.2 (63.2, 65.2) | 2.0 (0.1, 3.8) |
| Manual | 63.5 (62.5, 64.5) | 61.6 (60.3, 62.9) | 1.8 (−0.1, 3.7) |
| **Energy/vitality** | | | |
| Non-manual | 59.8 (58.6, 60.9) | 59.7 (58.3, 61.0) | 1.3 (−1.1, 3.7) |
| Manual | 60.3 (59.0, 61.7) | 61.0 (59.6, 62.3) | 0.7 (−1.7, 3.0) |
| **Social functioning** | | | |
| Non-manual | 83.2 (79.6, 86.8) | 55.6 (51.0, 60.1) | 24.7 (17.1, 32.4) |
| Manual | 80.6 (76.9, 84.3) | 42.1 (37.7, 46.6) | 39.3 (31.7, 46.9) |
| **General health perception** | | | |
| Non-manual | 66.6 (63.4, 69.7) | 63.0 (59.8, 66.3) | 5.1 (−1.1, 11.3) |
| Manual | 59.5 (56.4, 62.7) | 49.2 (45.7, 52.8) | 12.2 (5.8, 18.7) |

aScores for each dimension are based on a scale of 0–100: 0 indicates worst perceived health and 100 indicates best perceived health.
bStatistical analysis of mean paired-differences was based on stratification of the 611 case-control pairs by social class (manual or non-manual). Difference mean scores were based on the 332 pairs that were matched for social class as well as age and gender: 165 non-manual pairs and 167 manual pairs.

Table 4. Relationship between hip osteoarthritis and musculoskeletal symptoms at sites other than the hip in 611 osteoarthritis case-control age and sex-matched pairs

| No. (%) of concordant pairs | No. (%) of discordant pairs | ORb (95% CI) | ORc (95% CI) |
|-----------------------------|-----------------------------|-------------|-------------|
| Knee pain | | | |
| Case/controls positivea | 139 (23%) | 317 (52%) | 5.76 (4.32, 7.82) |
| Case/controls negativea | 99 (16%) | 55 (9%) | 6.78 (4.95, 9.29) |
| | | | n/a |
| Knee stiffness | | | |
| Case/controls positivea | 87 (14%) | 222 (37%) | 3.26 (2.48, 4.35) |
| Case/controls negativea | 232 (38%) | 68 (11%) | 1.40 (1.03, 1.93) |
| | | | n/a |
| Knee injury | | | |
| Case/controls positivea | 33 (5%) | 101 (17%) | 1.40 (1.03, 1.93) |
| Case/controls negativea | 402 (66%) | 72 (12%) | 0.7 (−1.7, 3.0) |
| | | | n/a |
| Finger pain | | | |
| Case/controls positivea | 54 (9%) | 116 (19%) | 1.09 (0.76, 1.55) |
| Case/controls negativea | 323 (53%) | 117 (19%) | 0.67 (0.48, 0.94) |
| | | | n/a |
| Shoulder pain | | | |
| Case/controls positivea | 51 (8%) | 137 (23%) | 1.14 (0.89, 1.47) |
| Case/controls negativea | 301 (49%) | 120 (20%) | 0.82 (0.60, 1.13) |

aPositive indicates subjects who had concurrent pain (such as knee pain); negative indicates subjects who did not have concurrent pain.
bMantel–Haenszel estimate of the OR for the association between concurrent pain and hip osteoarthritis, where absence of concurrent pain is the reference category.
cOR obtained by multivariate conditional logistic regression, adjusted for the other concurrent pain variables listed in the table (and excluding knee stiffness and knee injury), BMI, occupational lifting and exercise.

Discussion

We found that both physical and social functioning were substantially restricted in patients awaiting hip replacement compared with similarly aged controls selected from the general population. However, such patients’ own perceptions of their health status showed much less contrast between those with and without hip osteoarthritis than did the actual function scores. Mental health, energy and vitality seemed unaffected by the presence of advanced hip osteoarthritis.

