Quality of Nonpharmacological Care in the Community for People with Knee and Hip Osteoarthritis

LINDA C. LI, ERIC C. SAYRE, JACEK A. KOPEC, JOHN M. ESDAILE, SHERRY BAR, and JOLANDA CIBERE

ABSTRACT. ***Objective.*** To assess the quality of nonpharmacological care received by people with knee and/or hip osteoarthritis (OA) in the community and to assess the associated factors.

Methods. We conducted a postal survey to evaluate 4 OA quality-of-care indicators for knee/hip OA: (1) advice to exercise; (2) advice to lose weight; (3) assessment for ambulatory function; and (4) assessment for nonambulatory function, including dressing, grooming, and arising from a seated position. Eligible participants were identified from the administrative database of British Columbia between 1992 and 2006.

Results. In total, 1349 participants reported knee and/or hip OA [knee only = 700 (51.9%); hip only = 261 (19.3%); knee and hip = 388 (28.8%)]. Their mean age was 67.1 years (SD 11.1); 816 (60.5%) were women, and 921 (68.3%) were diagnosed with OA for 6 years or longer. The overall pass rate of the 4 quality indicators was 22.4% (95% CI 20.5, 24.3). The pass rate for the individual quality indicator ranged from 6.9% for assessment of nonambulatory function to 29.2% for receiving assessment of ambulatory function. Receiving exercise advice was associated with having a university degree (vs high school diploma; OR 3.10, 95% CI 2.00, 4.80). Receiving weight-loss advice was associated with being female (OR 2.64, 95% CI 1.71, 4.08), being aged 55–64 years (compared to being aged 75 and over; OR 1.96, 95% CI 1.02, 3.76), and having higher Western Ontario and McMaster Universities Osteoarthritis Index scores (for every 10-point increment; OR 1.14, 95% CI 1.02, 1.26). On the other hand, having less than a high school education reduced the odds of weight-loss advice (OR 0.52, 95% CI 0.30, 0.88).

Conclusion. The quality of nonpharmacological care for people with knee/hip OA in the community is suboptimal. Advice on exercise and weight management may not be provided equally across sex, age, disability, and formal education levels. (First Release Aug 1 2011; J Rheumatol 2011;38:2230–7; doi:10.3899/jrheum.110264)

Key Indexing Terms:
OSTEOARTHRITIS QUALITY OF CARE WEIGHT MANAGEMENT
NONPHARMACOLOGICAL INTERVENTIONS SURVEY EXERCISE

Osteoarthritis (OA) is the most common form of joint disease, affecting about 10% of the population[1]. The prevalence of OA is increasing rapidly with the aging of the population. In Canada, the prevalence of arthritis is projected to be 20% by 2031, representing an increase of 38% from 2007, and with the majority of these people having OA[2]. The knee and hip are commonly affected, and ample evidence supports the use of pain medication, exercise, and weight management as the first-line treatment[3,4,5]. Previous studies suggested that 33% to 63% of patients with knee or hip OA had received a recommendation from a health professional to exercise[6,7,8], 31% had been told to lose weight, and 27% had been recommended to use mobility aids[7]. Patients might also try these interventions on their own initiative, but some might require guidance from a health professional to achieve therapeutic benefits[9]. It was unclear whether those who did not receive a recommendation for these interventions really did not need it or if they simply did not receive a required intervention.

In 2004, the Arthritis Foundation supported the Rand Group to develop 14 quality indicators covering the assessment, treatment, and followup for patients with OA[10]. These indicators were developed using a comprehensive literature synthesis and were reviewed by a multidisciplinary expert

From the Department of Physical Therapy, the School of Population and Public Health, the Department of Medicine, and the Division of Rheumatology, University of British Columbia; the Arthritis Research Centre of Canada, Vancouver; and the Primary Health Care Branch, British Columbia Ministry of Health Services, Victoria, British Columbia, Canada.

