

Physical Therapy Services for Older Adults with at Least Moderately Severe Hip or Knee Arthritis in 2 Ontario Counties

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ABSTRACT. Objective. Physical therapy (PT) is a recommended treatment for the management of arthritis. We investigated factors related to referral to PT services in people with hip or knee arthritis and describe characteristics of treatment received.

Methods. As part of a longitudinal study of the population aged ≥ 55 years with at least moderately severe hip or knee arthritis in 2 Ontario counties ($n = 1350$), participants were surveyed in the third year of followup about use of PT. Participants were categorized as to whether they had total joint replacement surgery in the past year (TJR group, $n = 52$) or did not (non-TJR group, $n = 1298$). Multivariate logistic regression was used to identify determinants of referral to PT considering sociodemographic characteristics, comorbidity, use of prescribed arthritis medication, and arthritis severity (WOMAC summary score).

Results. Overall, 18.7% of the cohort was referred to PT in the past year: 65.4% of the TJR group and 16.8% of the non-TJR group. The only significant predictor of PT in the TJR group was current use of prescribed arthritis medication. Greater arthritis severity, current use of prescribed arthritis medication, and greater comorbidity were significant independent predictors of referral to PT for the non-TJR group in multivariate logistic regression. The Ontario Health Insurance Plan paid for the majority of PT received.

Conclusion. Low rates of referral to PT in the previous year suggest possible underutilization. Further research is needed to examine patterns of use of PT throughout the course of the arthritis disease process and to examine barriers to PT access. (J Rheumatol 2005;32:123–9)

Key Indexing Terms:

PHYSICAL THERAPY

ARTHRITIS

REFERRAL

Arthritis is one of the most frequently reported chronic conditions in the population and the most frequent cause of disability^{1,2}. With the aging of the population, the number of people with arthritis and arthritis associated disability is projected to increase greatly^{3,4}. Given the large burden in the population, it is important that those affected have the opportunity to make use of therapies, such as physical therapy (PT), aimed at reducing pain, maintaining or improving joint mobility, and limiting functional disability.

PT has been recognized as having a central role in the

management of patients with functional limitations by the American College of Rheumatology as part of its guidelines for the treatment of hip and knee osteoarthritis (OA)⁵⁻⁷, the predominant type of arthritis in the population⁸. Further, PT is considered an important component of the overall episode of care surrounding total joint replacement, as it helps individuals to maximize their function⁹⁻¹².

The emphasis on PT for arthritis is on exercise and education. There is evidence from randomized controlled trials that exercise is safe and effective for improving pain, func-

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tion, and disability in patients with arthritis¹³⁻¹⁹, although the optimal regimen has not been determined. Physical therapists can also provide interventions such as balance, coordination, and functional retraining techniques to assist arthritis patients in overcoming some of the barriers that may make participation in physical activity difficult²⁰. Further, patients with at least some contact with a physical therapist have been found to be more active in self-care activities such as regular exercise and symptom self-management²¹.

Arthritis has consistently been found to be one of the leading reasons for referral to PT²²⁻²⁵, yet literature on the patterns of use of PT for arthritis, particularly in a community setting, is scarce. Such information is of particular interest in Ontario, where there has been a significant shift in the delivery of PT services over the last decade. An increase in private sector involvement over this time has raised concerns about the accessibility of services in the province. Our objectives were to determine the rate of use of PT over the previous year in an Ontario cohort of older adults with at least moderately severe hip or knee arthritis, and to examine determinants of referral to PT, considering sociodemographic characteristics, arthritis severity, and comorbidity. We also examined the characteristics of PT service use, particularly the service setting, therapy duration, payment methods, and additional costs incurred.

MATERIALS AND METHODS

Data source. The data were collected as part of a larger study examining the determinants of arthritis disability and total joint replacement surgery (TJR). The study is being conducted in 3 phases in 2 counties in Ontario, Canada, where the current rates for TJR were shown to be disparate: Oxford County (rural, high rates) and East York (urban, low rates). Methods of this study have been reported²⁶⁻²⁸ and are summarized below. **Phase 1 — Screening survey.** A brief screening questionnaire was mailed to the entire population aged 55 years and older in East York (n = 26,293) and Oxford County (n = 21,925) to identify individuals with self-reported joint symptoms or disabilities.

