

Original Article

# The Role of Sex, Gender, Health Factors, and Job Context in Workplace Accommodation Use Among Men and Women with Arthritis

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## Abstract

**Background:** With the aging of populations in many countries, workers are expected to remain employed longer but may struggle with the onset of common, chronic conditions like arthritis. To date, few studies have examined workplace policies and practices that could help accommodate individuals with arthritis, and fewer still have used a sex and gender-based approach to explore similarities and differences between women and men.

**Objectives:** This study compared the health and work contexts of workers aged  $\geq 50$  years to better understand similarities and differences between women and men in accommodation availability, need, use, and unmet needs.

**Methods:** A cross-sectional survey of men and women with osteoarthritis (OA), inflammatory arthritis (IA), or both OA and IA was administered online or by telephone and assessed demographics (e.g. age, education), health (e.g. pain, fatigue, workplace activity limitations), work context factors (e.g. job sector, full/part-time work, job control), and workplace accommodations (e.g. health benefits, flexible hours, special equipment/adaptations, modified duties). Sex and gender-based analyses examined similarities and differences between men and women and included descriptive statistics, multivariable multinomial analyses, and nested regression analyses.

**Results:** There was a 58.9% response rate and final sample of 463 participants (women,  $n = 266$ ; men,  $n = 197$ ; OA = 59.0%; IA/both IA and OA = 23.7%; unsure = 17.3%). Women and men were significantly different in a number of health (e.g. fatigue, health variability, workplace activity limitations) and work context factors (e.g. job sector, part-time work, job stress). However, in other respects, they were similar (e.g. pain, job involving physical demands, size of organization, shift work, union membership, job control). There were no differences between men and women in the availability or use

of workplace accommodations. However, women reported significantly more accommodation needs and had greater unmet needs. Multivariable multinomial analyses found male/female as a binary variable did not explain differences in accommodation need, use, and unmet need. Nested analyses highlighted that differences in health variables explained male/female differences in accommodation need, while work context differences explained male/female differences in whether needs were met.

**Conclusions:** The findings highlight that women and men draw on a range of existing accommodation policies and practices to help manage their arthritis and that most have their accommodation needs met. Decomposing the context within which men and women with arthritis work suggests that women may face health and work context challenges that differ from men and that are related to greater accommodation needs and unmet need. This highlights potential vulnerabilities in the work of women that need to be addressed.

**Keywords:** employment; arthritis; sex; gender; accommodations; job context; health

## Introduction

There is considerable interest in understanding workforce participation among women and men with arthritis. Representing more than 100 conditions, arthritis is among the most prevalent chronic diseases and is associated with substantial workplace activity limitations, absenteeism, and presenteeism (Helmick *et al.*, 2008; Sokka *et al.*, 2010; Boonen *et al.*, 2010; Lenssinck *et al.*, 2013; Yelin, 2007; Boonen and Severens, 2011). Short- and long-term disabilities range from one-third to more than 50% of individuals with functional limitations (Bjork *et al.*, 2009; Burton *et al.*, 2006a, 2006b; Kaptein *et al.*, 2009; Sullivan *et al.*, 2010), and lost productivity and long-term disability costs are estimated at two to four times greater than the direct health care costs (Allaire *et al.*, 2005; Dunlop *et al.*, 2003; Li *et al.*, 2006; O'Donnell *et al.*, 2011; Wolfe *et al.*, 2005; Zhang *et al.*, 2010; Smith *et al.*, 2014).

New treatments have improved the lives of many individuals with arthritis. Yet, studies continue to find relatively high levels of work disability (Burton *et al.*, 2006b; Lenssinck *et al.*, 2013; Sokka *et al.*, 2010). This has resulted in a call for greater attention to contextual factors in the workplace that may impact work sustainability (Tang *et al.*, 2011). Of particular relevance are organization-level practices that may be used by men and women to accommodate their health and work needs. Examples include flexible hours, special equipment, personal days with pay, modified job duties, and work-at-home arrangements. These practices can be used for a variety of reasons but may be particularly beneficial as accommodations for managing work with arthritis.

A small number of studies have examined workplace accommodations among individuals with arthritis (Allaire *et al.*, 2003; Chen *et al.*, 2007; Gignac *et al.*, 2015; Yelin *et al.*, 2000). In general, findings suggest that levels of accommodation use are relatively low, despite

individuals reporting functional limitations, pain, and fatigue at work. Moreover, no one type of accommodation seems to be preferred. Instead, people use a range of accommodations to suit their health and work needs (Gignac *et al.*, 2015). Less clear is whether the absence of accommodation use reflects a lack of availability and/or a state of unmet accommodation needs or whether most workers have accommodation needs met. Also unclear are the factors associated with levels of accommodation need, use, and unmet needs. A better understanding of workplace accommodations and factors associated with them can inform employers about at-work disability and assist in assessing the potential value of workplace practices.

Also absent from the literature is a sex and gender-based analysis (SGBA) of arthritis and workplace accommodations. Research illuminating similarities and differences between women and men in the biological bases of diseases (sex differences), and in perceptions, roles and cultural dimensions of behavior (gender differences), can yield important information about living with a health condition and potential inequities in outcomes (Johnson *et al.*, 2009; Carothers and Reis, 2013; Moerman and van Mens-Verhulst, 2004; Smith and Koehoorn, 2016; Wood and Eagly, 2002). Previous research has focused largely on sex differences in the prevalence of arthritis, with many types of arthritis found to be more common in women and with women often reporting more severe disease symptoms (Helmick *et al.*, 2008; O'Donnell *et al.*, 2011; Srikanth *et al.*, 2005; van Vollenhoven, 2009; Nas *et al.*, 2017; Yacoub Wasef, 2004). Some research has also examined gender differences in employment, noting that women with arthritis are more likely to give up employment, be work disabled, and need more accommodations (Kaptein *et al.*, 2009; Wallenius *et al.*, 2009). However, other research finds that women report more positive value to working

than men, finds that men with arthritis are more likely to make changes to their jobs and report more discrimination, or finds similarities between men and women in their health, work, and role perceptions (Gignac *et al.*, 2014; Kaptein *et al.*, 2009).