L.C. Li, PT, PhD, Department of Physical Therapy, University of British Columbia, Arthritis Research Centre of Canada; E.C. Sayre, PhD, Arthritis Research Centre of Canada, School of Population and Public Health, Department of Medicine, University of British Columbia; J.A. Kopec, MD, PhD, Arthritis Research Centre of Canada, School of Population and Public Health, University of British Columbia; J.M. Esdaile, MD, MPH, FRCPC, Arthritis Research Centre of Canada, the Division of Rheumatology, University of British Columbia; S. Bar, BComm, MBA, BA, Primary Health Care Branch, British Columbia Ministry of Health Services; J. Cibere, MD, PhD, Arthritis Research Centre of Canada, Division of Rheumatology, University of British Columbia.

Address correspondence to Dr. L. Li, Arthritis Research Centre of Canada, 895 West 10th Ave., Room 324, Vancouver, British Columbia V5Z 1L7, Canada. E-mail: lli@arthritisresearch.ca

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panel. They represent the basic care that is appropriate for all clinical practice and can be used to evaluate quality of care. In our study, we applied these quality indicators to assess the nonpharmacological, nonsurgical care received by people with knee and/or hip OA in British Columbia, Canada. In addition, we explored the sociodemographic factors associated with nonpharmacological care for knee and/or hip OA.

MATERIALS AND METHODS

Study sample. Our study was 1 part of the 2007 British Columbia Osteoarthritis Survey, which aimed to evaluate the use of, and barriers to, health services and treatments by patients with OA[11]. A random sample of 6000 patients was identified using administrative databases collected by the Ministry of Health of British Columbia, for the purpose of reimbursements for outpatient physician visits (Medical Services Plan Fee-For-Service Database) and hospitalizations (Discharge Abstract Database). The sample was stratified by the 5 regional authorities that oversee healthcare delivery. Eligible participants were those who (1) met the case definitions for OA of any joints or hip/knee replacement surgeries based on the International Classification of Diseases 9/10 codes between April 1, 1992, and March 31, 2006[12]; (2) had at least 2 medical visits for OA or 1 hospitalization within a 365-day period; (3) were aged 19 years or older on March 31, 2006; (4) were living in British Columbia; and (5) were alive (i.e., no date of death recorded on the administrative databases at the time of sampling).

The case date was defined as the first date by which the case definition was met. To ensure confidentiality, the Ministry of Health used a computer-generated algorithm to randomly select individuals for the survey. Those selected were then asked if they had ever been told by a health professional that they had arthritis. Only those who responded positively were invited to complete the full questionnaire.

Questionnaire development and administration. The British Columbia OA Survey questionnaire covered areas related to the use of health services and the health of people with OA, including (1) use of services from health professionals and alternative therapy practitioners, treatments, and community services for managing arthritis; (2) general health and comorbid conditions, including diabetes, kidney and/or bladder problems, fibromyalgia, high blood pressure, lung problems, osteoporosis, heart problems, intestinal or stomach ulcers, cancer, liver problems, bowel disorder, depression; and (3) physical function, assessed by standardized outcome measures such as the Western Ontario and McMaster Universities OA Index (WOMAC).

The questionnaire, consisting of 62 questions, was pilot-tested on 200 people with OA and 50 who had hip or knee replacement surgery because of OA. We used the same 5 eligibility criteria to identify participants for the pilot testing (response rate = 49.2%). Fifteen questions were found to have > 10% missing data. They were subsequently reviewed by the research team and the wording was modified unless the question was from a standardized questionnaire.

The survey comprised 3 mailings between June and July 2007. In the first mailing, all participants received a survey package from the Ministry of Health, including an information letter, a questionnaire booklet, and a stamped return envelope. Reminder cards were sent at 2 weeks and 4 weeks. To protect confidentiality, the ministry assigned an identification number to all eligible individuals and the researchers had no access to any personal contact information. This procedure complied with British Columbia's Freedom of Information and Protection of Privacy Act. The study protocol was approved by the University of British Columbia Behavioural Research Ethics Board (application number H04-80289).

