

# Effects of physical activity on emotional well-being among older Australian women

## Cross-sectional and longitudinal analyses

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### Abstract

**Objective:** To explore relationships between physical activity and mental health cross-sectionally and longitudinally in a large cohort of older Australian women. **Method:** Women in their 70s participating in the Australian Longitudinal Study on Women's Health responded in 1996 (aged 70–75) and in 1999 (aged 73–78). Cross-sectional data were analyzed for 10,063 women and longitudinal data for 6472. Self-reports were used to categorize women into four categories of physical activity at each time point as well as to define four physical activity transition categories across the 3-year period. Outcome variables for the cross-sectional analyses were the mental health component score (MCS) and mental health subscales of the Medical Outcomes Study Short Form (SF-36). The longitudinal analyses focused on changes in these variables. Confounders included the physical health component scale (PCS) of

the SF-36, marital status, body mass index (BMI) and life events. Adjustment for baseline scores was included for the longitudinal analyses. **Results:** Cross-sectionally, higher levels of physical activity were associated with higher scores on all dependent variables, both with and without adjustment for confounders. Longitudinally, the effects were weaker, but women who had made a transition from some physical activity to none generally showed more negative changes in emotional well-being than those who had always been sedentary, while those who maintained or adopted physical activity had better outcomes. **Conclusion:** Physical activity is associated with emotional well-being among a population cohort of older women both cross-sectionally and longitudinally, supporting the need for the promotion of appropriate physical activity in this age group. © 2003 Elsevier Science Inc. All rights reserved.

**Keywords:** Ageing; Mental health; Physical activity; Population research; Surveys; Women

### Introduction

The positive effects of regular leisure-time physical activity on physical health and well-being have been extensively documented [1,2], and there is substantial evidence identifying the biological mechanisms by which these occur [3]. While there is also evidence that people who are physically active have better emotional health than those who are sedentary [4], the evidence for causality is less conclusive and the mechanisms underlying this effect are open to debate. Thus, the question of whether physical activity should be promoted as a strategy for im-

proving emotional health remains open [5]. This paper examines cross-sectional and longitudinal relationships between physical activity and emotional well-being in a cohort of older women while controlling for a number of possible confounders.

Women have lower levels of physical activity than men, and leisure-time physical activity tends to decrease with age, meaning that older women are the population group who are least likely to engage in health-related physical activity [6,7]. Women, particularly older women, have been neglected in research on physical activity and its promotion [8,9], at least in part because of social stereotypes suggesting that exercise is inappropriate or unsafe for older women [10]. There is, however, considerable evidence that physical activity has health benefits that are particularly relevant to older women, including improvements in sleeping patterns [11],

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relief of chronic pain [12], maintenance of the strength, coordination and balance required to maintain activities of daily living and avoid falls and fractures [13] and the prevention or alleviation of heart disease, osteoporosis and Type II diabetes [14].

This paper focuses on a further rationale for the promotion of physical activity among older people and its relationship with emotional well-being. It is well established that physical activity is associated positively with emotional well-being and negatively with anxiety and depression, both in research focusing on the acute effects of a single bout of activity and in that dealing with the relationship between regular physical activity and emotional well-being in general [15,16]. However, the question of whether the association is causal is less clear [5].

A number of physiological mechanisms by which exercise might cause positive mood states and emotional well-being have been proposed. There is a strong suggestion that physical activity improves mental health by improving the body's ability to deal with the effects of stress [16]. Other possible explanations include increases in body temperature and alterations to adrenaline and to endorphin levels, but these mechanisms are specific to the acute effects of high-intensity activity and do not appear to explain the long-term relationship between regular moderate activity and positive mood [17].

In general, research on the relationship between physical activity and emotional well-being has focused on young to middle-aged participants, used small and self-selected samples and focused on people with a lifetime history of physical activity or on groups with identified psychological distress [5]. Thus, the question of whether physical activity promotion at a population level might improve emotional health has yet to be answered. Further, the effects of confounders such as level of physical health have often been neglected. Among older women in particular, physical health may well determine both an individual's ability to be physically active and her level of emotional well-being. Thus, the relationship between the two may not be a causal one. The Australian Longitudinal Study on Women's Health, also known as Women's Health Australia (WHA), provides an opportunity to examine this relationship both cross-sectionally and longitudinally in a large representative cohort of older women and to explore the effects of other variables.

WHA, a longitudinal survey of the health and well-being of three cohorts of Australian women, has been described in detail elsewhere [18,19]. The project uses mailed surveys to collect self-report data on health and related variables from three cohorts of Australian women who were aged 18–23 years (“young”), 45–50 years (“mid-age”) and 70–75 years (“older”) when the project began in 1996. Over 40,000 women were recruited on a random basis from the Australian population, with the national health insurance database (Medicare) as the sampling frame and systematic oversampling of women living in rural and remote areas.

The project is designed run for 20 years, with the overall goal to conduct a series of interlocking data analyses in order to develop an understanding of factors that affect the health and well-being of women and in order to inform Australian government health policy [19].

Physical activity is one of a large number of variables assessed among the older cohort. The project provides a context for the assessment of the relationship between physical activity and emotional well-being and allows adjustment for a range of possible confounders. There is evidence, for example, that sedentariness among older adults is predicted by perceived or actual deficits in physical health [20], by obesity [21], by marital status [22] and by disruptive life events [23], all of which have been assessed in this survey. Previous research with the older cohort of WHA has demonstrated a cross-sectional relationship between physical activity and a range of measures of physical health and well-being, including perceived physical health, symptoms such as backache and medical conditions such as hypertension and osteoporosis [24]. This paper extends that work to examine the relationship between physical activity and emotional well-being cross-sectionally and longitudinally over 3 years, both with and without adjustment for a range of confounders.

## Method

### *Participants*

This analysis focuses on Survey 1 (1996) and Survey 2 (1999) data from the older cohort. A total of 12,939 older women responded to Survey 1 (aged 70–75) and 10,432 to Survey 2 (when they were aged 73–78), excluding 507 women who provided no contact details at Survey 1 and thus could not be recontacted, 490 who had died and 109 who were too ill to respond, representing an 88.2% retention rate. Overall, 4.9% withdrew from the study at Survey 2, 4% did not respond and 2.9% could not be relocated.

Data from 10,063 women (78% of those who responded to Survey 1) who provided complete data on all relevant variables were included in the cross-sectional analyses. Data from 6472 women (62% of those who responded to Survey 2) were used in the longitudinal analyses. This excludes 9% who completed a short version of the survey by phone and 29% who had missing data on at least one of the variables at Survey 1 or 2.

### *Survey*

Respondents completed a 24-page survey comprising over 300 items, which addressed health status, health service use and satisfaction, health-related behaviours and sociodemographic variables [19]. The current analysis used the following variables.

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