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Social role participation and the life course in healthy adults and individuals with
osteoarthritis: Are we overlooking the impact on the middle-aged?

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RUNNING HEAD: Social Role Participation in Middle- and Older-Aged Adults

Abstract

Little is known about life course differences in social role participation among those with chronic diseases. This study examined role salience (i.e., importance), role limitations, and role satisfaction among middle- and older-aged adults with and without osteoarthritis (OA) and its relationship to depression, stress, role conflict, health care utilization and coping behaviours. Participants were middle- and older-aged adults with OA ($n = 177$) or no chronic disabling conditions ($n = 193$), aged ≥ 40 years. Respondents were recruited through community advertising and clinics in Ontario, Canada (2009-2010). They completed a 45-50 minute telephone interview and 20 minute self-administered questionnaire assessing demographics (e.g., age, gender); health (e.g., pain, functional limitations, health care utilization); the Social Role Participation Questionnaire (SRPQ) (role salience, limitations, satisfaction in 12 domains), and psychological variables (e.g., depression, stress, role conflict, behavioural coping). Analyses included two-way ANOVAs, correlations, and linear regression. Results indicated that middle-aged adults (40-59 years) reported greater role salience than older-aged adults (60+ years). Middle-aged adults with OA reported significantly greater role limitations and more health care utilization than all other groups. Middle-aged adults and those with OA also reported greater depression, stress, role conflict, and behavioural coping efforts than older adults or healthy controls. Controlling for age and OA, those with higher role salience and greater role limitations reported more health care utilization. Those with greater role limitations and lower role satisfaction reported greater depression, stress, role conflict, and behavioural coping. This study has implications for research and interventions,

highlighting the need to characterize role participation as multidimensional. It points to the importance of taking into account the meaning of roles at different ages among those with chronic diseases like OA when developing interventions to help understand the impact of roles on psychological well-being.

Research Highlights:

- Individuals with OA report greater health care utilization and coping efforts than healthy adults
- Middle-aged participants report greater stress and role conflict
- Middle-aged adults with osteoarthritis report more role limitations and health care utilization
- Role perceptions and age are important in understanding the relationship of OA to health outcomes

Keywords: Canada; participation; roles; age; life course; arthritis; chronic disease; depression

Introduction

Living with a chronic disease can pose a significant threat to an individual's participation in social roles such as employment, parenting, intimate relationships, leisure, and community involvement. Conceptual reviews of life course research highlight the importance of roles, events, and transitions over time (Elder et al., 2003) and emphasize that role activities are influenced by biological forces like disease, as well as by psychological, social, historical and geographical factors (Alwin, 2012; Dannefer, 2012; Hendricks, 2012). Critical to a life course perspective is that individuals proactively manage and shape their roles (Alwin, 2012; Carstensen, 1992; Christiansen & Matuska, 2006; Elder et al., 2003; Featherman, 2012; Hendricks, 2012; Marks, 2009; Neugarten, 1979). The element of time is also essential. It illuminates age-graded sequences of events and can be used as a social benchmark (Hendricks, 2012). That is, individuals of different ages have social timetables related to their roles that shape a role's occupancy and their perceived meaning (Carstensen, 1992; Christiansen & Matuska, 2006; Hendricks, 2012; Marks, 2009; Neugarten, 1979). For example, when time is perceived as relatively long, many roles can be pursued. When time is perceived as limited, as in older age, roles may be given up or re-prioritized (Carstensen, 1992). Moreover, if expected or anticipated roles do not occur or they occur at a time that is not perceived as normative (i.e., a role is "off-time" – too early or too late), individuals may report distress or change their behaviour to better manage a role (Carstensen, 1992; Neugarten, 1979; Marks, 2009).