Drawing on a SGBA to illuminate needs for and use of workplace accommodations, it is necessary to go beyond a binary male/female variable in analyses. In building multivariable models, an initial effect of a male/female variable may disappear when other variables are included (Moerman and Van Mens-Verhulst, 2004). Rather than conclude that sex/gender is not relevant, it may be that the additional variables highlight a decomposition of a binary female/male variable into components that illuminate biological, psychological, or social factors (Moerman and Van Mens-Verhulst, 2004). For example, if workplace activity limitations are significantly greater among women with arthritis than among men, and if activity limitations are also related to accommodation use, it may still be relevant to consider sex/gender when addressing whether accommodations can minimize workplace activity limitations, even if analyses yield no differences related to a male/female variable.

In this study, we expected to find a number of differences between women and men in health, work context, and accommodations. Specifically, we expected women to report greater pain, fatigue, health variability, and workplace activity limitations than men. Studies have also found gender differences in the sectors in which men and women work and in hours of employment (Cranford *et al.*, 2003; Padavic and Reskin, 2002). As such, we expected more men in our sample to work in construction, manufacturing, and utilities and more women to work in health, education, and the arts. We also expected more women to report working part-time. Part-time work may mean that workplace benefits and accommodation policies are less available to women. If so, we would expect differences in accommodation availability, need for accommodations, and unmet accommodation needs in women compared with men.

Multivariable analyses examining predictors of accommodation need, use, and unmet needs are expected to find that pain, fatigue, health variability, and workplace activity limitations are related to greater accommodation need and use. Working part-time and having greater job stress are expected to be associated with unmet accommodation needs, whereas working for a larger organization, which may have a greater range of accommodation policies available, or having greater job control should be associated with being more likely to use accommodations and having needs met. It is not clear whether male/female as a separate factor

will remain significantly associated with accommodations when these other factors are included. However, if health and work context also differ between women and men, it may signal that sex and gender have relevance to understanding accommodations despite the lack of a separate male/female effect.

## Methods

### Study design and sample

Data were collected using a cross-sectional survey. Potential participants were eligible if born from 1946 to 1964 and if employed  $\geq 15$  hours/week. Data were drawn from a larger project examining health, accommodations, and retirement expectations among individuals with arthritis, diabetes, or no chronic disabling health conditions. As accommodation needs were greatest among those with arthritis, the article focuses on this group. Arthritis participants had a self-reported physician diagnosis of arthritis [e.g. osteoarthritis (OA), inflammatory arthritis (IA), like rheumatoid arthritis] and an arthritis duration of at least 1 year (to ensure time working with arthritis). Participants were excluded if they had been diagnosed with other chronic physically or mentally disabling health conditions (e.g. stroke, depression) before their arthritis diagnosis, experienced an injury, or were recovering from surgery (past 6 months). The occurrence of co-morbid conditions after diagnosis of arthritis is challenging for establishing inclusion/exclusion criteria as arthritis often results in increased risks for other conditions (Public Health Agency of Canada, 2010). Hence, individuals diagnosed with other conditions after their arthritis diagnosis were included.

### Recruitment and procedure

Participants were recruited from an existing panel of ~80 000 Canadians compiled using probability sampling. We aimed for at least 500 individuals with arthritis to ensure statistical power in accommodation and sex/gender analyses. Respondents had a choice of a telephone administered or online questionnaire in English or French. Before completing the survey, respondents were screened for eligibility. Questionnaires took 25–30 minutes to complete and were administered from September to October 2014. Ethics approval was received from the University of Toronto, Canada. Informed verbal/written consent was obtained from participants.

## Measures

### Outcome variables: workplace accommodations

*Accommodation availability, needs, use.* Respondents were asked about availability (Y/N), need for (Y/N), and use of

(Y/N) 14 workplace benefits and practices in the previous 12 months: (i) flexible hours, (ii) extended health benefits (paid for by employers and not covered by provincial health insurance, e.g. some medications, physical therapy, dental), (iii) short-term leave, (iv) personal days with pay, (v) part-time work with full benefits, (vi) additional breaks or rest periods, (vii) new skills training, (viii) special equipment/adaptations (e.g. built-up keyboard), (ix) modified job duties (e.g. reduced lifting), (x) altered work schedules, (xi) changes to a work station, (xii) work-at-home arrangements, (xiii) help from others for work tasks, (xiv) wellness programs. We created levels of accommodation need and use by examining sample distributions across women and men. This resulted in three levels: those who needed/used 0–1 accommodations (low need/use); 2–4 accommodations (medium need/use); or 5+ accommodations (high need/use).

*Accommodation needs unmet, met, exceeded.* We further examined combinations of accommodations by creating groups of respondents who (i) reported congruence between the accommodations they needed and used (accommodation needs met), (ii) reported needing more accommodations than they used (accommodation needs unmet), or (iii) reported not needing some accommodations, but using them anyway (accommodation needs exceeded).