Phase 2 — Baseline survey. Respondents were selected for the Phase 2 survey (Oxford County: n = 1735; East York: n = 1572) if they had at least moderately severe hip or knee complaints defined as meeting all the following criteria: (1) difficulty in the past 3 months with each of stair climbing, arising from a chair, standing, and walking; (2) self-reported swelling, pain, or stiffness in any joint lasting ≥ 6 weeks in the past 3 months; and (3) indication on a homunculus that a hip and/or knee was “troublesome.” Participants eligible for Phase 2 were mailed the Phase 2 questionnaire within 3 weeks of receipt of their completed Phase 1 questionnaire, between January 1996 and October 1998. Response rates for the Phase 1 and Phase 2 surveys were $\geq 72\%$ in both counties. Respondents completed the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC)²⁹, a reliable and valid measure of the severity of hip and knee arthritis symptoms and disability. The WOMAC consists of 3 subscales (pain, stiffness, physical function); the WOMAC summary score is the summation of these 3 subscales, rescaled to range from 0 to 100. Higher scores for the subscale and summary scores indicate greater arthritis severity. Respondents were also asked to report concurrent health problems, prior joint replacement surgery, medication use, and a variety of sociodemographic variables.

Phase 3 — Longitudinal followup. Annual interviews with Phase 2 respon-

dents are being carried out until at least 5 years of followup data is acquired. Each followup survey collects data on arthritis severity (WOMAC), concurrent health problems, joint replacement surgery, medication use, and sociodemographic characteristics.

To investigate the role of arthritis severity in precipitating referral to PT, WOMAC summary scores were calculated from the data obtained in the second followup questionnaire (May 2000–March 2001), while data on the use of PT services was collected in the third followup questionnaire (July 2001–March 2002).

Referral to PT in the past year was ascertained as a positive response to the question, “Have you been referred for or told to try physical therapy (physiotherapy) within the past year?” Participants were also asked who referred them to or told them to try PT. If respondents had received PT, they answered additional questions concerning treatment setting, method of payment, additional costs, and the number of sessions received.

Comorbid conditions were defined as the number of self-reported health problems, other than arthritis, for which treatment (seeing a physician or taking medication) was received in the past year. Participants were asked about 10 health problems other than arthritis: stomach ulcers, kidney disease, cancer (excluding skin), lung problems, cardiovascular problems, neurologic problems, diabetes, mental illness, osteoporosis, and cirrhosis of the liver.

A dichotomous variable (yes/no) for self-reported current use of prescribed arthritis medication was created. Prescribed arthritis medications were defined as any of celecoxib, rofecoxib, other antiinflammatory drugs, painkillers with codeine, and oral steroids.

Analysis. Baseline characteristics of respondents and nonrespondents were compared. The percentage of study participants referred to PT in the past year was calculated stratified by total joint replacement surgery status (TJR status): i.e., had hip or knee TJR in the past year (TJR group) versus did not have hip or knee TJR in the past year (non-TJR group). Characteristics of the 2 groups were compared and for each group, the percentage of participants referred to PT in the past year was calculated stratified by sociodemographic characteristics, number of comorbid conditions, use of prescribed arthritis medication, and WOMAC summary scores. The significance of associations was assessed using chi-square/Fisher exact tests for proportions and Student t-tests for means. The Mantel-Haenszel chi-square test for trend was evaluated for the proportion of respondents referred by WOMAC summary scores and number of comorbid conditions.

For the non-TJR group, multivariate logistic regression was used to evaluate the relationship between referral to PT in the past year (yes/no) and age, sex, region of residence, highest level of education, living arrangements, WOMAC summary score, number of comorbid conditions, and use of prescribed arthritis medication. WOMAC summary score and number of comorbid conditions were entered as continuous variables; all other variables were treated categorically. Odds ratios and 95% confidence intervals were determined. The goodness-of-fit of the model was assessed using the Hosmer-Lemeshow statistic. For all analyses, a 2-tailed $p \leq 0.05$ was considered to indicate statistical significance.