Research on health and disablement has increasingly focused on role participation and social functioning as a critical, underemphasized domain of study (Badley, 2008;

Baum et al., 2000; Brown et al., 2004; Cardol et al., 2002; Carr, 1999; Dijkers et al., 2000; Jette et al., 2003; Noreau et al., 2004; Perenboom & Chorus, 2003; Pollard et al., 2006; Wilkie et al., 2004; World Health Organization, 2001). In general, most of these studies have not applied conceptual perspectives from life course research. That is, although age is often included in research as an important personal factor, it is typically a proxy for the likelihood that health and functioning will decline over time. For example, numerous studies show that older adults are more likely to report ongoing health problems that may result in activity limitations and role participation restrictions than younger adults (Ferraro, 2005; Paillard-Borg et al., 2009; Rowe & Kahn, 1997; Verbrugge & Yang, 2002).

Lacking is an examination of perceived role participation at different ages within the context of health and chronic disease. Drawing on research from the health and disability literature, as well as integrating perspectives from life course research, role participation can be conceived of as multi-faceted. It includes not only involvement in a role (e.g., being a parent), but also perceptions of the importance of a role (i.e., its salience), appraisals of limitations or difficulties with role performance, and satisfaction with the ability to perform a role in the way an individual would prefer. These different perceptions of the meaning of role participation may vary by age and health. Role perceptions also could be important in explaining psychological appraisals of distress (e.g., depression, stress) and behaviours like health care utilization and coping efforts.

To examine this further, we took the example of a highly prevalent chronic illness, osteoarthritis (OA). OA ranks among the top ten causes of disability worldwide (Centers for Disease Control and Prevention (CDC), 2009; Murray & Lopez, 1996). It

results in pain, fatigue, functional limitations, increased health care utilization and substantial costs to society (Badley et al., 1994; Badley & Wang, 1998; LaPlante, 1991; Li et al., 2006a; Perruccio et al., 2006). Research on specific roles, especially employment, finds that OA is associated with role loss, role conflict (i.e., managing OA leaves too little time for other role demands or interferes with role performance), stress and depression (Gignac et al., 2006b; Gignac et al., 2007; Gignac et al., 2012; Li et al., 2006b). Moreover, OA disease symptoms are often minimized and normalized as part of “growing old” (Hudak et al., 2002; Kee, 1998; Sanders et al., 2002). As a result, OA is useful as a disease within which perceptions of role participation can be examined.

More specifically, in this study, we compared the role perceptions of middle- (40-59 years) and older-aged adults (60+ years). Although imperfect, we followed the lead of other researchers and used broad age groups as a proxy to assess potential differences in perceived role participation that may approximate life course changes. We also contrasted individuals who have no chronic disabilities with individuals living with OA. We expected that a higher proportion of middle-aged adults, regardless of OA, would be involved in more roles like employment and caregiving for children than older-aged adults. However, despite age-related differences in role occupation, participation across a wide range of roles (e.g., interpersonal relationships, leisure, socializing) would be perceived as important across age groups and regardless of OA. Role limitations might present a different scenario. Middle- and older-aged adults with OA were expected to report greater pain, fatigue, and disability than healthy adults and report more role difficulties or limitations.

Limitations in role participation were expected to relate to lower role satisfaction, particularly for those with OA. However, older adults with OA may perceive the onset of the disease as normative, while middle-aged adults may perceive it as premature or “off-time” (i.e., too early) (Gignac et al., 2006a; Hendricks, 2012; Hudak et al., 2002; Kee, 1998; Neugarten, 1979; Sanders et al., 2002). If so, both age and OA would be associated with role satisfaction, such that middle-aged adults with OA would report lower role satisfaction than older adults with OA and healthy adults (middle- or older-aged).

Previous studies have found that those with OA are more likely to report greater distress and health care utilization than healthy adults (Gignac et al., 2006a; Kee, 1998; LaPlante, 1991; Li et al., 2006a; Sanders et al., 2002). We expected similar findings. However, we also expected an age by OA interaction such that middle-aged adults with OA will report the greatest depression, stress, role conflict, health care utilization and behavioural coping efforts compared to other groups. Moreover, role perceptions are also expected to be important. In particular, greater role limitations and decreased role satisfaction are expected to relate to increased depression, stress, role conflict, health care utilization and self-management behaviours.