#### Main independent variable: sex/gender

The main independent variable was whether the respondent reported they were male or female. Recognizing that self-reports will include biological and social considerations, we label this variable sex/gender.

#### Covariates

Covariates were grouped into three areas: demographics, health, and work context.

#### Demographics

Information on age, sex, education, and marital status was collected.

#### Health

*Type of arthritis.* Type of arthritis was coded as OA, IA (e.g. rheumatoid arthritis), or both OA and IA.

*Pain.* A visual analogue scale assessed pain in the last month (range: 0–10; 0 = no pain; 10 = worst possible pain).

*Fatigue.* The five-item Profile of Mood States fatigue subscale asked the extent to which participants felt worn out, fatigued, exhausted, sluggish, and weary in the previous month (0 = not at all; 4 = extremely) (McNair

*et al., 1971*). Three additional items were added to balance the scale with more positive mood states and make it relevant to all respondents: full of energy, vigorous, and lively. Scores were summed.

*Health variability.* Variability in health symptoms was assessed by asking the extent to which respondents had ‘variable health problems (times of good and bad health) over the past 3 months’ (1 = not at all; 5 = a great deal).

*Workplace activity limitations.* The 12-item Workplace Activity Limitations Scale measured activity limitations at work (Gignac, 2005; Gignac *et al.*, 2008). Items assess getting to/from/around the workplace, upper and lower mobility difficulties, concentration, scheduling, and pace of work (0 = no difficulty; 3 = unable to do). Scores were summed.

#### Work context variables

*Job sector.* A list of 21 job sectors were provided and collapsed into four categories to differentiate among sectors with largely office work compared with greater amounts of physically demanding work activities and public service activities. The latter work activities can be more difficult for people with arthritis to sustain. Categories were as follows: (i) banking/insurance/business/technology/government, (ii) education/health/sciences/arts, (iii) construction/utilities/agriculture/ mining/logging, (iv) sales/retail.

*Physically demanding work.* Respondents were asked the extent to which their job involved physical activity or movement (e.g. bending, lifting) (1 = not at all; 5 = a great deal).

*Work schedule.* A single item asked about work schedules. Responses were collapsed into irregular schedule/shift work and regular schedule.

*Size of organization.* Respondents were asked for the size of their organization. Responses were collapsed into two groups: <100 people and ≥100 people.

*Full-time/part-time work and union membership.* Participants were asked whether they worked full- or part-time hours and whether they belonged to a union or a professional/managerial society at their place of employment that acted as a bargaining unit (Y/N).

*Job control.* Nine items asked about job control over work tasks, pace, and scheduling (1 = not at all; 5 = a great deal) (Dwyer and Ganster, 1991). Scores were summed.

*Job stress.* A single item asked about the extent to which work was stressful in the past 3 months (1 = not at all; 5 = extremely).

### Statistical analyses

Means, SDs, and percentages describe the accommodation, demographic, health, and work context variables. Differences in sample characteristics and accommodations by gender were examined using *t*-tests or chi-square tests. Multinomial bi-variable analyses examined the relationship of each predictor variable to each of the three levels of need and use of accommodations (0–1; 2–4; 5+). Bi-variable analyses also examined demographic, health, work context, and work perceptions associated with accommodation needs unmet/met/exceeded. Variables significant at  $P \leq 0.20$  in bi-variable analyses were retained and included in multivariable multinomial regressions.

Multivariable multinomial regression models sought to understand the extent to which factors explained differences in the levels of accommodation needs and use, as well as accommodation needs unmet, met, or exceeded. We examined variables in blocks (sex/gender; demographics; health; work context) to assess their significance and the percentage of variance accounted for with each block. Generalized *R*-square values and changes in *R*-square were calculated to compare models of each block of predictor variables for each outcome (Allison, 2012; Stokes *et al.*, 2012). Deviance chi-square, Pearson chi-square, and the generalized Hosmer–Lemeshow statistics (Hosmer *et al.*, 2013; Fagerland, 2012; Fagerland *et al.*, 2008) were used as goodness of fit measures. Model assumptions were checked using residual analyses.

Second, we ran a series of nested regression models. Initial models adjusted for demographics. Models were then run separately adjusting for health and work context. A final model included both health and work context. The nested models enabled us to examine the direct effect of male/female on each outcome, as well as the change in the direct effect under the scenario that health or work factors were the same between men and women (VanderWeele and Robinson, 2014). Changes in the direct effect are a function of the relationship between male/female and the variables added to the model, as well as the relationship between these variables and the outcomes. In using this modeling, we were interested in the change in the direct effect of male/female on our outcome (Lange *et al.*, 2012). Data were analyzed using the Statistical Analyses System (SAS) software (SAS/STAT User's Guide, 2012). To calculate the generalized Hosmer–Lemeshow goodness of fit statistics, we used STATA (StataCorp) (Fagerland *et al.*, 2008; StataCorp LP, 2011).

### Results

The overall response rate for the survey was 58.9% with 73.4% of respondents completing the online questionnaire. There were 631 respondents with arthritis. We excluded 168 self-employed respondents who could not answer questions about workplace accommodations (32.9% men; 21.3% women,  $P < 0.001$ ). Among the 463 remaining respondents, 59.0% reported OA (64.8% women), 23.7% IA, or both OA and IA (41.8% women); and 17.3% were unsure of their arthritis type (48.8% women). Cronbach's alpha, a measure of internal reliability, was excellent for the measures: fatigue = 0.89; workplace activity limitations = 0.83; job control = 0.91.