RESULTS

The response rate for the questionnaire administered in the third year of longitudinal followup was 80.0%, adjusted for deaths and ineligibility. Of the 2411 respondents who completed the baseline questionnaire, 702 were ineligible to complete the third followup questionnaire (463 dead, 239 unable to complete due to illness or cognitive problems). Of the remaining 1709 eligible respondents, 227 refused, 115 could not be traced, and data on PT were missing for one participant. There were 16 individuals who were currently on a waiting list for TJR. These individuals were excluded from the analyses, as sample size was too small to examine

this group separately and it was deemed inappropriate to group these individuals with either the TJR or non-TJR group. Thus the analyses presented here were based on 1350 individuals.

Nonrespondents were more likely to be older, less well educated, and residing in East York than respondents (Table 1). Nonrespondents also reported more comorbid conditions at baseline than respondents.

Subjects in the TJR group were more likely to be male and younger than those in the non-TJR group (Table 2).

Overall, 18.7% of the cohort was referred to PT in the past year: 65.4% of the TJR group and 16.8% ($p < 0.001$) of the non-TJR group (Table 3).

No statistically significant associations were found between various sociodemographic characteristics, WOMAC summary scores, or number of comorbid conditions and referral to PT in the past year for the TJR group. However, those currently taking a prescribed arthritis medication were referred in a higher proportion than those not taking such medications (47.4% vs 75.8%; $p = 0.038$). The small size of our TJR group prohibited multivariate analyses.

In the non-TJR group, the percentage of women referred was significantly higher than the percentage of men ($p = 0.028$). There were also statistically significant trends for higher referral rates with increasing WOMAC summary scores ($p_{\text{trend}} < 0.001$) and greater number of comorbid conditions ($p_{\text{trend}} = 0.004$). In the highest WOMAC score quar-

Table 1. Comparison of baseline (Phase 2) characteristics of respondents and nonrespondents.

	Percentage (no.) or Mean (95% CI)	
	Respondents, n = 1350	Nonrespondents, n = 359
Region of residence		
East York	42.4 (572)	50.4 (181)*
Oxford County	57.6 (778)	49.6 (178)
Sex		
Male	24.2 (327)	27.0 (97)
Female	75.8 (1023)	73.0 (262)
Age, yrs		
55–64	38.5 (520)	32.9 (118)†
65–74	40.0 (540)	31.8 (114)
75+	21.5 (290)	35.4 (127)
Highest level of education		
Grade 8 or less	27.6 (363)	36.6 (125)††
High school	50.7 (661)	48.0 (164)
Community college, university, or postgraduate	21.6 (282)	15.5 (53)
Living arrangement		
Alone	29.3 (388)	31.1 (106)
With others	70.7 (937)	68.9 (235)
WOMAC summary score	39.4 (38.4, 40.4)	39.7 (37.6, 41.9)
No. of comorbid conditions	1.2 (1.1, 1.3)	1.4 (1.3, 1.5)**

Comparing respondents and nonrespondents: * $p = 0.006$; † $p < 0.001$; †† $p = 0.002$; ** $p = 0.001$.

Table 2. Comparison of characteristics of TJR and non-TJR groups.

	Percentage (no.) or Mean (95% CI)	
	TJR Group, n = 52	Non-TJR Group, n = 1298
Region of residence		
East York	44.2 (23)	42.3 (549)
Oxford County	55.8 (29)	57.7 (749)
Sex		
Male	38.5 (20)	23.7 (307)*
Female	61.5 (32)	76.4 (991)
Age, yrs		
55–64	17.3 (9)	15.0 (194)†
65–74	51.9 (27)	37.4 (485)
75+	30.8 (16)	47.7 (619)
Highest level of education		
Grade 8 or less	26.5 (13)	27.7 (347)
High school	49.0 (24)	50.8 (637)
Community college, university, or postgraduate	24.5 (12)	21.5 (270)
Living arrangement		
Alone	25.0 (13)	34.9 (452)
With others	75.0 (39)	65.1 (844)
WOMAC summary score	39.2 (34.3, 44.2)	36.4 (35.4, 37.4)
No. of comorbid conditions	1.3 (0.9, 1.6)	1.4 (1.4, 1.5)
Use of prescribed arthritis medication		
Not currently taking	36.5 (19)	39.5 (511)
Currently taking	63.5 (33)	60.5 (784)

Comparing TJR status groups: * $p = 0.015$; † $p = 0.049$.

tile, roughly one-quarter of individuals were referred. Although not statistically significant, individuals with greater education in both TJR groups were more likely to have been referred than those with less education.