In sum, we hypothesized that a variety of roles would be salient to individuals regardless of their age or the presence of OA. Role limitations were likely to be shaped by OA and be less influenced by age. However, satisfaction with roles was likely to be shaped both by age and OA. Role limitations and satisfaction were also expected to mediate the relationship between age, OA and psychological well-being like depression, stress, and role conflict, as well as health care utilization and self-management behaviours.

Methods

Participants

Purposive samples of adults with OA and no chronic disabling health conditions (i.e., “healthy controls”) were recruited to compare their participation. Participants were 40 years or older and were recruited in southern Ontario, Canada (2009-2010) using community advertising in several newspapers with a broad spectrum of socio-economic readership characteristics and through advertising in community centres. Additional participants with OA were recruited using The Arthritis Society (TAS) website, from our previous research, and hospital clinics at the Toronto Western Hospital and Toronto General Hospital, Toronto, Canada. Study eligibility was established with a telephone-screening questionnaire. Eligibility for the OA group included: 1) being diagnosed with OA by a health professional; 2) having knee, hip, and/or groin pain or other joints affected by OA; 3) being at least 40 years old; and 4) fluency in English. Exclusion criteria were: 1) being diagnosed with other musculoskeletal conditions; 2) an acute musculoskeletal injury in the previous 6 months; 3) hip or knee surgery within the previous year or other surgery from which the individual was recovering; 4) having other chronic health conditions resulting in daily activity limitations (e.g., multiple sclerosis, stroke). Participants with non-disabling co-morbidity (e.g., diabetes, hypertension) were included in the study if these conditions did not limit daily activities. Excluding these conditions would have resulted in a highly unrepresentative sample of the population. Inclusion-exclusion criteria for the healthy control sample were similar to the OA group except that participants had not been diagnosed with OA and did not report OA joint symptoms.

Screening established that 409 individuals were eligible for the study. Those not eligible most often reported other disabling health conditions, ongoing joint pain but no OA diagnosis, recent injuries or surgery. Some participants also expressed being unable to participate or being uninterested in participation once study details were explained. Of those eligible for the study, 370 (90.5%) agreed to participate and provided data (OA = 177; healthy control = 193).

Procedure

Data collection occurred in two parts. A 45-50 minute telephone questionnaire was administered to participants at a time of their choice. A shorter (20 minute) self-administered questionnaire collected additional information and was mailed to participants at the time of their interview. Most self-administered questionnaires were completed within 2-3 weeks of the telephone interview. In total, 352 (95.1%) of participants provided both telephone and self-administered data. Telephone interviewers completed standardized training supplemented by regular meetings. A small honorarium (Canadian \$20) was provided to participants. Ethics approval was received from the Research Ethics Board of the University Health Network, Toronto, and informed written consent was obtained from all participants.

Measures

Role Participation. Social roles were assessed using the Social Role Participation Questionnaire (SRPQ), which was modified from its original version to include information on role limitations (Davis et al., 2011; Gignac et al., 2008). Three components of roles were measured. The first was role salience, which assessed the extent to which different roles were important to a person, regardless of whether or not an

individual was currently engaged in that role (e.g., the importance of employment was assessed even if a participant was not working). Eleven role domains and one global question were gauged: 1) work; 2) education; 3) intimate relationships; 4) children/step-children/grandchildren; 5) other family; 6) community involvement; 7) socializing; 8) casual contact with others; 9) travel; 10) physical activity; and 11) hobbies. Responses were on a 5-point scale from 1 = not at all important to 5 = extremely important.

Participants were also asked whether they were currently employed, attending school, involved in an intimate relationship, or had children, step-children, or grandchildren (Yes/No). The second component of the SRPQ, role limitations, asked participants how difficult it was, given their present health status, to participate in each of the role domains. Responses were on a 4-point scale from 0 = no difficulty; 1 = some difficulty; 2 = a lot of difficulty; 3 = not able to do. A not applicable category was provided for respondents not currently engaged in a role. Finally, role satisfaction questions asked participants to consider their health and assess the extent to which they were satisfied with their ability to participate in each of the applicable roles in the ways they would like. Responses ranged from 1 = not at all satisfied to 5 = extremely satisfied. The SRPQ takes 5-10 minutes to complete. Mean scores were calculated for role salience, role limitations and role satisfaction. Those reporting a role was not applicable to them on the role limitation subscale (i.e., employment, education, intimate relationships, children/grandchildren) were coded as not being restricted in that role and were given a score of 0 (no difficulty). Because individuals may not engage in all roles, a mean role satisfaction score was calculated if participants responded to at least 9 of 12 domains.

