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Outcomes and Factors Influencing Response to an Individualized Multidisciplinary Chronic Disease Management Program for Hip and Knee Osteoarthritis

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ABSTRACT

Background: The objective of the study was to investigate the effectiveness of, and factors associated with, response to a chronic disease management program for patients with hip and knee osteoarthritis (OA).
Methods: Over a 2-year period (2012-2014), 218 patients (97 hip OA; 121 knee OA) were managed with an individualized program of interventions that could include education, physiotherapy, orthotics, occupational therapy, or dietitian referral. Changes in Oxford Hip Score or Oxford Knee Score and Short Form-12 (SF-12) Physical and Mental Component Summary Score (PCS, MCS) were analyzed by joint affected, both unadjusted, and gender and age adjusted. A further analysis also adjusted for body mass index.
Results: At mean 12-month follow-up, patients with knee OA had a statistically significant improvement in Oxford Knee Score and PCS, while patients with hip OA had a statistically significant deterioration in all 3 scores. There was evidence that these changes differed between joints for Oxford and PCS scores. Older age was associated with worse outcomes for Oxford scores. Higher body mass index was associated with worse outcomes for Oxford and PCS scores. Patients with hip OA (35%) were more likely to deteriorate to a clinically significant extent (5 points) for Oxford scores than those with knee OA. Gender was not associated with outcomes. Patients with hip OA (54%) were more likely than those with knee OA (24%) to have subsequently had surgery ($P < .001$).
Conclusions: Patients with knee OA were more likely to improve with a chronic disease management plan than patients with hip OA and efforts should be directed to them.

In New Zealand and elsewhere, increasing numbers of patients are being referred for assessment of hip and knee osteoarthritis (OA), and the demand for surgery is rising [1,2]. This is putting pressure on many public health-care systems. Hip and knee total joint arthroplasty (TJA) are very effective interventions for the management of end-stage OA. They have excellent long-term results and are cost-effective [3–6]. However, up to 15%-20% of patients may be dissatisfied with the outcome of knee arthroplasty [7]. It is important, therefore, that surgery is reserved for failure of nonoperative treatment which should be maximized and effective.

Nonoperative treatment may include pharmacological treatments, exercise and physiotherapy programs, dietary advice and weight loss, and education and advice [8–10]. There is evidence for the effectiveness of nonoperative measures in both knee and hip OA [9,11–13]. However, there is conflicting evidence on predictors of response to nonoperative treatment. Studies have been based on patient populations in differing settings, with varying interventions and variable severity of disease [13–15]. There has been a trend

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toward the development of a chronic disease management model with multidisciplinary input aimed at implementing an individualized program for the management of hip and knee OA [8,15]. This may have advantages in optimizing nonoperative care, reducing the need for surgery, or delaying it to a more appropriate time, setting expectations, prehabilitating patients and hopefully may result in fewer dissatisfied patients [7,12,15,16].

In our institution, we have limited capacity to match the increasing demand for both out-patient assessment and for surgery [17–19]. This led us to develop a physiotherapist- and nurse-led clinic to assess and manage patients with hip and knee OA [20,21]. We have shown this to be effective as a triage tool which has freed up surgeon time to see only those most in need of surgical assessment [21]. The main purpose of the clinic, however, was to maximize nonoperative management of patients referred with hip and knee OA.

The purpose of this study was to determine the effectiveness of and to identify factors associated with response to an individualized multidisciplinary nonoperative program for patients with hip or knee OA who were initially assessed as being below the threshold for surgery.

Patients and Methods

The joint clinic was developed as part of a wider program to improve orthopedic patient flows. After a literature review and consultation, a physiotherapist led out-patient clinic set within the Orthopaedic Department of our institution was developed [20,21]. Patients referred by their general practitioner (GP) for orthopedic consultation for symptomatic hip or knee OA were triaged by an orthopedic consultant surgeon to the joint clinic, on the basis of the referral letter and radiographs. At the joint clinic, patients were assessed and examined by a senior musculoskeletal physiotherapist and orthopedic nurse, and appropriate radiological investigations were performed. Patients were given advice and education on their OA including lifestyle modifications and optimization of analgesia. An individualized program of interventions was developed which could include referral to a dietitian, physiotherapist, occupational therapist, and/or orthotist to develop a chronic disease management program aimed at optimizing nonoperative treatment. Patients could be referred for specialist assessment for surgery either at initial appointment or at a follow-up appointment. Review appointments were offered at 6 months and then every 6 months according to the need. Patients could be referred back before 6 months if their condition had deteriorated.