Quality of nonpharmacological care for OA. To assess the quality of nonpharmacological care, we applied 4 of the Arthritis Foundation Quality Indicators for OA[10] to the British Columbia OA Survey data. The quality indicators included (1) advice to exercise, (2) advice to lose weight, (3) assessment for ambulatory function, and (4) assessment for nonambulatory function. The latter includes self-care activities such as dressing and grooming, as well as arising from sitting to standing. A typical quality indicator includes 2 components: The "IF" statement determines the eligibility for the care process in question; the "THEN" statement specifies what care process should be performed. The pass rate of each quality indicator was calculated by dividing the number of people who received the care (i.e., those who passed the "THEN" statement) by the number of those eligible for the care (i.e., those who passed the "IF" statement). Table 1 presents the criteria for passing the 4 quality indicators and the survey questions used.

Statistical analysis. Participant characteristics and health status were summarized in frequencies, means (SD) or medians [interquartile ranges (IQR)], depending on the measure. The pass rate of each of the 4 quality indicators was calculated. In addition, we calculated each participant's summary score of nonpharmacological care by dividing the number of times the individual passed a quality indicator and the total number of quality indicators for which he/she was eligible (ranging from 0 to 4). We also calculated the mean and 95% CI of the overall pass rate for nonpharmacological care.

After controlling for the aggregate WOMAC score (0–96), logistic regression with backward elimination was used to assess the association between each of the 4 quality indicators and the following independent variables: (1) sex; (2) age group (24–54, 55–64, 65–74, 75+); (3) education (university degree, trade/vocational certificate, high school diploma, < high school); and (4) employment (employed, retired for medical reasons, unemployed/retired not because of medical reasons). We began with models that included number of comorbidities (maximum 12), plus all 2-way interactions between age group, sex, employment, and education. Backward elimination was used to drop nonsignificant interaction terms, and number of comorbidities if nonsignificant. In the Assessment of Ambulatory Activities model, education was omitted for model convergence. The level of statistical significance was set at $p \leq 0.05$.

RESULTS

Of the 6000 records, 501 had invalid addresses, leaving 5499 eligible individuals. A total of 2259 individuals (41.1%) responded; 1713 of those confirmed that they had received a diagnosis of arthritis from a health professional, 442 had never been told that they had arthritis or OA, 96 returned an empty questionnaire, and 8 were deceased. Of the 1713 participants, 1349 reported knee and/or hip OA [knee only = 700 (51.9%), hip only = 261 (19.3%), knee and hip = 388 (28.8%); Table 2]. The participants' mean age was 67.1 years (SD 11.1), 816 (60.5%) were women, and 921 (68.3%) were diagnosed with OA 6 years ago or longer. They had a median of 1 comorbid condition (IQR 1.0, 3.0). The mean WOMAC aggregate score was 32.9 (SD 19.4). Most of the participants (n = 783; 58.0%) rated their health excellent, very good, or good; and the vast majority met the eligibility (i.e., fulfilling the criteria for the "if" statement) of at least 1 quality indicator (n = 1304; 96.7%).

The overall pass rate of the 4 quality indicators was 22.4% (95% CI 20.5, 24.3). The pass rates of individual quality indicators ranged from 29.2% for receiving assessment of ambulatory function to 6.9% for receiving assessment for nonambulatory function (Table 3). The pass rates were similar in both sexes, except for "advice to lose weight," in which 32.3% of women vs 14.4% of men who were overweight or obese received this advice (Figure 1).

None of the interaction terms or the number of comorbidities was found to be statistically significant. They were subsequently dropped from all logistic regression modes. The OR

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Table 1. Criteria for meeting a quality indicator for osteoarthritis and the corresponding items on the questionnaire.