There were a number of significant differences between women and men, but in many respects, especially related to work context, they were similar (Table 1). Men were more likely to be married/living as married. Women reported more fatigue and health variability, but there were no differences in pain. Both sexes reported, on average, moderate pain levels. Women in the sample were more likely to work in education/health/sciences/arts, as well as in sales/retail, whereas men were more likely to work in construction/manufacturing/agriculture/mining/logging. Women reported significantly greater workplace activity limitations, were more likely to work part-time, and reported greater job stress. There were no significant differences between men and women in age, education, reports of physically demanding work, work schedules, organization size, union membership, or job control.

Despite differences between women and men in job sector and part-time work, there were no gender differences in availability of workplace accommodations. Only 13.3% of men and 9.0% of women reported 0–1 accommodations available, whereas 71.3% of men and 69.2% of women reported 5 or more of 14 accommodations available. There were also no significant differences in reports of accommodations used in the previous 12 months. Despite their arthritis, over a third of the sample (39.6% men; 34.6% women) reported using 0–1 accommodations. Less than one in five respondents used 5 or more accommodations (18.8% men; 19.0% women). However, women reported needing a greater number of accommodations. As a result, more women reported unmet accommodation needs than men (27.4% versus 20.0%, respectively) and more men reported their accommodation needs were exceeded (i.e. using accommodations even when not needed) (19.5% versus 11.7%, respectively). Overall, 60.5% of men and 60.9% of women had their workplace accommodation needs met.

**Table 1.** Sample characteristics for men and women with arthritis (*n* = 463).

	Men ( <i>n</i> = 197)	Women ( <i>n</i> = 266)	<i>P</i> values
	Mean (SD)%	Mean (SD) %	
<b>Demographics</b>			
Age	59.0 (5.0)	59.0 (5.2)	0.92
Marital status			0.001
Married/living as married	147 (75.4)	155 (58.5)	
Divorced/separated/widowed	28 (14.4)	77 (29.1)	
Never married	20 (10.2)	33 (12.4)	
Education			0.53
Secondary or less	34 (17.3)	41 (15.5)	
Some post-secondary	35 (17.9)	58 (22.0)	
Completed post-secondary schooling	127 (64.8)	127 (64.8)	
<b>Health variables</b>			
Pain (range 0–10)	4.4 (2.1)	4.5 (2.2)	0.54
Fatigue (range 0–32)	11.7 (6.1)	14.5 (7.0)	<0.001
Health variability (range 1–5)	2.0 (1.0)	2.2 (1.1)	0.03
<b>Work context</b>			
Job sector			<0.0001
Banking/insurance/business/technology/government	46 (23.4)	59 (22.4)	
Education/health/sciences/arts	55 (27.9)	137 (51.9)	
Construction/utilities/manufacturing/agriculture/mining/logging	67 (34.0)	22 (8.3)	
Sales/retail	29 (14.7)	46 (17.4)	
Job involves physical activity (range 1–5)	3.1 (1.4)	3.1 (1.3)	0.71
Workplace activity limitations (range 0–36)	3.6 (4.1)	4.9 (4.7)	0.01
Work schedule			0.93
Regular daytime schedule	141 (71.4)	189 (71.1)	
Evening/irregular schedule	56 (28.6)	77 (28.9)	
<b>Size of organization</b>			
<100 employees	75 (39.1)	91 (37.8)	0.78
Part-time work	34 (17.7)	86 (34.1)	0.001
Member of a workplace union	66 (33.7)	86 (32.8)	0.85
Job control (range: 0–36)	18.5 (9.0)	17.1 (9.2)	0.10
Job stress (range: 1–5)	2.7 (1.1)	3.0 (1.0)	0.01
<b>Accommodations</b>			
Accommodation availability			0.11
0–1 accommodations available	26 (13.3)	24 (9.0)	
2–4 accommodations available	30 (15.4)	58 (21.8)	
5+ accommodations available	139 (71.3)	184 (69.2)	
Accommodations needed			0.01
0–1 accommodations needed	79 (40.5)	76 (28.6)	
2–4 accommodations needed	75 (38.5)	98 (36.8)	
5+ accommodations needed	41 (21.0)	92 (34.6)	
Accommodations used			0.53
0–1 accommodations used	78 (39.6)	92 (34.6)	
2–4 accommodations used	82 (41.6)	121 (45.5)	
5+ accommodations used	37 (18.8)	53 (19.0)	
Accommodation needs unmet/met/exceeded			0.03
Accommodation needs unmet	39 (20.0)	73 (27.4)	
Accommodation needs met	118 (60.5)	162 (60.9)	
Accommodation needs exceeded	38 (19.5)	31 (11.7)	

Sample sizes may vary because of missing observations; Differences between men and women examined with chi-square tests for categorical variables and *t*-tests for continuous variables.

A comparison of each accommodation type further illustrates differences between men and women (Table 2). Significantly more women reported needing 7 of the 14 accommodations: extended health benefits, personal days with pay, part-time work with full benefits, modified job duties, altered work schedules, changes to a work station, and work-at-home arrangements. Despite this, with the exception of flextime, extended health benefits, and personal days with pay, the reported need for the 14 accommodations was relatively low. Generally, less than one quarter of women and men reported needing the various accommodations.

There were no significant differences in using accommodations between women and men with the exception of help from others with tasks. Over half of women in the sample (55.2%) reported receiving help compared with 39.2% of men. Noteworthy was that often greater percentages of respondents reported using an accommodation than said they needed it. However, less than half of women in the sample had used 9 of 14 accommodations and less than half of men in the sample had used 10 of 14 accommodations.