Case series of patients awaiting hip and knee replacement have made similar observations. Jones et al. [6], for example, noted that bodily pain and physical function scores in patients listed for hip or knee replacement were lower than population normal values, whereas scores on other dimensions were similar to the norms for the relevant age group. Furthermore, there is evidence that the general decline in physical health with advancing age is independent of mental health, which by contrast remains relatively stable [20, 21]. These studies all used the SF36, and it may be that the mental health dimension of this instrument is insensitive to psychological problems in older people or in those with chronic physical illness. However, studies of other chronic illnesses suggest that this is not the explanation. Reduction in mental health status scores using the SF36 have been observed in studies of hospital attenders with, for example, type 2 diabetes [22], coronary heart disease [23] and chronic renal failure [24]. In the coronary heart disease study [23] the SF36 performed in a similar fashion to the GHQ28, an instrument designed more specifically to identify symptoms of anxiety and depression [25]. Chronic illness in the general population is also associated more generally with lower mental health scores on the SF36 [26].

The apparent well being of those awaiting hip replacement may have a number of explanations. It...
Health status and hip osteoarthritis

Table 5. Association of hip osteoarthritis with health status dimensions of the SF36, stratified by presence or absence of knee pain

| Dimensiona | Controls | Cases | Differenceb |
|------------|----------|-------|-------------|
| Physical function |          |       |             |
| No knee pain | 77.4 (75.3, 79.5) | 36.6 (33.3, 39.9) | 40.8 (33.4, 44.6) |
| Knee pain    | 50.4 (46.5, 54.2)  | 26.3 (24.8, 27.9) | 24.1 (19.1, 28.8) |
| Mental health |          |       |             |
| No knee pain | 65.4 (66.2, 65.8) | 64.1 (62.6, 65.6) | 1.3 (−0.8, 3.8)   |
| Knee pain    | 63.4 (62.1, 64.8) | 62.5 (61.6, 63.5) | −0.9 (−2.6, 1.5)  |
| Energy/vitality |        |       |             |
| No knee pain | 59.6 (58.6, 60.6) | 58.6 (58.6, 60.4) | 1.6 (−1.0, 4.4)   |
| Knee pain    | 61.1 (59.4, 62.7) | 61.0 (59.9, 62.1) | 0.6 (−2.2, 3.5)   |
| Social functioning |     |       |             |
| No knee pain | 88.2 (85.7, 90.7) | 60.8 (54.4, 67.1) | 22.2 (12.9, 31.1) |
| Knee pain    | 69.1 (63.7, 74.6) | 44.7 (41.1, 48.3) | 27.4 (19.6, 35.9) |
| General health perception |      |       |             |
| No knee pain | 68.5 (66.0, 71.0) | 64.5 (60.2, 68.8) | −1.1 (−2.2, 6.0)  |
| Knee pain    | 51.5 (47.4, 55.5) | 53.5 (50.7, 56.4) | −2.0 (−11.9, 2.3) |

aScores for each dimension are based on a scale of 0–100: 0 indicates worst perceived health and 100 indicates best perceived health.
bStatistical analysis of mean paired-differences was based on stratification of the 611 case–control pairs by presence or absence of knee pain.

There was no evidence of an association between social class and waiting list status for hip osteoarthritis. However, there was no evidence in our study of a differential impact on mental health or vitality pre- and post-retirement age. It may be important that the hip osteoarthritis was, by definition, soon to be specifically treated, whereas chronic back pain and fibromyalgia lack specific cures. However, similar findings to those in this study have been reported from a cohort of new consultants with hip pain in primary care [9]. Alternatively, it may be that osteoarthritis of the large weight-bearing joints in older people presents a different ‘biopsychosocial’ mixture to chronic pain elsewhere.