Arthritis Foundation Quality Indicators for OA	Eligibility for the "IF" Statement	Eligibility for the "THEN" Statement	Rationale and Limitation
1. Advice to exercise IF an ambulatory patient has had a diagnosis of symptomatic OA of the knee or hip for > 3 months AND has no contraindication to exercise and is physically and mentally able to exercise THEN a directed or supervised muscle-strengthening or aerobic exercise program should have been prescribed at least once and reviewed at least once per year	Had a diagnosis of hip and/or knee OA Answered "No" to: "Because of any condition or health problem, do you need the help of another person in personal care such as washing, dressing, or eating?"	Had seen a PT in the past year OR Had attended a land-based or pool exercise program OR Had used fitness facilities	Rationale: Those with OA would have participated in directed or supervised exercise at least once if they had seen a PT and/or attended a land-based/pool exercise program Limitations: The criteria would not identify individuals with severe dementia or other conditions that would preclude them from participating in programs. Those included in the analysis might or might not have had their exercise reviewed in the past year. Also, not all fitness facilities provide supervised programs
2. Advice to lose weight IF a patient has symptomatic OA of the knee or hip and is overweight (BMI > 27 kg/m^2) THEN the patient should be advised to lose weight at least annually AND the benefit of weight loss on the symptoms of OA should be explained to the patient	Had a diagnosis of hip and/or knee OA and had BMI > 27 kg/m^2	Had used a weight-loss program or visited a dietician	Rationale: Those who used a weight-loss program or saw a dietician would have received weight-loss counseling Limitation: The "IF" criteria would not identify those who had been advised to lose weight and had successfully lost weight in the past year. Also, they would not include those who had been advised to lose weight by other health professionals; hence, the pass rate may be underestimated. Conversely, among those who received counseling, the visit might have been more than a year ago. In this case, the pass rate might be overestimated
3. Assessment for ambulatory function: IF a patient has had symptomatic OA of the knee or hip and reports difficulty walking to accomplish activities of daily living for more than 3 months THEN the patient's walking ability should be assessed for need for ambulatory assistive devices	Had a diagnosis of hip and/or knee OA Answered "severe" or "extreme" to (in the past 4 weeks): "How much pain did you have in your hip or knee walking on a flat surface?"	Had one or more visits to a PT or OT in the past year	Rationale: The criteria were modified to include people with severe or extreme pain within the past 4 weeks. There is evidence supporting the use of ambulatory assistive devices as early as possible to improve mobility. Those who saw a PT or OT would have been assessed for walking ability Limitation: The criteria would not identify people who had been assessed for ambulatory assistive devices by other health professionals. Also, the criteria would not identify those who had "severe" or "extreme" pain longer than 4 weeks, but visited a PT or OT in the past year and improved

(Table 4) revealed that receiving exercise advice was associated with having a university degree (vs a high school diploma; OR 3.10, 95% CI 2.00, 4.80). Receiving weight-loss advice was associated with being female (OR 2.64, 95% CI 1.71, 4.08), the age range of 55 to 64 years (compared to age 75 and over; OR 1.96, 95% CI 1.02, 3.76), and higher WOMAC scores (for every 10-point increment; OR 1.14, 95% CI 1.02, 1.26). However, less education (i.e., < high school) had a reverse effect on receiving weight-loss advice (OR 0.52; 95% CI 0.30, 0.88). For those who met the quality indicator for assessment of nonambulatory activities, retirement because of medical reasons (compared to retirement/unemployment because of other reasons) emerged as a significant factor for receiving care (OR 3.66, 95% CI 1.22, 10.97). No statistically significant association was found between the demographic/health status variables and the quality indicator on assessment of ambulatory activities.

DISCUSSION

The majority of those who completed the survey perceived

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Table 1. Continued.