Bi-variable multinomial regression analyses found that women were more likely to report needing 5+ accommodations than men (data not shown). Other variables significant at  $P < 0.20$  and carried forward into multinomial analyses examining accommodation needs were as follows: education, pain, fatigue, health variability, and workplace activity limitations. Work context factors included job sector, organizational size, being a member of a workplace union, job control, and job stress. Variables associated with accommodation use at  $P < 0.20$  were age, education, fatigue, health variability, workplace activity limitations, job involves physical activity, organization size, job control, and job stress. Sex/gender was also included in analyses. Bi-variable multinomial regression analyses differentiating accommodation needs met, unmet, or exceeded yielded sex/gender significant at  $P < 0.20$ , as well as marital status, fatigue, workplace activity limitations, job sector, job involves physical activity, part-time work, job control, and job stress.

Multivariable multinomial regressions revealed few factors associated with the need for different levels of accommodations (Table 3). Greater health variability was associated with an increased need for 5+ accommodations compared with 0–1 accommodations, and greater workplace activity limitations were associated with greater need for 2–4, as well as 5+ accommodations compared with 0–1 accommodations. The overall percentage of variance accounted for in the model

**Table 2.** Percentages of men and women reporting needing and using workplace accommodations ( $n = 463$ ).

	Men ( $n = 197$ ), $n$ (%)	Women ( $n = 266$ ), $n$ (%)	$P$ values
Flexible hours or flextime			
Needed	66 (34.4)	99 (37.8)	0.46
Used	63 (56.8)	79 (56.4)	0.96
Extended health benefits			
Needed	110 (57.3)	178 (67.4)	0.03
Used	105 (73.9)	141 (75.4)	0.76
Short-term leave			
Needed	42 (22.0)	77 (29.1)	0.09
Used	33 (22.8)	57 (29.7)	0.15
Personal days with pay			
Needed	47 (24.9)	92 (35.0)	0.02
Used	48 (52.2)	69 (53.1)	0.89
Part-time work with full benefits			
Needed	23 (12.2)	58 (22.2)	0.001
Used	15 (30.0)	22 (36.7)	0.46
Additional breaks or rest periods			
Needed	32 (16.8)	57 (21.6)	0.21
Used	28 (34.2)	45 (38.8)	0.50
New skills training			
Needed	34 (18.0)	57 (21.8)	0.32
Used	50 (44.3)	48 (36.1)	0.19
Special equipment for the job			
Needed	36 (18.9)	53 (20.1)	0.74
Used	27 (23.7)	35 (23.8)	0.98
Modified job duties			
Needed	21 (10.9)	56 (21.1)	0.01
Used	15 (16.0)	29 (22.5)	0.23
Altered work schedule			
Needed	23 (12.0)	65 (24.5)	0.001
Used	24 (27.6)	44 (39.3)	0.08
Changes to a workstation			
Needed	16 (8.4)	38 (14.4)	0.05
Used	13 (16.3)	16 (16.2)	0.99
Work-at-home arrangements			
Needed	31 (16.6)	63 (24.4)	0.04
Used	45 (63.4)	53 (53.0)	0.18
Help from others with job tasks			
Needed	37 (19.3)	61 (23.1)	0.32
Used	40 (39.2)	69 (55.2)	0.02
Wellness programs			
Needed	44 (23.0)	75 (28.4)	0.20
Used	34 (34.0)	51 (42.9)	0.18

Sample sizes vary because of missing values; differences in the proportions of men and women needing and using accommodations were examined with chi-square tests.

Table 3. Multivariable multinomial regression of demographic, health, work context and workplace perceptions and their association with perceived need and use of workplace accommodations.

	Accommodations needed				Accommodations used			
	2-4 versus 0-1		5+ versus 0-1		2-4 versus 0-1		5+ versus 0-1	
	OR	OR	OR	OR	OR	OR	OR	
Sex/gender: female	1.17	1.78	1.52	1.12	1.24	1.12	0.90	
Demographics		$R^2 = 3.0$		$R^2 = 0.4$				
Age	—	—			0.96	0.98	1.02	
Education								
Secondary or less	0.53	0.79	1.49	1.41	0.64	1.41	2.23	
Some post-secondary	0.74	0.48	0.64	0.55	0.85	0.55	0.65	
Health variables		$R^2 = 5.3; \Delta R^2 = 2.3\%$					$R^2 = 4.6; \Delta R^2 = 4.2\%$	
Pain	0.97	0.87	0.90	—	—	—	—	
Fatigue	0.99	1.03	1.03	0.98	0.98	1.01	1.03	
Health variability	1.19	1.53*	1.29	1.09	1.09	1.44*	1.32	
Workplace activity limitations	1.24*	1.28*	1.03	1.14*	1.14*	1.13*	0.98	
Work context		$R^2 = 22.2; \Delta R^2 = 16.9\%$					$R^2 = 11.5; \Delta R^2 = 6.9\%$	
Job sector								
Education/health/sciences/arts	0.69	0.96	1.39	—	—	—	—	
Construction/utilities/manufacturing/agriculture/mining/logging	0.71	0.87	1.23	—	—	—	—	
Sales/retail	0.47	0.66	1.40	—	—	—	—	
Job involves physical activity	—	—		0.84	0.84	0.79	0.94	
Organization size <100 employees	0.65	0.80	1.23	0.59*	0.59*	0.63	1.08	
Member of a workplace union	1.16	1.16	1.00	—	—	—	—	
Job control	0.99	0.98	1.00	1.01	1.01	1.06*	1.05*	
Job stress	1.01	1.32	1.31	1.05	1.05	1.19	1.13	
Goodness of fit statistics		$R^2 = 25.6; \Delta R^2 = 3.4\%$					$R^2 = 17.3; \Delta R^2 = 5.8\%$	
		Deviance chi-square = 727, df = 726, $P = 0.48$ ;					Deviance chi-square = 737, df = 742, $P = 0.55$ ;	
		Pearson chi-square = 744, df = 726, $P = 0.31$ ;					Pearson chi-square = 780, df = 742, $P = 0.1614$ ;	
		generalized Hosmer-Lemeshow statistics:					generalized Hosmer-Lemeshow statistics:	
		chi-square = 9.8, df = 16, $P = 0.88$					chi-square = 10.6, df = 16, $P = 0.55$	