Demographics. Data on age, gender, education, marital status, employment status, income and living with children under age 18 (Yes/No) were collected. Age was dichotomised into two groups: middle-age (40-59 years) and older-age (60+ years).

Health Outcomes. Self-reported Health was measured with a single item, “In general, how would you rate your health” (1 = poor; 2 = fair; 3 = good; 4 = very good; 5 = excellent). Pain in the past month was assessed with a 0-10-point visual analogue scale (VAS) (0 = no pain; 10 = worst possible pain). The Profile of Mood States (POMS) 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). The Health Assessment Questionnaire II (HAQ II) measured limitations with everyday activities (Wolfe et al., 2004). Ten items assessed difficulty with activities like walking, stair climbing, and lifting. Responses were on a 4-point scale where 0 = without any difficulty; 3 = unable to do. A mean score was analysed (Cronbach’s alpha = .93). Respondents with OA were asked for the duration of their disease symptoms in years.

Mental Health. The 20-item Center for Epidemiologic Studies Depression Scale (CES-D) measured depressive symptoms (Radloff, 1977). Respondents reported on the frequency of symptoms experienced in the past week (0 = rarely or none of the time/less than 1 day; 1 = some or a little of the time/1-2 days; 2 = occasionally or a moderate amount of time/3-4 days; 3 = most or all of the time/5-7 days). Summed scores were analysed (Cronbach’s alpha = .92). Scores of 16 or more are often taken as evidence of depression. The 14-item Perceived Stress Scale measured global stress levels in the previous month (1 = never; 5 = very often) (Cohen et al., 1983). Summed scores were analysed (Cronbach’s alpha = .91).

Role Conflict. Four new items were developed for this study measuring role conflict. Items asked the extent to which individuals had chosen between roles, given up time in important roles, had difficulty balancing roles, and perceived they had too many role responsibilities. Responses were on a 5-point scale (1 = not at all; 5 = a great deal). Summed scores were analysed (Cronbach's $\alpha = .74$).

Health Care Utilization. Respondents reported whether or not they consulted with each of 12 categories of health professionals in the past year (e.g., family doctor, medical specialist, surgeon, physical therapist, pharmacist). The number of responses was summed as an indication of health care utilization.

A 4-item Behavioural Coping scale measured efforts to self-manage one's health and included giving up or limiting time spent in activities; modifying activities; planning, pacing, or anticipating problems before they happened; and receiving help (Gignac, 2005; Sale et al., 2008). Responses on a 5-point scale (1 = not at all; 5 = a great deal) were summed (Cronbach's $\alpha = .72$).

Analyses

Frequencies, means, and standard deviations were calculated for all variables. Chi-square and two-way analyses of variance (ANOVA) tests compared OA and healthy control participants on sample characteristics. Pearson correlations examined the inter-relationships among the role salience, limitations and satisfaction components for those with OA and healthy controls. Linear regression analyses examined age, OA, age by OA interaction effects and role salience, role limitations, and role satisfaction as potential predictors of depression, stress, role conflict, health care utilization, and behavioural coping efforts. Analyses proceeded in steps. Age and OA main effects were entered first

followed by age by OA interaction effects. Then role salience, role limitations, and role satisfaction variables were entered in the model.