The inclusion criteria for this study were all patients seen and subsequently reviewed at the joint clinic. Exclusions were patients referred for surgical assessment at the initial appointment, those who chose to go to the private sector, incorrect diagnosis of hip or knee OA, death or severe illness, and those discharged directly back to their GP because of a mild clinical presentation. Twenty-three patients self-discharged from clinic or failed to attend for planned follow-up at 6 months.

This study reports on 218 patients with hip or knee OA seen at the joint clinic over a 2-year period from June 5, 2012 to May 27, 2014 and reviewed at a mean 12 months from the first assessment. There were 121 (56%) patients with knee OA and 97 (44%) with hip OA (Table 1.).

Patient-reported outcome measures (PROMs) were collected at the initial assessment and at follow-up appointments at the joint clinic. The Oxford score is a condition-specific self-reporting instrument commonly used for OA of hip and knee. In this study, the modified Oxford score was used, which contained 12 questions scored between 0 and 4, with 4 being the best outcome, thus yielding a total from 0 (worst outcome) to 48 (best outcome) [22]. The SF-12 is a measure of general well-being, composed of physical component summary (PCS) and mental component summary (MCS) scores. The 2 component scores were computed from the responses to 12 questions yielding a range from 0 (worst outcome) to 100 (best outcome) [23].

Responders were defined as patients who had an improvement greater than the minimum clinically important difference (MCID) for each score. The MCID for the Oxford score may be as low as 2 points between groups. We used a change of 5 points as being a clinically important difference for an individual patient [22,24]. The change on SF-12 PCS has also been calculated as 5 points for patients after TKA [25]. No equivalent figures could be found for MCS in TJA, but an MCID of 4.4 points has been described following anterior cruciate ligament reconstruction [26]. Therefore, the MCID was also, conservatively, taken as 5 points for the MCS.

Statistical Analysis

Comparisons between groups were performed using Mann-Whitney *U* tests for continuous measures and chi-squared tests for categorical measures. Spearman's correlations were calculated for associations between continuous outcomes. Paired *t* tests were used to compare changes in each of the 3 outcomes from baseline to follow-up where the assumption of normally distributed changes was satisfied. Marginal homogeneity of changes using MCIDs for pairs of outcome scores was tested using the Stuart-Maxwell test.

Further analysis were performed using linear regression for continuous outcomes (changes in each of Oxford, SF-12 PCS, and SF-12 MCS scores) and multinomial logistic regression for clinically significant changes in these outcomes (with categories of worse, stable, and improved based on MCIDs of 5 as described previously). Analyses were performed including only joint and baseline outcome scores in the models and then adjusted for baseline age and gender. Additional analyses were performed adding baseline body mass index (BMI) to the model where this was available. Interactions between each independent variable (age, gender, BMI,

Table 1
Demographic Details and Baseline Scores for all Patients.

	All Patients	Male	Female	Male vs Female (*P*)	Hip	Knee	Hip vs Knee (*P*)
Number (%)	218	100 (46%)	118 (54%)		97 (44%)	121 (56%)	
Age (y), mean (SD)	67.6 (9.4)	67.6 (9.4)	67.7 (9.4)	.991	66.5 (9.7)	68.5 (9.1)	.177
BMI, mean (SD) for n = 89	29.8 (5.6)	29.7 (4.9)	29.9 (6.2)	.780	28.4 (5.2)	30.8 (5.6)	.048
OHKS, mean (SD)	21.1 (7.7)	20.8 (7.8)	21.4 (7.6)	.590	22.1 (8.2)	20.3 (7.2)	.104
SF-12 PCS, mean (SD)	33.4 (8.9)	33.8 (8.9)	33.1 (8.9)	.606	34.7 (9.6)	32.3 (8.1)	.056
SF-12 MCS, mean (SD)	50.1 (11.0)	50.0 (11.3)	50.3 (10.8)	.795	50.4 (10.9)	49.9 (11.2)	.453

P values are from Mann-Whitney *U* tests.
BMI, body mass index; OHKS, Oxford Hip or Knee Score; SF-12 PCS, Short Form-12 Physical Component Score, SF-12 MCS, Short Form-12 Mental Component Score; SD, standard deviation.