Comparison groups for sex/gender, education, job sector, and size of organization are as follows: men, completed post-secondary schooling, banking/insurance/business/technology/government,  $\geq 100$  people. \*  $P < 0.05$ .



was modest ( $R$ -squared = 25.6%). Sex/gender, although not significant, accounted for 3.0% of the variance in accommodation needs. Health factors explained most of the variance ( $R$ -squared = 16.9%).

Health variability and workplace activity limitations also were significantly associated with accommodation use (Table 3). In addition, respondents working for smaller organizations were less likely to use 2–4 accommodations versus 0–1, whereas respondents with greater job control were more likely to use 5+ accommodations versus other levels of accommodation use. Total  $R$ -squared values were relatively low (17.3%). Sex/gender explained only 0.4% of the variance with health accounting for 6.9%. Several model fit statistics were calculated. Deviance chi-square, Pearson chi-square, and the generalized Hosmer–Lemeshow statistics showed good fit of the models to accommodation needs and use.

Table 4 presents nested regression models further examining sex/gender. Adjusting for demographic factors, females had an increased likelihood for needing five or more accommodations (versus 0–1) compared with males [odds ratio (OR) = 2.42, 95% confidence interval (CI) = 1.41–4.15]. Adjustment for health led to a large attenuation of this effect (change in odds estimate of 27%), greater than the adjustment for work context factors (change in odds estimate of 10%), suggesting that health differences between women and men largely explained the absence of a binary male/female effect. Differences between men and women in accommodation use were less pronounced.

Sex/gender was not significantly associated with differences in accommodation needs met, unmet, or exceeded (Table 5). However, respondents working in education/health/sciences/arts were 2.13 times more likely to have unmet needs and respondents working in sales/retail were 3.03 times more likely to report unmet needs compared with having needs met. Part-time work was 2.52 times more likely to be associated with having unmet needs and significantly less likely to be associated with having accommodation needs exceeded versus unmet. Job stress also was associated with unmet accommodation needs, whereas greater job control was associated with being more likely to have accommodation needs exceeded. Sex/gender and health factors did not account for a large percentage of the variance (1.7% and 3.6%, respectively). Work context accounted for most of the variance (11.4%; total  $R$ -squared = 20.3%).

Nested regression models showed that women were slightly, but not statistically more likely to have unmet accommodation needs after adjustment for demographics (OR = 1.31, 95% CI = 0.79–2.16) (Table 6). Adjustment for work context factors had a larger impact

than adjustment for health factors with the OR estimate for women changing direction after adjustment for work context (OR = 0.86, 95% CI = 0.48–1.54) and indicating women were at decreased risk of having accommodation needs unmet once work context was taken into account. Women were less likely to report accommodation needs exceeded after adjustment for demographics (OR = 0.62, 95% CI = 0.35–1.12). Adjustment for health only led to moderate attenuation of the female versus male OR (11% change in odds estimate). Adjustment for work context also had a limited impact on odds estimates for women compared with men.

## Discussion

This study examined workplace accommodations and used sex and gender-based analyses to better understand accommodation needs, use, and unmet needs among women and men. Health and work findings were largely consistent with previous research. Women with arthritis reported greater fatigue, health variability, and workplace activity limitations, and men and women differed in job sector, part-time work, and job stress (Gignac *et al.*, 2014; Helmick *et al.*, 2008; Kaptein *et al.*, 2009; Lenssinck *et al.*, 2013; O'Donnell *et al.*, 2011; Srikanth *et al.*, 2005; van Vollenhoven, 2009; Nas *et al.*, 2017; Yacoub Wasef, 2004). Our findings go beyond previous studies to reveal that most men and women reported the availability of at least some workplace accommodations to help manage their disease. We also found that accommodation need and use were relatively modest with about 60% of participants having their accommodation needs met. This is useful information for workplaces that may be considering whether to introduce new policies or wanting more information on specific types of accommodations. It also provides initial insights into proportions of employees drawing on accommodations. Women reported needing more accommodations and were more likely to have unmet needs than men. Our analyses suggested that differences in health factors between men and women largely explained differences in accommodation needs, whereas differences between men and women in work context largely explained differences in unmet needs. This highlights the complexity of sex and gender concepts and the need for additional research, not only into the role of accommodations in helping workers with arthritis sustain their jobs but also into potential biological, psychological, social, and environmental factors that may make sustaining employment particularly difficult for women.

Similar to other studies, women tended to report more severe arthritis symptoms and limitations (Helmick

**Table 4.** OR for females versus males across combinations of nested multinomial regression models for accommodations needed and used.