Results

Table 1 presents characteristics of the sample. In general, healthy control group participants were similar in demographic characteristics to the OA sample. On average, middle-aged participants were 50 years old and older participants were 67 years old. The sample included more women than men. Fewer older-aged OA participants had university educations and middle-aged healthy controls were less likely to be married. In keeping with their disease, respondents with OA reported greater pain and activity limitations than healthy controls (all p 's < .001). Middle-aged respondents with OA had significantly poorer self-reported health and greater fatigue than all other groups. Older adults with OA reported longer disease durations than middle-aged adults with OA (p < .05). However, their pain and activity limitations did not significantly differ. Not all respondents were involved in all roles assessed by the SRPQ. Overall, 38.5% ($n = 142$) were not involved in an intimate relationship; 38.5% ($n = 142$) did not have children, stepchildren, or grandchildren; 45.3% ($n = 167$) of respondents were not employed; and 84.1% ($n = 312$) were not enrolled in educational activities. Two-way ANOVA's found no group differences in involvement in an intimate relationship. Middle-aged adults were significantly more likely than older adults to be living with children under age 18 and be employed. Healthy adults also were more likely to be employed and to be involved in continuing education than those with OA. Because educational pursuits were not applicable to most participants, this role was dropped from subsequent analyses. Significant main effects for age and OA were found with middle-aged respondents and

those with arthritis reporting greater depression, stress, role conflict and behavioural coping efforts. A significant interaction effect was found for health care utilization with middle-aged respondents with OA reporting the greatest health care utilization of all groups.

The findings for the three role participation dimensions show that means were relatively high for role salience indicating that many participants rated a range of roles as important to their lives. Middle-aged respondents, regardless of their health, reported that roles were more important to them than older-aged respondents. Middle-aged respondents were also significantly more likely to report lower role satisfaction than their older counterparts. However, there was also a significant main effect for OA with those having arthritis reporting less role satisfaction than healthy controls. An interaction between age and OA emerged for role limitations with middle-aged participants with OA reporting significantly greater difficulties with their roles than all other groups.

We next examined the relationship of age, OA, and role perceptions to depression, stress, role conflict, health care utilization and behavioural coping efforts (Table 2). Linear regression analyses were performed in steps. Main effects for age and OA were tested first followed by age by OA interaction effects. To simplify presentation of the data, these data are combined and presented in Model 1. Model 2 adds role salience, role limitations, and role satisfaction to the analyses. For Model 1, there were significant age effects with middle-aged respondents reporting greater stress and role conflict, as well as a trend for greater depression, than older adults. Model 1 also reveals that individuals with OA were significantly more likely to report depression, stress, role conflict, health care utilization and behavioural coping efforts than all other groups.

There was a significant age by OA interaction for health care utilization indicating that middle-aged adults reported greater health care utilization compared to all other groups. There was also a trend for middle-aged adults with OA to report greater depression than other groups ($p < .10$). Model 1 R-squares were relatively low for depression, stress, and role conflict accounting for between 13-19% of the variance. R-squared values for health care utilization and behavioural coping efforts were 22% and 47%, respectively.

Model 2 examined the addition of role salience, role limitations, and role satisfaction to the analyses. Age remained significant for stress and role conflict but was not significant for depression. Those with OA continued to report greater health care utilization and behavioural coping efforts. However, OA was no longer significantly related to role conflict and only trends were found in predicting greater depression and stress ($p < .10$). Age by OA interaction effects were not found, with the exception of a trend for depression ($p < .10$). Instead, those with greater role limitations and lower role satisfaction reported significantly greater depression, stress, role conflict, and behavioural coping efforts. Greater role salience and role limitations were also associated with more health care utilization. Model 2 R-square values increased and accounted for 27% of the variance for role conflict and 39% and 44% of the variance for stress and depression, respectively. Model 2 accounted for 30% of the variance for health care utilization and 59% of the variance for behavioural coping.

Discussion

Findings support hypotheses that both age and OA relate to role participation perceptions and that middle-aged participants with OA may report more difficulties with

roles than their older counterparts or healthy individuals. It also found support for assessing the meaning of roles as multidimensional and for examining role salience, role limitations, and role satisfaction. These dimensions, especially role limitations and satisfaction, were related to depression, stress, role conflict, health care utilization and behavioural coping efforts. The findings are important because adults in their middle years typically are expected to take on a large number of diverse roles. If individuals perceive that they are not able to participate fully in valued areas of life because of chronic diseases like OA, it may have personal and societal consequences, including implications for physical and psychological health.

