

2023 Doctoral Dissertation (Abstract)

Investigating the Effect of Group Activity Participation on
Physical Function in Older Adults: Focusing on Walking Ability

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Introduction

Social participation among older adults is promoted by the expectation of extending their healthy life expectancies. Participation in group activities as a type of social participation has been reported to reduce health outcomes such as death and new care needs. However, the difference in the effects of these different types of group activities on health outcomes is assumed to occur because the intensity of the activity depends on the type of group activity, which, in turn, is influenced by differences in the amount of physical activity. One possible reason for the different effects on health outcomes depending on the group activity type is the effect of the amount of physical activity. Because the amount of physical activity in older adults is known to be strongly related to physical function, including walking speed, it is also possible that walking ability may affect the relationship between group activity type and health outcomes. Previous studies have indicated that participation in group activities can impact psychological and social functioning. However, effects on physical activity and walking ability remain to be explored. Notably, no previous studies have examined the relationship between physical activity and walking ability according to group activity type. Additionally, the effect of group activities, effective for the general older population, on the walking ability of frail older adults has not been examined.

Study 1: Cross-sectional Relationship between Group Activity Participants and Physical Activity in community-dwelling older adults

I. Purpose

This study aimed to investigate the link between group activity involvement and physical activity levels in older adults residing in the community. We also assessed variations in physical activity based on the type of group activity.

II. Method

This study included older adults who participated in the 2014 “Otassha Study” conducted in Itabashi Ward, Japan. We utilized the short version of the International Standardized Physical Activity Questionnaire (IPAQ-Short) to gather data. The following dependent variables were derived from IPAQ-Short: (1) total physical activity (METs/hour/week); (2) vigorous-intensity physical activity (VPA, min/week); (3) moderate-intensity physical activity (MPA, min/week); (4) brisk walking (BW, min/week); and (5) sitting time (min/day). The independent variables consisted of five group activities: neighborhood community associations (community), senior citizen clubs (senior club), hobby groups (hobby), sports groups (sports), and volunteer groups (volunteer) (yes =1; no =0). We conducted logistic regression analyses for each dependent variable after categorizing them based on median values (high,1; low,0).

III. Results and Discussion

After excluding outliers, 309 participants (median age, 73; quartile range, 69–77; 120 men, 189 women) who completed the IPAQ were included in the analysis. In the model with all independent variables entered, only sports showed a significant increase in total physical activity (odds ratio (OR):3.53, 95% confidence interval (CI) 2.04 - 6.11) and VPA (OR:4.11, 95%CI:2.19 – 7.11), MPA (OR:4.14, 95%CI:2.38 - 7.19) while a significant decrease in sitting time (OR:0.58, 95%CI:0.34 - 0.99). Sports such as gymnastics, walking, and golf have been shown to have a higher intensity of physical activity than daily life, suggesting that participants in sports-related groups are more physically active than in other group activities.

Study 2: Longitudinal Relationship between Group Activity Participation and Three-Year Change in Walking Ability in Community-dwelling Older Adults

I. Purpose

This study examined the relationship between participation in group activities and walking ability among community-dwelling older adults and determined which group activities contribute to maintaining walking speed.

II. Method

We administered three follow-up surveys with older adults who participated in 2014 (T1) and 2017 (T2), using data from The Otassha Study. Dependent variables included changes in normal and maximum walking speeds and TUG (T2-T1). Independent variables encompassed the five group activities: community, senior club, hobbies, sports, and volunteering (yes=1, no=0). Multiple regression analyses were performed for each dependent variable after categorizing them based on two median values.

III. Results and Discussion

A total of 396 participants (median age, 72; quartile range, 68–76; 149 men; 247 women) excluded from T1 and T2 venue surveys due to missing values were analyzed. In the model with all adjusted variables, only sports showed a significant positive association with changes in average walking speed (B=0.06, 95% CI: 0.02–0.10) and maximum walking speed (B=0.09, 95% CI: 0.03–0.14), meeting the clinically significant minimum change in walking speed (0.05 m/s). This underscores the significance of participation in sports-related groups for maintaining walking speed, indicating the necessity of group activities with a certain level of physical activity, such as sports, to preserve walking speed.

Study 3: Longitudinal Relationship Between Four-Year Changes in Walking Ability with Participation in Resident-Oriented Voluntary Group Activities in Frail Older Adults

I. Purpose

This study explored whether participation in voluntary group activities could sustain walking speed in frail older adults who completed the Frail Prevention Activity Support Program.

II. Method

The study included 32 participants who completed a program promoting community activities and preventing frailty at the institute. Data from the Otassya study covered the period from 2017 (T2) to 2021 (T6). Primary outcomes included average walking speed, maximum walking speed, and timed up-and-go (TUG) test duration. Sub-outcomes encompassed the frequency of light exercise, regular exercise/sports, and going out. Primary outcomes were compared using a two-factor linear mixed model of group \times survey period, while sub-outcomes were compared using the χ^2 test (T2 vs. T6).

III. Results and Discussion

The study involved 13 participants in the self-management group (median age, 73; quartile range, 67.5 to 76.0; three men, ten women) and 19 non-participants who did not participate in the self-management group (median age, 77; quartile range, 67 to 80 years; six men, 13 women). Among the primary outcomes, only the usual walking speed significantly changed during the study period. When participants were divided into two groups based on voluntary group activity participation, there was no difference in the participation group between T2 and the T3–T6 time intervals. However, in the non-participation group, there was no notable difference between T1 (1.29 ± 0.26) and 2021 (1.12 ± 0.26). Nonetheless, a statistically significant decrease was observed in the non-participating group from T2 (1.29 ± 0.26) to T6 ($p=.001$). These findings suggest that participation in self-management group activities may have helped frail older adults with exercise opportunities, contributing to maintaining their usual walking speeds.

Limitations and Recommendations for Future Study

This study showed that the effects of different types of group activities on the amount of physical activity and maintenance of walking differed. Participation in sports-related group activities resulted in higher physical activity and maintenance of walking. There are limitations, such as selection bias and a small number of participants. Nonetheless, the results suggest that participation in voluntary group activities led by residents may increase physical activity and contribute to maintaining walking ability in frail older adults. These results reinforce the significance of participation in sports-related and voluntary group activities and may serve as a resource for recommending health promotion for older adults.

Future studies should examine the relationship between group activity participation and walking speed by considering the specific content of group activities. In future studies, we would like to further examine the relationship between participation in group activities and walking ability by considering the frequency and continuity of group activities as well as the content of sports activities.