Arthritis Foundation Quality Indicators for OA	Eligibility for the "IF" Statement	Eligibility for the "THEN" Statement	Rationale and Limitation
4. Assessment for nonambulatory function: IF a patient has a diagnosis of OA and reports difficulties with nonambulatory activities of daily living THEN the patient's functional ability with problem tasks should be assessed for need of nonambulatory assistive devices to aid with problem tasks	Had a diagnosis of hip and/or knee OA Answered "severe" or "extreme" to: "What degree of difficulty do you have with rising from sitting, and/or putting on socks/stockings, and/or taking off socks/stockings, and/or getting in/out of bath, and/or getting on/off toilet?"	Had one or more visits to an OT in the past year	Rationale: The criteria were modified to include people with severe or extreme difficulties with nonambulatory activities at the time of the assessment. Our assumptions were that individuals reporting severe/extreme disabilities would have experienced problems with the activities months prior to the survey, and that during this time they should have been assessed by an OT for assistive devices Limitation: The "IF" criteria would not identify people who had severe or extreme difficulties with nonambulatory activities, but had improved when they completed the questionnaire. Also, it did not identify those who had been assessed for assistive devices by other health professionals

OA: osteoarthritis; PT: physical therapist; OT: occupational therapist; BMI: body mass index.

themselves as having good health, but this study also identifies a substantial gap in nonpharmacological care. Of the participants, 22.4% received the recommended nonpharmacological, nonsurgical care for knee/hip OA, based on 4 quality indicators. This overall pass rate echoes the findings in previous studies, including the 57% reported by Ganz, *et al*[13] in the medical treatment for community-dwelling older adults with knee/hip OA, and by McGlynn, *et al*[14] in the general management of OA among adults of all ages. In addition, only 1 in 4 of those who needed advice to exercise or lose weight received the necessary care and < 7% of those with severe difficulties in self-care were assessed for nonambulatory activities. These findings add to the observation of the suboptimal care received by people with OA elsewhere[6,13,15].

Previous studies on quality of care in OA focused on the use of exercise, but not other nonpharmacological interventions. McGlynn, *et al*[14] used an earlier version of the quality indicator for exercise, which states, "Providers caring for patients with symptoms of hip or knee OA should recommend exercise programs at least once in 2 years." The pass rate for this quality indicator was 29.7%. In contrast, the current version has narrowed the timeframe to once per year, which may be a reason for the difference in pass rate (25.2%). The exercise quality indicator in our study is similar to that used by Ganz, *et al* except that they limited the age to 75 years and over. The pass rate of this quality indicator was 44.0%. It should be noted that their sample was drawn from the ACOVE-2 study, in which some of the participants had received an intervention for cognitive impairment, falls/mobility problems, and/or incontinence[16]. This intervention also included information on specific exercises and community-based exercise groups, although it was not specifically designed for OA management[16].

The observed gaps in nonpharmacological care are alarming, especially because physical activity and exercise have been shown to reduce pain and improve quality of life[4,17,18], and have the potential to reduce the progression of joint damage[19]. In addition, a high body mass index (BMI) is associated with an increased likelihood of deterioration in the functional status in the first 3 years following an OA diagnosis[20]. In a case-control study, Wendelboe, *et al*[21] found that severely obese women (BMI > 40) were 4 times more likely to have hip replacement surgery and 19 times more likely to have knee replacement surgery when compared to normal-weight people. Among those with OA who are overweight, even a moderate weight loss of 5% can significantly reduce physical disability[22]. Further, a decrease in the BMI is associated with people's adherence to exercise and the improvement in function[23], suggesting that it may be beneficial for people who are obese to lose weight even before starting an exercise program. Our findings suggest that these effective interventions have not reached the community level, as evidenced by the low pass rates for weight management and exercise.

Our study also revealed that the majority of patients with severe functional limitation had not been assessed by a physical therapist or an occupational therapist in the past year. Little is known about the use of physical therapy and occupational therapy by patients with OA in the community, but a recent study in Ontario found that about 43% of these patients had been referred for physical therapy within a 4-year period[8].