In multivariate logistic regression for the non-TJR group, sociodemographic characteristics were not related to referral to PT in the past year (Table 4). For every 10 point increase in the WOMAC summary score, the odds of referral to PT increased by a factor of 1.15 (95% CI 1.04–1.27). Individuals with greater comorbidity were more likely to be referred (OR 1.24, 95% CI 1.07–1.44), and for those taking a prescribed arthritis medication, the odds of referral to PT were 1.63 times greater (95% CI 1.16–2.29) than for those not currently taking such medications.

Of the 252 individuals referred to PT, 178 reported the source of the referral. The majority (97.2%) were referred by a physician, while the remainder reported being told to try PT by friends or family members or were simply self-referred. Most people (95.6%) referred to PT reported attending at least one session. The median number of PT sessions received per week was 2 for both the TJR and non-TJR groups, for a median of 10 and 8 weeks for these groups, respectively. The majority of the TJR group received their therapy in a hospital outpatient department (Table 5). For individuals who did not have TJR, just over half reported receiving therapy in a community clinic, although a substantial proportion also reported receiving

Table 3. Descriptive statistics for referral to physical therapy in the past year stratified by TJR status.

	Percentage (no.) of Participants Referred to Physical Therapy in the Past Year	
	TJR Group	Non-TJR Group
Total	65.4 (34)*	16.8 (218)
Region of residence		
East York	60.9 (14)	18.2 (100)
Oxford County	69.0 (20)	15.8 (118)
Sex		
Male	50.0 (10)	12.7 (39) [†]
Female	75.0 (24)	18.1 (179)
Age, yrs		
55–64	66.7 (6)	21.1 (41)
65–74	63.0 (17)	15.3 (74)
75+	68.8 (11)	16.6 (103)
Highest level of education		
Grade 8 or less	46.2 (6)	15.0 (52)
High school	66.7 (16)	17.6 (112)
Community college, university, or postgraduate	83.3 (10)	18.2 (49)
Living arrangement		
Alone	61.5 (8)	18.6 (84)
With others	66.7 (26)	15.8 (133)
WOMAC summary score		
0 – < 24	58.3 (7)	13.9 (46) ^{††}
24 – < 37	60.0 (6)	11.9 (31)
37 – < 49	69.2 (9)	20.5 (62)
49+	75.0 (12)	24.2 (68)
No. of comorbid conditions		
0	60.0 (9)	12.5 (31)**
1–2	66.7 (22)	16.7 (143)
3+	75.0 (3)	23.0 (44)
Use of prescribed arthritis medication		
Not currently taking	47.4 (9)***	11.7 (60) [#]
Currently taking	75.8 (25)	20.2 (158)

Comparing TJR status groups: * $p < 0.001$. Within TJR status group: [†] $p = 0.028$; ^{††} $p_{\text{trend}} < 0.001$; ** $p_{\text{trend}} = 0.004$; *** $p = 0.038$; # $p < 0.001$.

therapy in a hospital outpatient department. The Ontario Health Insurance Plan (OHIP) paid for most PT, although over a quarter of individuals in the non-TJR group reported paying for some part of their own therapy. Most people reported no additional costs resulting from their therapy (e.g., purchase of assistive devices or exercise equipment).

DISCUSSION

Only a minority, about one in 5 people, with at least moderately severe hip or knee arthritis in our Ontario cohort were referred to and received PT treatment in the past year. Having had hip or knee TJR in the previous year was a major determinant of being referred; 65% of those who had TJR were referred, while only 17% of those who did not were referred. These results suggest possible underutilization of PT for arthritis in the province of Ontario.

The finding that 35% of individuals in the TJR group did not receive PT is significant. This finding is similar to that

Table 4. Odds ratios for referral to physical therapy in the past year for the non-TJR group.

