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Physical activity and quality of life in older women with a history of depressive symptoms

Kristiann C. Heesch, DrPH [a,*], Yolanda R. van Gellecum, MSocSci [b], Nicola W. Burton, PhD [b], Jannique G.Z. van Uffelen, PhD [b,c], Wendy J. Brown, PhD [b]

[a] School of Public Health and Social Work and Institute of Health & Biomedical Innovation, Queensland University of Technology Victoria, Park Road, Brisbane, QLD 4059, Australia
[b] School of Human Movement and Nutrition Sciences, The University of Queensland, Blair Drive, Brisbane, QLD 4072, Australia
[c] Institute of Sport, Exercise and Active Living, Victoria University, Footscray Park Campus, Ballarat Road, Melbourne, VIC 8001, Australia

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ABSTRACT

Physical activity (PA) is positively associated with health-related quality of life (HRQL) in older adults. It is not evident whether this association applies to older adults with poor mental health. This study examined associations between PA and HRQL in older women with a history of depressive symptoms. Participants were 555 Australian women born in 1921–1926 who reported depressive symptoms in 1999 on a postal survey for the Australian Longitudinal Study on Women's Health. They completed additional surveys in 2002, 2005 and 2008 that assessed HRQL and weekly minutes walking, in moderate PA, and in vigorous PA. Random effects mixed models were used to examine concurrent and prospective associations between PA and each of 10 HRQL measures (eight SF-36 subscales; two composite scales). In concurrent models, higher levels of PA were associated with better HRQL ($p < 0.001$). The strongest associations were found for the bodily pain, physical functioning, general health perceptions, social functioning and vitality measures. Associations were attenuated in prospective models, more so for mental HRQL-related scales than for physical HRQL-related scales. However, strong associations (>3 point differences) were evident for physical functioning, general health, vitality and social functioning. For women in their 70s–80s with a history of depressive symptoms, PA is positively associated with HRQL concurrently, and to a lesser extent prospectively. This study extends previous work by showing significant associations in older women with a history of depressive symptoms. Incorporating PA into depression management of older women may improve their HRQL.

1. Introduction

With global increases in life expectancy, the ageing population is expanding. The number of people aged 65 + years is projected to rise from 524 million in 2010 to almost 1.5 billion in 2025, representing 16% of the world's population (World Health Organization, 2015). A key priority for public health action is, therefore, to foster healthy ageing to maximize functional ability. Health-related quality of life (HRQL) is a key indicator of healthy ageing (Bize et al., 2007). This multidimensional construct reflects not only subjective perceptions of physical and psychological health, but also role and social functioning and general life status. This broad perspective is particularly important for older adults given the range of their age-related experiences, processes, and health conditions that can negatively affect HRQL. To inform policy makers and service providers, more research is required to identify ways to support healthy ageing and optimize HRQL in older adults.

Physical activity (PA) is an important determinant of HRQL in older adults. A systematic review of 42 articles (27 cross-sectional, four prospective cohort, and 11 intervention studies) concluded that there is a positive, consistent association between PA and general HRQL, functional capacity, mental health, vitality and psychological HRQL (Vagetti et al., 2014). A cross-sectional study using pedometers as an objective measure of PA found that participants (mean age = 66 years) doing >7000 steps/day had higher scores for mental, physical, and global health domains of HRQL than those doing less ($p \leq 0.001$) (Vallance et al., 2016). Those reporting >150 min/week of moderate-vigorous PA also had better HRQL than those doing less, with the highest HRQL among people reporting 300 + min/week. A 6-year longitudinal study reported significant and clinically meaningful associations between PA and physical functioning, physical role functioning, bodily pain, vitality, social functioning, emotional role functioning and mental health HRQL in community-dwelling older adults (Balboa-Castillo et al., 2011). Positive associations between PA and HRQL in older adults have been predominantly demonstrated for functional capacity, with strong support

* Corresponding author.
E-mail addresses: k.heesch@qut.edu.au (K.C. Heesch), yolanda.vangellecum@uqconnect.edu.au (Y.R. van Gellecum), n.burton@uq.edu.au (N.W. Burton), jannique.vanuffelen@vu.edu.au (J.G.Z. van Uffelen), wbrown@uq.edu.au (W.J. Brown).

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for mental health, vitality and psychological domains and moderate evidence for social relationships, pain and environmental domains (Vagetti et al., 2014). Some research has suggested stronger associations between PA and physical HRQL than psychological HRQL (Salguero et al., 2011; Stewart et al., 2003).

Most studies of PA and HRQL in older adults are with healthy people; those that are not tend to focus on physical conditions. Few studies have considered older adults with mental health concerns. Of the studies identified in the systematic review (Vagetti et al., 2014), only one (Salguero et al., 2011) recruited people with a mental health condition (depression). Depression is projected to be the second-leading cause of burden of disease worldwide by 2030 and the leading cause in high-income countries (Mathers and Loncar, 2006). In the general population, depression can precipitate greater declines in HRQL than chronic medical conditions (Bonicatto et al., 2001; Hays et al., 1995). In older adults, depression is associated with deteriorations across all domains of HRQL, even in the absence of comorbid medical illness (Gallegos-Carrilloa et al., 2009).