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Table 2. Sociodemographic characteristics and health status of survey participants (n = 1349).

Characteristic	
Age, yrs, mean (SD)	67.1 (11.1)
Sex (%)	
Women	816 (60.5)
Men	511 (37.9)
Data missing	22 (1.6)
Education (%)	
University degree	122 (9.0)
Trade/vocational certificate	271 (20.1)
High school diploma	601 (44.6)
< High school	329 (24.4)
Data missing	26 (1.9)
Employment status (%)	
Employed	435 (32.2)
Unemployed for nonmedical reasons	630 (46.7)
Retired for medical reasons	257 (19.1)
Data missing	27 (2.0)
OA site	
Knee OA	700 (51.9)
Hip OA	261 (19.3)
Both	388 (28.8)
Time since diagnosis, yrs	
< 1	36 (2.7)
1–5	381 (28.2)
6–10	397 (29.4)
11+	524 (38.8)
Data missing	11 (0.8)
No. comorbidities, median (IQR)	1.0 (1.0, 3.0)
WOMAC (0–96), median; mean (SD)	32.0; 32.9 (19.4)
SF-8 physical scale, median; mean (SD)	39.9; 39.9 (9.7)
SF-8 mental scale, median; mean (SD)	51.4; 49.2 (10.1)
General health (%)	
Excellent	70 (5.2)
Very good	194 (14.4)
Good	519 (38.5)
Fair	403 (29.9)
Poor	101 (7.5)
Very poor	20 (1.5)
Data missing	42 (3.1)
No. people eligible for (%)	
0 quality indicator	45 (3.3)
1 quality indicator	511 (37.9)
2 quality indicators	556 (41.2)
3 quality indicators	199 (14.8)
4 quality indicators	38 (2.8)

OA: osteoarthritis; IQR: interquartile range; WOMAC: Western Ontario and McMaster Universities OA Index; SF-8: Medical Outcomes Study Short Form-8 (questionnaire).

Given that only 29% and 7% of our participants with severe functional disability had seen a physical therapist or an occupational therapist in the past year, respectively, future efforts should be directed toward supporting the appropriate use of rehabilitation services.

Our study also identified a few sociodemographic factors associated with OA care. For example, participants with a university education were more likely to have passed the quality indicator on exercise advice compared to those with lower education levels. The findings echo an earlier study by Dexter, *et al*[24] that reported that patients with lower education levels received less comprehensive instruction and monitoring of exercise. Also, among participants who were overweight or obese, those with less than a high school education were less likely to meet the weight-management quality indicator. Interestingly, women were more likely than men to have joined a weight-loss program or have seen a dietician, as were the middle-aged group compared to those over the age of 75 years, and those with more severe symptoms. We could not determine whether this was associated with patients' help-seeking decisions, health professionals' prescribing practices, or both. Nonetheless, with the prevalence and severity of OA being higher among those with lower education and socioeconomic status[25,26,27], our results add to the growing literature that urges immediate action to address the inequity in OA care[28]. It should be noted that in a 2011 systemic review, Borkhoff, *et al*[29] identified 10 studies evaluating interventions that aimed to reduce the disparity in care for disadvantaged populations with OA, but none of these interventions targeted health professional practices. Our findings lend further support for research in this area.

Our findings, however, should be interpreted with caution because of limitations of the eligibility definitions for the quality indicators (Table 1), which might have resulted in underreporting or overreporting of the pass rates. Also, the return rate of this survey was low (41.1%); hence, the findings are subject to response bias where those who responded may be systematically different from those who did not, thus affecting the generalizability. A recent study has shown that more than 80% of people aged 50 years or older and with knee pain had undiagnosed knee OA, and many of them had only mild radiographic joint damage[30]. Thus many with undiagnosed early OA are not included in the study. These individuals could benefit from early intervention, but without a diagnosis they would be unlikely to receive the appropriate advice and followup. Our findings, therefore, may underestimate the care gaps in OA. Also, this study relied on patient self-reported data, which is an inherent limitation in most surveys examining chronic illnesses and treatment use. To address this limitation, a few recent studies have advocated for the use of electronic medical records to assess quality of care[31,32]. Finally, the percentage of English-speaking participants was higher than that of the British Columbia population[33] (71%, vs 96% in the survey) because the questionnaire was in English only. Hence, our data are insufficient to estimate the health services use and care gaps in the non-English-speaking population, particularly new immigrants.

