## The impact of sedentary and physical activity behavior on frailty in middle-aged and older adults

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Title Page:

Title: The Impact of Sedentary and Physical Activity Behavior on Frailty in Middle-Aged and Older Adults

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Abstract

Background and objectives: Physical activity and sedentary behaviors are associated with frailty. However, it is unknown if different accumulation patterns of these behaviors are linked with frailty. Four studies were conducted: the first three determined if bouts of moderate-vigorous physical activity (MVPA) and patterns of sedentary behaviors were associated with frailty, (study 1) and if sex (study 2) and CVD status (study 3) affected these associations. Study 4 systematically reviewed the evidence to determine if preoperative physical activity and sedentary behaviors were linked to post-cardiac surgical outcomes.

Methods: Study 1-3 used accelerometer data from the 2003-04/2005-06 National Health and Nutrition Examination Survey. Bouted (≥10 minutes) and sporadic (<10 minutes) durations of MVPA were analyzed based on meeting a proportion of the physical activity guidelines of 150 min/week. Prolonged sedentary behaviours were measured in bouts lasting ≥30 minutes. Breaks from sedentary behavior were any ≥1 minute interruption in sedentary time. Average intensity and duration during breaks were analyzed. Frailty was measured with a 46-item frailty index (FI). Study 4 included investigations that linked preoperative physical activity behaviors to postoperative health outcomes.

Results: The first three studies revealed that sporadic and bouted MVPA were associated with a lower FI. Meeting 1-49% of the physical activity guidelines had a protective association with frailty. Prolonged sedentary bouts had a more detrimental association with frailty in females than males. Bouted MVPA was associated with a lower FI in CVD participants but not in those without CVD. Average break intensity was associated with a lower FI across studies. Average
break duration was associated with frailty in males and in those with CVD. Study 4 included 11 articles, which reported inconsistent findings in relation to self-reported physical activity behavior and postoperative outcomes in cardiac surgery patients. No studies analyzed sedentary behavior or frailty.

**Conclusions:** Data from this thesis suggest that bouts of MVPA and patterns of sedentary behaviors are associated with frailty, and support the need to limit extended periods of sedentary time and promote a physically active lifestyle. Studies are needed to determine if preoperative physical activity and sedentary behaviors are associated with post-cardiac surgical frailty.
Statement of current assignment/research:

I am currently a Postdoctoral Fellow in the Department of Medicine, Division of Geriatric Medicine, under the supervision of Drs. Kenneth Rockwood and Olga Theou. I am pursuing multiple research projects related to aging, frailty, and other geriatric-related health outcomes in relation to sedentary and physical activity behaviors. For example, I hold a CIHR Fellowship for my proposed research work in frailty and cardiac rehabilitation, and how sedentary and physical activity behaviors have an influence.