Variable	OR (95% CI)
Region of residence	
East York	Reference
Oxford County	0.93 (0.67, 1.28)
Age group, yrs	
55–64	Reference
65–74	0.69 (0.44, 1.08)
75+	0.67 (0.43, 1.05)
Sex	
Male	Reference
Female	1.10 (0.73, 1.65)
Highest level of education	
Grade 8 or less	Reference
High school	1.20 (0.82, 1.76)
Community college or higher	1.38 (0.87, 2.18)
Living arrangement	
Alone	Reference
With others	0.85 (0.61, 1.21)
WOMAC summary score	1.01 (1.00, 1.02)*
No. of comorbid conditions	1.24 (1.07, 1.44)*
Use of prescribed arthritis medication	
Not currently taking	Reference
Currently taking	1.63 (1.16, 2.29) [†]

* $p = 0.004$; [†] $p = 0.005$. Hosmer-Lemeshow goodness-of-fit statistic, 10.51 with 8 degrees of freedom ($p = 0.23$).

Table 5. Location of physical therapy, payment methods, and additional costs.

	Percentage (no.) of Study Participants Who Received Physical Therapy in the Past Year	
	TJR Group	Non-TJR Group
Location of physical therapy*		
Hospital outpatient department	78.8 (26)	34.0 (68)
Community clinic	21.2 (7)	52.5 (105)
At home	30.3 (10)	20.0 (40)
Major payment methods for physical therapy*		
Ontario Health Insurance Plan	97.0 (32)	85.3 (174)
Extended healthcare benefits	3.0 (1)	12.8 (26)
Self	9.1 (3)	26.5 (54)
Additional costs associated with physical therapy		
None	87.9 (29)	91.7 (187)

* Some respondents reported more than one location or payment method.

of Lingard, *et al*³⁰ for knee replacement patients in the United Kingdom and Australia. They reported that 53% and 67% of patients in these countries received outpatient PT, respectively, while 5% and 6% received home PT. Further research into the determinants of PT use for patients who undergo hip or knee TJR is required. Particular attention to measures of socioeconomic status may also be warranted; only 46% of the least educated individuals in our TJR group were referred to PT, whereas 83% of those with the most education were referred.

We excluded the small number of individuals in the study cohort who were currently on a waiting list for joint replacement from our analyses. Of these 16 individuals, 7 (44%) reported being referred to PT in the past year. The appropriate role of preoperative PT warrants further study given conflicting findings about its benefits³¹⁻³³.

In research not limited to arthritis related care, women^{22,23,34} and more educated individuals²⁵ have been found to be more frequent users of rehabilitation services. Research has also found that referral rates to rehabilitation services decrease with increasing age³⁵, even among the elderly^{25,35,36}. In our study, age, sex, and highest level of education were not significant predictors of referral to PT in multivariate logistic regression. Disease severity was significantly associated with PT referral, in accord with previous findings for OA³⁷ and rheumatoid arthritis²¹. However, the associations in our non-TJR group between referral to PT and number of comorbid conditions, and particularly taking a prescribed arthritis medication, were stronger than that for the WOMAC summary score, our measure of arthritis severity. The participants in our study were quite homogeneous in terms of severity, as indicated by the narrow confidence interval around the WOMAC summary score (Table 2). It may be that other factors drive PT referral once this level of severity is reached. An interesting finding by Waltz, *et al*²¹ was that fatigue severity was a better predictor of PT referral in patients with rheumatoid arthritis than measures of disease activity and functional status. Arthritis is often perceived as a normal part of aging and as a result, affected individuals may simply not seek care or be aware of the benefits of PT. Research has shown that self-perceived helpfulness of PT predicts use in patients with OA, as does a physician recommendation³⁷. A major factor in precipitating referral to PT may simply be contact with a physician so that such a recommendation can be made. Taking a prescribed medication is indicative of contact with a physician, as is increased comorbidity.

There has been concern about the adequacy of treatment provided by primary care practitioners for musculoskeletal conditions³⁸⁻⁴⁰, including the appropriate use of nonpharmacological modes⁴¹ such as PT⁴². An additional factor that may affect physicians' propensity to refer to PT may be the length of waiting lists^{43,44}. Research in Ontario has shown that rheumatologists less frequently refer to PT in particular settings when they perceive the waiting time as unacceptable⁴⁴. Although primary care physicians are largely responsible for diagnosing and treating musculoskeletal conditions, they often receive little exposure to them during undergraduate^{45,46} and residency training⁴⁷. Our results imply that health education about the availability and benefit of nonpharmacological treatment options like PT may be warranted, for patients and practitioners alike. Although clinical guidelines^{5-7,48} clearly emphasize the role of nonpharmacological treatment modes in the management of

lower limb OA, greater evidence for the effectiveness of specific PT modalities would likely be beneficial in encouraging physician referral.