Proponents of quality indicators suggest that judicious application of these tools can optimize healthcare because it provides the means to measure the process of care and feedback to health professionals[34,35,36,37]. The results from our province-wide survey indicate that nonpharmacological care

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Table 3. Quality of nonpharmacological care for osteoarthritis (n = 1349).

Quality Indicator	No. People Who Needed Care (% of All Survey Participants)	No. People Who Received Care	Pass Rate, %
1. Advice to exercise	1165 (86.4)	294	25.2
2. Advice to lose weight	659 (48.9)	165	25.0
3. Assessment for ambulatory function	120 (8.9)	35	29.2
4. Assessment for nonambulatory function	403 (29.9)	28	6.9

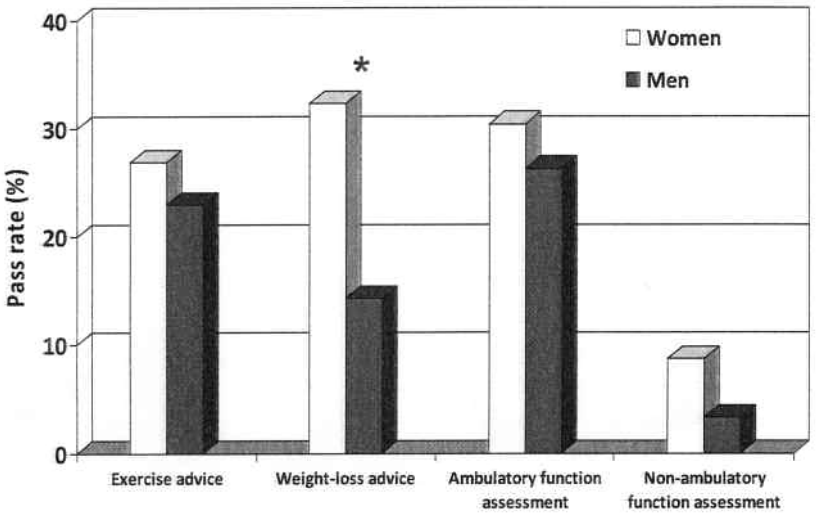

Figure 1. Quality of nonpharmacological care for osteoarthritis: women compared to men. *p < 0.05.

for people with knee/hip OA is not consistent with the current treatment guidelines. Further, there may be inequity in the provision of advice on exercise and weight management. Our findings indicate the need to identify barriers to providing advice on exercise and healthy weight and referring patients for functional assessment when needed. In addition, we have argued for a need to invest in interventions, specifically those that target health professionals, to address the disparity in care for patients with OA due to their sociodemographic status.

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Table 4. Logistic regression models for the quality indicators.