Findings from the study revealed that involvement in diverse roles was common among participants and that there were few group differences. Differences that existed generally were associated with age, not OA (e.g., middle-aged adults were more likely to be employed). Although middle-aged healthy adults reported greater salience or importance of roles in their lives compared to older-aged OA adults, mean scores were relatively high suggesting that older adults may not be withdrawing from or re-prioritizing their social roles as hypothesized in some theories of aging (Carstensen, 1992). Additional research needs to further examine involvement in roles and role salience, particularly in larger population samples. Although our sample was diverse in terms of gender, education, marital status and income, and participants with OA were comparable to clinical and population health studies in terms of pain, disability, and disease duration, further research would enable a better understanding of whether role differences are largely related to age, health, or other factors.

Middle- and older-aged respondents with OA reported similar levels of disease severity (e.g., pain, physical function, self-reported health). Yet, middle-aged adults with OA reported greater fatigue and role limitations than older adults with OA. It is not immediately clear why this occurred. However, it suggests that variables other than a disease diagnosis are important in understanding people's perceptions of role limitations. Conceptual discussions of the life course would speculate that it may reflect divergent social timetables and perceptions of what is normative at this time of life across middle- and older-aged adults with OA (Hendricks, 2012). For example, middle-aged adults with OA may have contact with fewer individuals who, like them, are living with OA. As a result, they may compare themselves to healthy peers who are able to do more or whose performance they believe is superior to their own. To date, we lack data on the role expectations of different age groups living with chronic illnesses. If middle-aged adults with OA perceive their condition as occurring prematurely and if their role expectations lead them to believe they are more limited in their role performance, it can also explain why middle-aged adults with OA reported lower role satisfaction than others.

Perceptions of role participation, age, and OA were also important in understanding depression, stress, and perceived role conflict. Previous studies have found that individuals with chronic diseases are more likely to report poorer psychological well-being than their healthy counterparts. However, little attention has been given to specific sources of distress. This study points to role limitations and role dissatisfaction as potential factors that contribute to poorer psychological well-being. This was particularly true for those with OA. However, middle-aged adults also reported greater stress and role conflict than older adults. As such, perceptions of role participation and age may warrant

greater attention in intervention studies for those with chronic disabling diseases. Many self-management programs focus primarily on symptom management and do not explicitly highlight limitations with role participation or perceptions of role dissatisfaction. The findings are also important given that psychological health and physical health are often inter-related. Longitudinal research needs to examine the long-term implications of role limitations and dissatisfaction on changes in health like pain, fatigue, and activity limitations, and whether this is moderated by other role perceptions such as role conflict.

Differences in perceived role participation were also related to health care consultations and behavioural coping strategies. Age was unrelated to these variables. Not surprisingly, those with OA reported more health care utilization and behavioural coping. Specifically, greater role salience and role limitations were associated with consulting a greater range of health care professionals. Participants with more role limitations and less role satisfaction reported more behavioural coping efforts. These findings are preliminary and need to be replicated, particularly with longitudinal data. Additional research may point to role perceptions as being important factors in motivating health behaviours. If so, this information is of potential value to clinicians. Currently, clinicians often emphasize the value of treatments in alleviating symptoms and delaying or halting disease progression. However, it may be important to discuss role demands in a patient's life and their salience, as well as the potential for treatment to impact role limitations and satisfaction. As such, the relationship of role participation perceptions to treatment adherence deserves increased attention.