Although the majority of PT provided to the participants of our study was funded by the Ontario Health Insurance Plan, the publicly funded fee-for-service system that covers the cost of medical and hospital care, this does not reflect the balance of public and private funding for PT in Ontario. There has been a shift in the provision of PT in Ontario over the last decade towards an increase in the number of privately funded clinics located both inside and outside hospitals, with the result that the majority of PT is now provided in the private sector. Currently, only about 14% of physical therapists in the province work in an OHIP funded clinic (Schedule 5; written communication, The College of Physiotherapists of Ontario, Toronto).

Individuals with extended health care benefits, for example through their place of employment, can have PT services in private, non-OHIP clinics paid for by these plans. Individuals not covered by an extended health insurance plan must pay for the cost of their services in a private clinic themselves. It may be that physicians refer patients to PT on the basis of their health care coverage. The low proportion of participants receiving PT in our study may be a reflection of financial barriers to PT when a publicly funded clinic is unavailable. Such financial barriers are likely to be of particular significance for older individuals, like the participants in this study, many of whom are retired.

There were several limitations to our study. First, participants in our study were limited to residents of 2 Ontario counties and our findings may not be generalizable to other areas. Second, all the data were based on participants' self-report. However, our study participants all had significant symptoms and functional impairments consistent with moderate to severe symptomatic arthritis and it is these symptoms that PT seeks to address.

The data on PT referral and use in our study only relate to the past year and do not allow for inferences about the use of PT throughout the course of the disease. It may be that some participants were currently attending PT, but were referred prior to the year before the survey, meaning that we may have underestimated the use of PT in the past year. Individuals with arthritis may also receive treatment similar to PT via self-help programs or other health professionals such as chiropractors or kinesiologists. However, only 6% of individuals in the non-TJR group who were not referred to PT reported participating in a formal exercise program. Subjects may also have received PT at an earlier date and have been currently maintaining a PT-prescribed exercise program at home. We could not determine whether PT referral occurred before or after surgery for the TJR group. However, this would have the effect of overestimating post-surgical PT referral, raising further concern about the significant proportion of individuals in our study who had TJR,

but who did not receive PT. We may also have overestimated referral to PT for hip and knee arthritis specifically, as the reasons for referral were not attributed.

Examining matters of access to care for arthritis is an important public health issue, given the high prevalence of the disorder in the population. This issue is expected to increase in relevance, as estimates suggest that the number of people with arthritis in Canada will double by 2020³. Despite this, there has been little published research on the patterns of use of PT for arthritis. Our study documented low rates of referral to and use of PT in the past year for individuals with at least moderately severe hip or knee arthritis in 2 Ontario counties. Further research is needed to examine the patterns of use of PT throughout the course of the arthritis disease process and to examine barriers to PT access.