	2–4 versus (0, 1)			5+ versus (0, 1)		
	OR	95% CI	Change in estimate (%)	OR	95% CI	Change in estimate (%)
Accommodations needed						
Female versus males	1.24	0.77–2.00		2.32	1.36–3.95	
Female + demographic factors	1.24	0.77–2.02		2.42	1.41–4.15	
Female + demographic + health	1.10	0.66–1.84	11	1.77	0.98–3.20	27
Female + demographic + work context	1.22	0.72–2.08	2	2.17	1.19–3.97	10
Female + demographic + health + work context	1.17	0.67–2.04	6	1.78	0.93–3.39	27
Accommodations used						
Female versus males	1.30	0.83–2.06		1.25	0.71–2.20	
Female + demographic factors	1.33	0.84–2.12		1.31	0.74–2.32	
Female + demographic + health	1.24	0.76–2.01	7	1.06	0.58–1.95	19
Female + demographic + work context	1.28	0.80–2.06	4	1.33	0.73–2.41	–2
Female + demographic + health + work context	1.24	0.76–2.02	7	1.12	0.60–2.08	15

Change in estimate is the difference between the estimate of interest and the estimate from the female + demographic model divided by the estimate from the female + demographic model.

Only variables with bi-variate relationships with *P* values less than 0.20 are included in each model.

*et al.*, 2008; O'Donnell *et al.*, 2011; Srikanth *et al.*, 2005; van Vollenhoven, 2009; Nas *et al.*, 2017; Yacoub Wasef, 2004). It is unclear whether health differences reflect sex or gender. Symptoms like fatigue are complex and likely a combination of biology and social and environmental conditions which has been found in pain studies (Pool *et al.*, 2007; Racine *et al.*, 2012). Workplace activity limitations also are likely to be complex and comprise health difficulties, personal perceptions, and workplace demands that underscore issues of person-job fit (Sandqvist and Henriksson, 2004). Additional research is needed to understand differences between working women and men in arthritis symptoms and particularly to understand biological bases for symptoms versus differences in perceptions and social or cultural aspects of disease.

There were similarities between men and women in their work despite differences in job sector and full- and part-time hours. This included no differences in the availability of workplace policies and practices that might accommodate arthritis. About 70% of respondents reported 5 or more of the 14 accommodations available. Use of accommodations was also comparable by gender, although men reported receiving less help from others than women. Respondents drew on a wide range of accommodations, the most common being flex-time, extended health benefits, personal days with pay, and work-at-home arrangements. Most other accommodations were used by a third or fewer respondents.

This suggests that a wide range of accommodations have the potential to assist workers with arthritis and that many existing policies and practices are already in place. If large numbers of individuals with arthritis are able to draw on existing policies, it may mean that singular arrangements and potentially more disruptive accommodations will be less commonly needed. However, longitudinal research is needed examining whether the use of accommodations is associated with improved job outcomes like sustaining work, lower absenteeism, and less presenteeism. Research is also needed on potential preferences for help from others, the costs of workplace accommodations for different groups, including those with no chronic diseases, and whether outcomes and costs differ between women and men.

Although availability and use of accommodations were similar between men and women, more women reported needing a range of accommodations and, as a result, more women had unmet accommodation needs. Women reported greater needs for extended health benefits, personal days with pay, and part-time work with full benefits, which may reflect a greater proportion of women in our sample who were employed in sales/retail occupations and part-time work where these benefits are less common. Alternatively, our finding that men reported fewer unmet accommodation needs may indicate a gender difference in a healthy worker effect for this sample. That is, a greater proportion of men with arthritis who worked in physically demanding sectors

**Table 5.** Multivariable multinomial regression of needs met/unmet of benefits/accommodations for arthritis sample ( $n = 391$ ).

	Accommodation needs unmet versus needs met	Accommodation needs exceeded versus unmet needs	Accommodation needs exceeded versus needs met
	OR	OR	OR
Sex/gender: female	0.83	0.83	0.69 $R^2 = 1.7\%$
Demographics			
Marital status			
Divorced/separated/widowed	0.66	0.91	0.60
Never married	1.06	0.12	0.13
			$R^2 = 5.3; \Delta R^2 = 3.6\%$
Health variables			
Fatigue	1.01	0.98	0.99
Workplace activity limitations	1.03	0.97	0.99
			$R^2 = 8.9; \Delta R^2 = 3.6\%$
Work context			
Job sector			
Education/health/sciences/arts	2.13*	0.46	0.99
Construction/utilities/ manufacturing/agriculture/ mining/logging	1.66	0.51	0.84
Sales/retail	3.03*	0.65	1.96
Job involves physical activity	0.88	1.16	1.03
Part-time work	2.52*	0.26*	0.66
Job control	0.96*	1.10*	1.06*
Job stress	1.43*	0.67	0.95
			$R^2 = 20.3; \Delta R^2 = 11.4\%$
Goodness of fit statistics		Deviance chi-square = 649, $df = 756$ , $P = 0.99$ ; Pearson chi-square = 743, $df = 756$ , $P = 0.62$ ; Generalized Hosmer– Lemeshow statistics: chi-square = 12.7, $df = 16$ , $P = 0.70$	

Comparison groups for sex/gender, marital status, job sector, and work hours are as follows: men; married/living as married, banking/insurance/business/technology/government, full-time employment.

\* $P < 0.05$ .

like construction, manufacturing, utilities, and mining may have changed jobs because of difficulty working with arthritis, leaving a healthier group of men in our sample with fewer accommodation needs. More men also may prefer not to receive help from others or to acknowledge their need for accommodations compared with women. Finally, significantly more men were excluded from our study because they were self-employed. This could represent a sampling difference that is relevant to health and accommodation needs. Additional studies of the intersection of health, work context, and work hours may further illuminate these findings.