Most evidence on PA and HRQL in older adults with depression comes from exercise training studies, and results are mixed (Tavares et al., 2014). One study showed no significant differences between PA and social visits for impact on physical or psychological HRQL (Kerse et al., 2010). Another demonstrated that resistance training improved physical function, role physical, vitality, social function, role emotional, and mental health (Singh et al., 2005). A third study demonstrated significantly greater improvements in bodily pain, vitality, social functioning and role emotional HRQL from PA (progressive resistance training) than from group health education (Singh et al., 1997). Little work has been done with observational studies using population-based cohorts.

This study's aim was to examine concurrent and 9-year prospective associations between PA and HRQL in ambulatory community-dwelling healthy women who reported depressive symptoms in 1999, when they were aged 73–78 years.

2. Methods

2.1. Australian Longitudinal Study on Women's Health (ALSWH)

ALSWH is a prospective study of health and well-being of Australian women born in 1973–1978, 1946–1951 and 1921–1926. They were first surveyed in 1996 and have been surveyed on a rolling-basis every 3 years. Sampling and recruitment details have been reported elsewhere (Brown et al., 1998). The study was approved by the Ethics Committees of the University of Queensland and the University of Newcastle. Informed consent was received from all respondents. Further study details are available on the ALSHW website at http://www.alswh.org.au/.

2.1.1. Sample

The analysis sample included the women born in 1921–1926 who completed surveys in 1999, 2002, 2005 and 2008. The baseline 1996 survey was not included because the presence of depressive symptoms was not measured then. At baseline 12,432 women born in 1921–1926 completed the ALSWH survey (Brown et al., 1998). They were broadly representative of the general population of Australian women aged 70–75 years, although married and university-educated women were over-represented (Brown et al., 1998).

In 1999, the baseline for this analysis, 10,030 women born in 1921–1926 completed the survey (Young et al., 2006). Of these women, 819 reported depressive symptoms (CESD10 score ≥ 10) (Andresen et al., 1994), and, therefore, were eligible for inclusion in the current analysis. Data from 176 were excluded because they did not complete any surveys after 1999. Data from another 81 were excluded because they reported on more than one survey that they were unable to walk 100 m, which suggested a long-term limited ability to engage with ambulatory PA. Excluding them decreased the possibility of reverse causation (e.g., that low HRQL resulted in women being unable to be physically active). After excluding data from another seven with missing HRQL data on all four surveys, data from 555 women were available for analysis. There were no significant differences in demographic characteristics ($p > 0.05$) between included and excluded women ($n = 264$). However, excluded women reported being treated or diagnosed with fewer chronic conditions, were more likely to report being diagnosed or receiving treatment for anxiety or other psychiatric conditions, were more likely to report being non-drinkers and less likely to be low-risk drinkers, and more likely to be overweight or obese ($p < 0.05$; see Supplementary Table 1).

2.2. Measures

2.2.1. Health-related quality of life

The well-validated Medical Outcomes Study's Health Status Survey short form (SF-36) (Ware et al., 1998; Ware and Gandek, 1998) served as the measure of HRQL. Four subscales (21 items) measure mental HRQL: vitality, social functioning, mental health, and role limitations from emotional problems. The items in these subscales are summarized to create a general mental HRQL measure, called the Mental HRQL Component Summary scale (MCS). Four additional subscales (14 items) measure physical HRQL: bodily pain, physical functioning, general health perception, and role limitations from physical problems. The items in these subscales are summarized to create a physical HRQL measure, called the Physical Component Summary scale (PCS). The factor structures of the MCS and PCS were validated using the 1996 baseline ALSWH survey (Mishra and Schofield, 1998). HRQL scores were standardized to range from 0 to 100, with the population average set at 50 (Mishra and Schofield, 1998). MCS, PCS and each subscale were treated as separate outcome variables. Higher scores indicated better HRQL.

2.2.2. Physical activity

PA was measured with the validated Active Australia survey (Brown et al., 2004; Brown et al., 2008; Heesch et al., 2011). The survey measures minutes in the previous week (in ≥10-min bouts) spent walking briskly ('for recreation or exercise or to get from place to place'), in moderate-intensity PA ('like golf, social tennis, moderate exercise classes, recreational swimming, line dancing'), and in vigorous-intensity PA ('that makes you breathe harder or puff and pant, like aerobics, competitive sport, vigorous cycling, running, swimming'). As done previously (Heesch et al., 2007; Heesch et al., 2012), to compute a PA MET.min/week score, minutes in each PA type were first multiplied by an assigned metabolic equivalent (MET): walking by 3.0 METs; moderate-intensity PA by 4.0 METs and vigorous-intensity PA by 7.5 METs (Brown and Bauman, 2000). The MET.min per PA type were then summed. Because the distribution of scores was highly skewed, women were categorized based on total MET.min/week into: no PA (<40), insufficient (40- < 600), and sufficient (600 +). Participants in the sufficient category were considered to be meeting international PA guidelines (World Health Organization, 2016) because the lower cut-off for this category is equivalent to 150 min/week of moderate-intensity PA (150 min × 4 METS = 600 MET.min).

2.2.3. Confounders

Socio-demographic and health-related variables indicated by previous work to be confounders (Heesch et al., 2015) were examined as potential confounders. These included demographic variables: country of birth (proxy for ethnicity), area of residence (derived from postal codes), educational attainment, and ability to manage on one's income (proxy for income status). Social variables were marital status, the number of stressful life events in the past year (e.g., death of partner), caregiving duties to children or adults, and social support (measured with