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REFERENCES

1. Lagace C, Perruccio A, DesMeules M, Badley EM. The impact of arthritis on Canadians. In: Badley EM, DesMeules M, editors. *Arthritis in Canada: an ongoing challenge*. Ottawa: Health Canada; 2003:7-34.
2. Centers for Disease Control and Prevention. Prevalence of disabilities and associated health conditions among adults – United States, 1999. *MMWR Morb Mortal Wkly Rep* 2001;50:120-5.
3. Badley E, Wang PP. Arthritis and the aging population: projections of arthritis prevalence in Canada 1991 to 2031. *J Rheumatol* 1998;24:138-44.
4. Helmick CG, Lawrence RC, Pollard RA, Lloyd E, Heyse SP. Arthritis and other rheumatic conditions: who is affected now, who will be affected later? National Arthritis Data Workgroup. *Arthritis Care Res* 1995;8:203-11.
5. Altman RD, Hochberg MC, Moskowitz RW, Schnitzer TJ. Recommendations for the medical management of osteoarthritis of the hip and knee. *Arthritis Rheum* 2000;43:1905-15.
6. Hochberg MC, Altman RD, Brandt KD, et al. Guidelines for the medical management of osteoarthritis: Part I. Osteoarthritis of the hip. *Arthritis Rheum* 1995;38:1535-40.
7. Hochberg MC, Altman RD, Brandt KD, et al. Guidelines for the medical management of osteoarthritis: Part II. Osteoarthritis of the knee. *Arthritis Rheum* 1995;38:1541-6.
8. Felson DT, Lawrence RC, Dieppe PA, et al. Osteoarthritis: new insights. Part 1: the disease and its risk factors. *Ann Intern Med* 2000;133:635-46.
9. Harris WH, Sledge CB. Total hip and knee replacement (1). *N Engl J Med* 1990;323:725-31.
10. Harris WH, Sledge CB. Total hip and knee replacement (2). *N Engl J Med* 1990;323:801-7.
11. Liang MH, Cullen KE, Larson MG, et al. Effects of reducing physical therapy services on outcomes in total joint arthroplasty. *Med Care* 1987;25:276-85.
12. Zavadak KH, Gibson KR, Whitley DM, Britz P, Kwok CK. Variability in the attainment of functional milestones during the acute care admission after total joint replacement. *J Rheumatol* 1995;33:482-7.
13. van Baar ME, Dekker J, Oosterdorp RA, et al. The effectiveness of exercise therapy in patients with osteoarthritis of the hip or knee: a randomized clinical trial. *J Rheumatol* 1998;25:2432-9.
14. Rogind H, Bibow-Nielsen B, Jensen B, Moller HC, Frimodt-Moller H, Bliddal H. The effects of a physical training program on patients with osteoarthritis of the knees. *Arch Phys Med Rehabil* 1998;79:1421-7.
15. Ettinger WH Jr, Burns R, Messier SP, et al. A randomized trial comparing aerobic exercise and resistance exercise with a health education program in older adults with knee osteoarthritis. The Fitness Arthritis and Seniors Trial (FAST). *JAMA* 1997;277:25-31.
16. O'Reilly SC, Muir KR, Doherty M. Effectiveness of home exercise on pain and disability from osteoarthritis of the knee: a randomized controlled trial. *Ann Rheum Dis* 1999;58:15-9.
17. Franssen M, Crosbie J, Edmonds J. Physical therapy is effective for patients with osteoarthritis of the knee: a randomized controlled trial. *J Rheumatol* 2001;28:156-64.
18. Wang AW, Gilbey HJ, Ackland TR. Perioperative exercise programs improve early return of ambulatory function after total hip arthroplasty: a randomized, controlled trial. *Am J Phys Med Rehabil* 2002;81:801-6.
19. Hopman-Rock M, Westhoff HM. The effects of a health educational and exercise program for older adults with osteoarthritis of the hip or knee. *J Rheumatol* 2000;27:1947-54.
20. Fitzgerald GK, Oatis C. Role of physical therapy in management of knee osteoarthritis. *Curr Opin Rheumatol* 2004;16:143-7.
21. Waltz M. The disease process and utilization of health services in rheumatoid arthritis: the relative contributions of various markers of disease severity in explaining consumption patterns. *Arthritis Care Res* 2000;13:74-88.
22. Jaswal K, Vandervoot A, Speechley M, Helewa A. Use of outpatient physiotherapy services by seniors. *Physiother Can* 1997;49:129-36.
23. Akpala CO, Curran AP, Simpson JO. Physiotherapy in general practice: Patterns of utilization. *Public Health* 1988;102:263-8.
24. McCallum NC. A survey of the views of elderly out-patients on their physiotherapy treatment. *Physiotherapy* 1990;76:487-92.
25. Mayer-Oakes SA, Hoenig H, Atchison KA, Lubben JE, De Jong F, Schweitzer SO. Patient-related predictors of rehabilitation use for community-dwelling older Americans. *J Am Geriatr Soc* 1992;40:336-42.
26. Hawker GA, Wright JG, Coyte PC, et al. Differences between men and women in the rate of use of hip and knee arthroplasty. *N Engl J Med* 2000;342:1016-22.
27. Hawker GA, Wright JG, Coyte PC, et al. Determining the need for hip and knee arthroplasty: the role of clinical severity. *Med Care* 2001;39:206-16.
28. Hawker GA, Wright JG, Glazier RH, et al. The effect of education and income on need and willingness to undergo total joint arthroplasty. *Arthritis Rheum* 2002;46:3331-9.
29. Bellamy N, Buchanan WW, Goldsmith CH, Campbell J, Stitt LW. Validation study of WOMAC: a health status instrument for measuring clinically important patient relevant outcomes to antirheumatic drug therapy in patients with osteoarthritis of the hip or knee. *J Rheumatol* 1988;15:1833-40.
30. Lingard EA, Berven S, Katz JN; Kinemax Outcomes Group. Management and care of patients undergoing total knee arthroplasty: variations across different health care settings. *Arthritis Care Res* 2000;13:129-36.
31. Gilbey HJ, Ackland TR, Wang AW, Morton AR, Troughet T, Tapper J. Exercise improves early functional recovery after total hip arthroplasty. *Clin Orthop* 2003;408:193-200.
32. Rodgers JA, Garvin KL, Walker CW, Morford D, Urban J, Bedard J. Preoperative physical therapy in primary total knee arthroplasty. *J Arthroplasty* 1998;13:414-21.
33. Wijgman AJ, Dekkers GH, Waltje E, Krekels T, Arens HJ. No positive effect of preoperative exercise therapy and teaching in patients to be subjected to hip arthroplasty. *Ned Tijdschr Geneesk*