Sex and gender-based multivariable analyses found no significant relationship of sex/gender with accommodation needs and use. Instead, need for and use of

workplace accommodations were largely associated with health variability and workplace activity limitations. Treatment for arthritis often addresses symptoms like pain and, to some extent, fatigue (Burton *et al.*, 2006; Lenssinck *et al.*, 2013; Sokka *et al.*, 2010). Generally, studies find modest improvements in work participation (Bjork *et al.*, 2009; Burton *et al.*, 2006a, 2006b; Kaptein *et al.*, 2009; Lenssinck *et al.*, 2013; Sokka *et al.*, 2010; Sullivan *et al.*, 2010). Our findings suggest greater attention to the episodic nature and unpredictability of disease symptoms, as well as to person-job fit as captured by measures of workplace activity limitations, as these aspects of working with arthritis may be particularly difficult (Gignac *et al.*, 2011). They also may be amenable to change with the help of workplace accommodations,

Table 6. OR for females versus males across nested multinomial regression models for unmet accommodation need versus accommodation needs met, and exceeded accommodation need versus accommodations needs met.

	Accommodation needs met/unmet/exceeded					
	Unmet needs versus needs met			Needs exceeded versus needs met		
	OR	95% CI	Change in estimate (%)	OR	95% CI	Change in estimate (%)
Female versus males	1.23	0.75–2.02		0.56	0.32–1.00	
Female + demographic factors	1.31	0.79–2.16		0.62	0.35–1.12	
Female + demographic + health	1.16	0.69–1.95	11	0.69	0.38–1.27	-11
Female + demographic + work context	0.86	0.48–1.54	34	0.67	0.35–1.27	-7
Female + demographic + health + work context	0.83	0.46–1.50	36	0.69	0.36–1.33	-10

Change in estimate is the difference between the estimate of interest and the estimate from the female + demographic model divided by the estimate from the female + demographic model.

Only variables with bi-variate relationships with *P* values less than 0.20 are included in each model.

which could improve work sustainability. A focus on health variability and workplace activity limitations may be particularly important for women who scored significantly higher on these variables than men.

Also associated with accommodations was job control. Greater control was related to greater use of workplace policies and practices, having fewer unmet accommodation needs, and with a greater likelihood of having accommodation needs exceeded. Job control has been studied extensively in the workplace literature and is associated with a range of positive work outcomes (De Jonge *et al.*, 1999; De Rijk, 2013; Karasek and Theorell, 1990; Kristman *et al.*, 2016; North *et al.*, 1996; Ostry *et al.*, 2003; Taris and Kompier, 2005). Women and men with arthritis in the study reported similar overall levels of job control. The importance of job control as a predictor of accommodations suggests that, in addition to accommodation practices, work environments that provide workers with greater levels of control to take advantage of accommodations may be beneficial in managing arthritis for both men and women.

Of interest was that the predictors of unmet accommodation needs were largely related to work context and not health. Respondents with arthritis working in education/health/sciences/arts, as well as in sales/retail, reported greater unmet accommodation needs as did part-time workers. Workers reporting more job stress also had greater unmet accommodation needs. Here again, gender differences were not significant in multivariable analyses. Yet, women were more likely to work in these sectors and to report more job stress. A sex and gender-based approach to future research suggests that greater attention needs to be given to the

specific nature of some jobs in understanding whether they make workers vulnerable to unmet accommodation needs. Examining the experiences of men and women separately can provide useful insights into potential differences.

There are a number of limitations to this study, including that the data are cross-sectional. Longitudinal research would help better understand changes in health and work and their temporal relationship to accommodation needs, use, and unmet needs in women and men. The study also used self-report to assess health and workplace factors, which can introduce sample and response biases (Becker, 2005; Podsakoff *et al.*, 2012). Although self-report data are frequently used in epidemiological studies and, where available, we included measures with reported validity, additional research would be beneficial to further assess the validity and generalizability of the findings, including workplace data that could provide confirmation of accommodation use. Future research should also incorporate concepts of gender roles and gender identity at the start of data collection, recognizing that debate continues over how best to measure concepts of gender and the relevance of the different scales (Hoffman and Borders, 2001; Smiler and Epstein, 2010). In addition, although women and men with arthritis were often working with various health difficulties, suggesting that our findings were not due to a healthy worker effect, studies are needed with individuals who have given up work, as well as with those who are employed to examine the efficacy of different types of accommodations. This study also used broad categorizations of job sector to examine gender differences. Research is needed to refine the analyses and

further explore sex/gender related to specific job types and work schedules. This includes more research on self-employment. As noted, more men in this sample were self-employed, which may make them particularly vulnerable to difficulties in living with arthritis and may limit opportunities for accommodations. Alternatively, self-employment may provide greater amounts of job control that could enhance self-management of arthritis at work.

Despite these limitations, our focus on sex and gender differences and the use of a SGBA to examine workplace accommodations among men and women with arthritis provides new insights. The findings suggest that a range of existing policies and practices is drawn upon to help manage arthritis and that most women and men have their accommodation needs met. The findings also highlight that women reported health and work context challenges that differed from men and that these were related to greater accommodation needs and unmet needs. Specifically, poorer health reported by women largely explained differences in accommodation needs, whereas differences in the work context of men and women largely explained differences in unmet accommodation needs. This highlights the complexity of sex and gender and highlights potential vulnerabilities in the work of women that need to be addressed going forward.

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## Declaration

The authors declare no conflict of interest relating to the material presented in this article. Its contents, including any opinions and/or conclusions expressed, are solely those of the authors and do not necessarily reflect those of the Province of Ontario.

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