The association of hip osteoarthritis with knee pain was not unexpected: clinically hip disease can present with knee pain, the presence of hip disease leading to gait alterations and consequent knee pain. Radiographic studies of osteoarthritis have shown an association between osteoarthritis at the hip and osteoarthritis at the knee and the hand [28]. However, in our patient group there were only weak links with hand pain, and a similar lack of association with shoulder pain. Once again this contrasts with the ‘regional musculoskeletal pain syndromes’ of young and middle-aged adults (back, shoulder, neck), where concurrence of pain at different sites is consistently reported [29]. It seems that with hip osteoarthritis we are dealing with a different type of problem compared to axial, upper-limb and generalized pain syndromes. There have been previous reported associations of BMI, occupational lifting and physical activity with hip osteoarthritis and knee osteoarthritis [30–32]. However, these factors did not explain the link between hip osteoarthritis and knee pain in our study.

There was no evidence of an association between social class and waiting list status for hip osteoarthritis...
surgery. However, social class was linked with health status, and hence cases from semi- or unskilled manual social classes awaiting hip replacement had lower mean function scores than those from higher social classes. Indeed, when average scores were compared across age, gender and social class bands, the absolute function scores of two adjacent people on a waiting list could be considerably different. Men aged under 65 yr in social class 1 or 2 awaiting total hip replacement were estimated as having a mean physical function score of 41.0, whereas females aged over 75 yr in social class IV or V had a mean physical function score of 20.6. Given that many of these differences also apply to people without hip disease who are in different age, gender and social class groups, such contrasts are to be expected. However, the differences between cases and controls, with respect to social functioning, were greater than expected on the basis of differences observed in social class. We are currently planning a prospective study to investigate the extent to which social functioning changes after total hip replacement in this cohort.

Acknowledgements

This research was supported by a grant from the Arthritis and Rheumatism Council of Great Britain. We thank Sydney Ansee, Trish Byng, Gillian Smith and Gillian Latham who managed the project and carried out the fieldwork, and general practitioners who allowed us to approach their patients. We thank our orthopaedic colleagues David Barrett and Magnus McLaren for their contribution. The late Graham Wield supported the data handling and Paul Winter helped with the database. The manuscript was prepared by Gail White.