Several limitations to this research should be acknowledged. First, as noted in the introduction, age is an imperfect proxy for life course demands. Although the age groups used in this study captured expected differences in role involvement (e.g., more middle-aged adults were employed and had younger children than older adults), additional research needs to more fully explore diverse roles in the lives of individuals of different ages. In addition, we created indices reflecting the importance, difficulties, and satisfaction individuals have with their roles. But, additional research needs to be conducted validating the SRPQ and assessing whether there are other dimensions that reflect the meaning, quality, and quantity of role domains. This study drew on a sample of adults with OA and those with no chronic disabling health conditions. Although OA is among the most prevalent chronic diseases causing disability, research is needed to replicate these findings with a greater range of chronic health samples and conditions, including visibly disabling conditions and those that include cognitive impairments. Moreover, including younger adults and adults with different onset ages of chronic disease in studies would increase our understanding of life course issues related to health and disability (e.g., early life onset). Finally, the study was cross-sectional making the direction of effects unclear. Longitudinal studies would help clarify, not only the direction of relationships related to health and role participation, but also the impact of changes in participation on health. Population health studies are also needed to examine the generalizability of the findings.

In summary, this study highlights that participation in roles is perceived as important across the life course. However, the occurrence of chronic health problems at different ages has important implications, not only for role limitations and satisfaction,

but also for psychological well-being. In particular, middle-aged adults with chronic conditions like OA may report more limitations in role participation and heightened distress than older adults. This suggests potential new directions for interventions that take into account life course factors and that focus on helping individuals maintain involvement in valued roles.

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Table 1. Percentages, means, standard deviations (SD) and differences due to age and health status (OA) (n = 370)

	Healthy adults		Adults with Osteoarthritis	
	Middle-Aged (n=115)	Older-aged (n=78)	Middle-Aged (n=90)	Older-aged (n=87)
Age in years (Mean/SD)	50.1 (6.1)	66.5 (5.5)	50.8 (5.7)	67.8 (6.2) ***
Gender (%)				
Female	59.1	61.5	64.8	74.7
Male	40.9	38.5	35.2	25.3
Education (%)				
Secondary school or lower	12.2	14.1	14.4	28.7 *
Some post-secondary	21.7	19.2	16.7	20.7
College, university or higher	66.1	66.7	68.9	50.6
Marital Status (%)				
Married	42.6	47.4	53.3	50.6 **
Divorced or Widowed	23.5	37.2	22.2	34.5
Single	33.9	15.4	24.4	14.9
Household Income (%)				
Less than \$30000	28.8	29.4	30.4	38.0
\$30000-69999	41.3	47.1	38.0	36.6
\$70000 above	29.8	23.5	31.7	25.4
Self-rated health (Mean/SD; range = 1-5)	4.0 (0.7)	4.3 (0.7)	2.8 (1.1)	3.1 (0.9) ^{b, c}
OA disease duration (years)	NA	NA	7.3 (9.0)	10.1 (9.3) *
Pain (Mean/SD; scores range 0-10)	2.3 (2.2)	1.8 (2.1)	6.2 (2.2)	5.9 (2.5) ^b
Fatigue (Mean/SD; scores range 0-20)	4.9 (4.4)	2.9 (2.9)	11.2 (5.0)	8.9 (5.6) ^{a, b, c}
Activity Limitations (HAQII) (Mean/SD; scores range 0-3)	0.2 (.02)	0.1 (0.2)	1.0 (0.6)	0.9 (0.6) ^b

Role Involvement (%)				
Involved in an intimate relationship	53.4	60.3	71.4	57.5
Have children, stepchildren or grandchildren	49.6	70.5	57.1	73.6 ^a
Live with children under 18 years of age	21.7	1.3	26.4	4.6 ^a
Currently in educational pursuit	22.6	20.5	14.3	4.6 ^b
Currently in paid employment	73.9	39.7	63.7	33.3 ^{a, b}
Depression (0-60)	8.0 (7.6)	5.6 (6.2)	17.4 (17.7)	11.4 (9.2) ^{a, b}
Stress (0-56)	20.6 (7.6)	16.5 (7.4)	25.8 (9.0)	20.7 (7.4) ^{a, b}
Role conflict (4-20)	11.0 (3.5)	8.9 (3.3)	12.8 (3.4)	11.0 (3.2) ^{a, b}
Health care utilization (0-12)	2.3 (1.4)	2.2 (1.2)	4.3 (2.2)	3.4 (1.5) ^{a, b, c}
Behavioural coping efforts (4-20)	7.3 (2.5)	6.9 (1.9)	12.5 (3.2)	11.6 (2.9) ^{a, b}

Note: 53 cases are missing from household income. Chi-square tests examined differences in education, marital status, and income; Two-way ANOVAs examined differences by age and OA in self-rated health, pain, fatigue, activity limitations, role involvement, depression, stress, role conflict, health care utilization, behavioural coping efforts. OA disease duration was not applicable (NA) to healthy adults, where t-tests compared middle-aged and older-aged adults with OA.