- 1994;138:949-52.
34. Kauffmann T, Jackson OL. Defining the geriatric population. *Clinical Management* 1990;10:18-22.
 35. Blake R. Disabled older persons: a demographic analysis. *J Rehabil* 1981;47:19-27.
 36. Vasey LM. DNAs and DNCTs — why do patients fail to begin or to complete a course of physiotherapy treatment? *Physiotherapy* 1990;76:575-8.
 37. Hsieh JB, Domnick KL. Use of non-pharmacological therapies among patients with osteoarthritis. *Aging Clin Exp Res* 2003;15:419-25.
 38. Gamez-Nava JI, Gonzalez-Lopez L, Davis P, Suarez-Almazor ME. Referral and diagnosis of common rheumatic diseases by primary care physicians. *Br J Rheumatol* 1998;37:1215-9.
 39. Glazier RH, Dalby DM, Badley EM, et al. Management of common musculoskeletal problems: a survey of Ontario primary care physicians. *CMAJ* 1998;158:319-20.
 40. Bellamy J, Gilbert JR, Brooks PM, Emmerson BT, Campbell J. A survey of current prescribing practices of anti-inflammatory and urate lowering drugs in gouty arthritis in the province of Ontario. *J Rheumatol* 1988;15:1841-7.
 41. Chevalier X, Marre JP, de Butler J, Hercek A. Questionnaire survey of management and prescription of general practitioners in knee osteoarthritis: a comparison with 2000 EULAR recommendations. *Clin Exp Rheumatol* 2004;22:205-12.
 42. Glazier RH, Dalby DM, Badley EM, et al. Management of the early and late presentations of rheumatoid arthritis: a survey of Ontario primary care physicians. *CMAJ* 1996;155:679-87.
 43. Earwicker SC, Whynes DK. General practitioners' referral thresholds and choices of referral destination: an experimental study. *Health Econ* 1998;33:566-8.
 44. Li L, Bombardier C. Utilization of physiotherapy and occupational therapy by Ontario rheumatologists in managing rheumatoid arthritis: a survey. *Physiotherapy Canada* 2003;55:23-30.
 45. Pinney SJ, Regan WD. Educating medical students about musculoskeletal problems. Are community needs reflected in the curricula of Canadian medical schools? *J Bone Joint Surg Am* 2001;83:1317-20.
 46. DiCaprio MR, Covey A, Bernstein J. Curricular requirements for musculoskeletal medicine in American medical schools. *J Bone Joint Surg Am* 2003;85:565-7.
 47. Renner BR, DeVellis BM, Ennett ST, et al. Clinical rheumatology training of primary care physicians: the resident perspective. *J Rheumatol* 1990;17:666-72.
 48. Jordan KM, Arden NK, Doherty M, et al. EULAR recommendations 2003: an evidence based approach to the management of knee osteoarthritis: report of a task force of the Standing Committee for International Clinical Studies Including Therapeutic Trials (ESCISIT). *Ann Rheum Dis* 2003;62:1145-55.