References

1. Burger H, van Daele PL, Odding E et al. Association of radiographically evident osteoarthritis with higher bone mineral density and increased bone loss with age. The Rotterdam Study. Arthritis Rheum 1996;39:81–6.
2. Oberg U, Oberg T. Worse functional status among old people who admitted for arthroplasty—an evaluation with a new assessment system. Scand J Caring Sci 1996; 10:96–102.
3. Hopman-Rock M, Odding E, Hofman A, Kraaimaat FW, Bijlsma JW. Physical and psychosocial disability in elderly subjects in relation to pain in the hip and/or knee. J Rheumatol 1996;23:1037–44.
4. Hopman-Rock M, Kraaimaat FW, Bijlsma JW. Quality of life in elderly subjects with pain in the hip or knee. Qual Life Res 1997;6:67–76.
5. Hopman-Rock M, Odding E, Hofman A, Kraaimaat FW, Bijlsma JW. Difference in health status of older adults with pain in the hip or knee only and with additional mobility restricting conditions. J Rheumatol 1997;24:2416–23.
6. Jones CA, Voaklander DC, Johnston DW, Suarez-Almazor ME. Health related quality of life outcomes after total hip and knee arthroplasties in a community based population. J Rheumatol 2000;27:1745–52.
7. Orbell S, Espley A, Johnston M, Rowley D. Health benefits of joint replacement surgery for patients with osteoarthritis: prospective evaluation using independent assessments in Scotland. J Epidemiol Community Health 1998;52:564–70.
8. Williams JJ, Llewellyn Thomas H, Arshinoff R, Young N, Naylor CD. The burden of waiting for hip and knee replacements in Ontario. Ontario Hip and Knee Replacement Project Team. J Eval Clin Pract 1997;3:59–68.
9. Birrell F, Croft P, Cooper C, Hosie G, Macfarlane G, Silman A. Health impact of pain in the hip region with and without radiographic evidence of osteoarthritis: a study of new attendees to primary care. Ann Rheum Dis 2000; 59:857–63.
10. Grubber JM, Callahan LF, Helmick CG, Zuck MM, Pollard RA. Prevalence of radiographic hip and knee osteoarthritis by place of residence. J Rheumatol 1998; 25:959–63.
11. Urwin M, Symmons D, Allison T et al. Estimating the burden of musculoskeletal disorders in the community: the comparative prevalence of symptoms at different anatomical sites, and the relation to social deprivation. Ann Rheum Dis 1998;57:649–55.
12. Eachus J, Chan P, Pearson N, Propper C, Davey Smith G. An additional dimension to health inequalities: disease severity and socioeconomic position. J Epidemiol Community Health 1999;53:603–11.
13. Arnett FC, Edworthy SM, Bloch DA, McShane DJ, Fries JF, Cooper NS. The American Rheumatism Association, Revised criteria for the classification of rheumatoid arthritis. Arthritis Rheum 1988;31:315–24.
14. Rigby AS. Ankylosing spondylitis. In: Silman AJ, Hochberg MC, eds. Epidemiology of the rheumatic diseases. Oxford: Oxford University Press, 1993;105–47.
15. Ware JE, Snow KK, Kosinski M. SF-36<sup>®</sup> Health survey: manual and interpretation guide. Lincoln, RI: QualityMetric Incorporated, 2000.
16. Jenkinson C, Layte R, Wright L, Coulter A. The UK SF-36: An analysis and interpretation manual. Oxford: Health Services Research Unit, University of Oxford, 1996.
17. Office of National Statistics. Standard occupational classification. London: HMSO, 1991.
18. SPSS for Windows, Rel. 10.0.0. Chicago: SPSS Inc., 1999.
19. StataCorp. Stata statistical software: release 6.0. College Station, TX: Stata Corporation, 1999.
20. Singer MA, Hopman WM, MacKenzie TA. Physical functioning and mental health in patients with chronic medical conditions. Qual Life Res 1999;8:687–91.
21. Walters SJ, Munro JF, Brazier JE. Using the SF-36 with older adults: a cross-sectional community-based survey. Age Ageing 2001;30:337–43.
22. Claiborne N, Massaro E. Mental quality of life: an indicator of unmet needs in patients with diabetes. Soc Work Health Care 2000;32:25–43.
23. Faidhe I, Ramos I, Fernandez-Palacin F. Comparison between the GHQ-28 and SF-36 (MH 1–5) for the assessment of the mental health in patients with ischaemic heart disease. Eur J Epidemiol 2000;16:311–6.
24. Mittal SK, Ahern L, Fishbane S. Self-assessed physical and mental function of haemodialysis patients. Nephrol Dial Transplant 2001;16:1387–94.
25. Goldberg D, Hillier V. A scaled version of the General Health Questionnaire. Psychol Med 1979;9:139–45.
26. Doll HA, Petersen SE, Stewart-Brown SL. Obesity and physical and emotional well-being: associations between
body mass index, chronic illness, and the physical and mental components of the SF-36 questionnaire. Obes Res 2000;8:160–70.

27. Achat H, Kawachi I, Spiro A 3rd, DeMolles DA, Sparrow D. Optimism and depression as predictors of physical and mental health functioning: the Normative Aging Study. Ann Behav Med 2000;22:127–30.

28. Cooper C, Egger P, Coggon D et al. Generalised osteoarthritis in women: pattern of joint involvement and approaches to definition for epidemiological studies. J Rheumatol 1996;23:1938–42.

29. Makela M. Common musculoskeletal syndromes. Helsinki, Finland: Social Insurance Institution, 1993.

30. Cooper C, Inskip H, Croft P et al. Individual risk factors for hip osteoarthritis: obesity, hip injury, and physical activity. Am J Epidemiol 1998;147:516–22.

31. Coggon D, Kellingray S, Inskip H, Croft P, Campbell L, Cooper C. Osteoarthritis of the hip and occupational lifting. Am J Epidemiol 1998;147:523–8.

32. Felson DT, Zhang Y, Hannan MT et al. Risk factors for incident radiographic knee osteoarthritis in the elderly: the Framingham Study. Arthritis Rheum 1997;40:728–33.