Note: * $p < .05$; ** $p < .01$; *** $p < .001$;

a = significant age effect, *b* = significant OA effect, *c* = significant age*OA interaction effect using two-way ANOVAs.

These results should go into table 1. See where I added the variable names. Authors need to add the means (SD) from this table into table1.

Table 2. Role salience, role limitations and role satisfaction means, standard deviations and differences due to age and health status

	Healthy adults		Adults with Osteoarthritis	
	Middle-Aged (n=115) Mean (SD)	Older-aged (n=78) Mean (SD)	Middle-Aged (n=90) Mean (SD)	Older-aged (n=87) Mean (SD)
Social Role Participation				
Role salience (1-5)	4.06 (.46)	3.89 (.53)	4.02 (.53)	3.86 (.48) ^a
Role limitations (0-3)	0.13 (.23)	0.10 (.21)	0.87 (.55)	0.65 (.48) ^{a,b,c}
Role satisfaction (1-5)	3.97 (.63)	4.20 (.48)	2.89 (.83)	3.24 (.78) ^{a,b}

Note: Two-way ANOVAs examined age, OA and age by OA interaction effects; *a* = significant age effect (p<0.05); *b* = significant OA effect (p<0.05), and *c* = significant OA*Age interaction effect (p<0.05)

Table 2. Beta coefficients (SE) for multivariate regression analyses examining role participation components, age, and OA for depression, stress, health-care utilization and behavioural coping efforts

	Depression (n = 336)		Stress (n = 335)		Role Conflict (n = 336)		Health Care Utilization (n = 317)		Behavioural Coping Efforts (n = 336)	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Age	2.37† (1.31)	0.67 (1.14)	4.10*** (1.19)	2.92** (1.04)	2.15*** (.49)	1.53** (.49)	0.15 (.25)	0.08 (.25)	0.36 (.39)	0.15 (.37)
OA	5.74*** (1.39)	-2.44† (1.36)	4.27*** (1.27)	-2.28† (1.24)	2.15*** (.52)	0.13 (.58)	1.25*** (.26)	0.60* (.29)	4.68*** (.41)	2.73*** (.43)
Age * OA	3.64† (1.87)	2.72† (1.63)	0.94 (1.71)	-0.31 (1.48)	-0.37 (.71)	-0.67 (.70)	0.75* (.35)	0.36 (.35)	0.54 (.56)	-0.17 (.52)
Role salience		1.15 (.91)		0.17 (.82)		0.67† (.39)		0.45* (.20)		0.39 (.29)
Role limitations		3.47** (1.34)		3.99*** (1.22)		1.19* (.58)		1.10*** (.29)		2.56*** (.43)
Role satisfaction		-5.73*** (.76)		-4.46*** (0.69)		-1.45*** (.33)		-0.08 (.16)		-0.63** (.24)
R-square	0.19	0.44	0.14	0.39	0.13	0.27	0.22	0.30	0.47	0.59

Note: SE = standard error; † p<0.1; * p < .05; ** p < .01; *** p < .001

Note: Model 1 presents the final model examining age, OA, and age by OA interaction effects. Age effects compared middle-aged (designated '1') and older-aged (designated '0') groups; OA effects compared adults with OA (designated '1') to healthy adults (designated '0'). Intercepts are not shown. Model 2 examined age, OA, age by OA interaction effects, role salience, role limitations, and role satisfaction.

Note: All R-squares were significant at $p < 0.001$ level.