Independent Variable	n (received care)/ n (needed care)	Adjusted OR (95% CI)	p
Advice to exercise (no. eligible for the analysis = 1057)[1]			
Women	178/645	1.24 (0.92, 1.66)	0.16
Men	99/412	1	—
Age, yrs (reference: ≥ 75)			
24–54	50/163	0.94 (0.55, 1.62)	0.84
55–64	75/293	0.74 (0.47, 1.17)	0.20
65–74	83/330	0.90 (0.61, 1.33)	0.60
≥ 75	69/271	1	—
Education (reference: high school diploma)			
University degree	53/111	3.10 (2.00, 4.80)	< 0.01*
Trade/vocational certificate	64/234	1.28 (0.89, 1.83)	0.19
High school diploma	115/487	1	—
Less than high school	45/225	0.78 (0.52, 1.16)	0.22
Employment (reference: not/unemployed)			
Employed	114/385	1.40 (0.93, 2.10)	0.10
Retired for medical reasons	52/183	1.38 (0.89, 2.13)	0.15
Not/unemployed	111/489	1	—
WOMAC/10 (0–9.6)	—	1.08 (1.00, 1.17)	0.06
Advice to lose weight (n eligible for the analysis = 594)			
Women	123/361	2.64 (1.71, 4.08)	< 0.01*
Men	36/233	1	—
Age, yrs (reference: ≥ 75)			
24–54	32/100	2.13 (0.98, 4.61)	0.05
55–64	62/190	1.96 (1.02, 3.76)	0.04*
65–74	44/170	1.78 (0.98, 3.26)	0.06
≥ 75	21/134	1	—
Education (reference: high school diploma)			
University degree	13/42	1.36 (0.64, 2.88)	0.42
Trade/vocational certificate	43/129	1.28 (0.79, 2.07)	0.31
High school diploma	76/271	1	—
Less than high school	27/152	0.52 (0.30, 0.88)	0.02*
Employment (reference: not/unemployed)			
Employed	68/217	1.22 (0.70, 2.14)	0.48
Retired for medical reasons	37/121	1.31 (0.73, 2.36)	0.36
Not/unemployed	54/256	1	—
WOMAC/10 (0–9.6)	—	1.14 (1.02, 1.26)	0.02*
Assessment for assistive devices for ambulatory activities[2] (n eligible for the analysis = 103)			
Women	23/67	1.78 (0.65, 4.90)	0.26
Men	9/36	1	—
Age, yrs (reference: ≥ 75)			
24–54	6/18	1.29 (0.26, 6.32)	0.75
55–64	14/26	3.08 (0.73, 12.97)	0.13
65–74	7/35	0.79 (0.21, 2.98)	0.73
≥ 75	5/24	1	—
Employment (reference: not/unemployed)			
Employed	11/28	1.84 (0.43, 7.89)	0.41
Retired for medical reasons	15/41	1.97 (0.55, 7.01)	0.30
Not/unemployed	6/34	1	—
WOMAC/10 (0–9.6)	—	0.90 (0.68, 1.20)	0.47
Assessment for assistive devices for nonambulatory activities (n eligible for the analysis = 350)			
Women	24/242	3.03 (0.99, 9.25)	0.05
Men	4/108	1	—
Age, yrs (reference: ≥ 75)			
24–54	6/56	1.71 (0.40, 7.28)	0.47
55–64	8/79	1.19 (0.32, 4.38)	0.80
65–74	8/93	1.43 (0.45, 4.55)	0.55
≥ 75	6/122	1	—

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Table 4. Continued.

Independent Variable	n (received care)/ n (needed care)	Adjusted OR (95% CI)	p
Education (reference: high school diploma)			
University degree	4/31	2.35 (0.64, 8.56)	0.20
Trade/vocational certificate	5/56	1.04 (0.33, 3.30)	0.94
High school diploma	12/155	1	—
Less than high school	7/108	0.72 (0.26, 2.02)	0.53
Employment (reference: not/unemployed)			
Employed	6/101	1.05 (0.27, 4.08)	0.94
Retired for medical reasons	15/94	3.66 (1.22, 10.97)	0.02*
Not/unemployed	7/155	1	—
WOMAC/10 (0–9.6)	—	1.11 (0.84, 1.47)	0.47

[1] Only participants with no missing independent variables were included in the logistic regression analysis. [2] In the Assessment of Ambulatory Activities model, the variable "Education" is omitted for model convergence. WOMAC: Western Ontario and McMaster Universities Osteoarthritis Index. * $p < 0.05$.

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