



Relationship between step count, urinary incontinence, and physical ability among middle-aged and older women

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Introduction

- Regular physical activities, such as walking and exercising, are closely related to the prevention and improvement of pelvic floor dysfunction because they help maintain an appropriate body weight.
- In addition, gait function, as measured by the Timed Up Go (TUG) test that assesses gait speed and functional mobility, is a factor that is related to urinary incontinence.
- Although studies have shown that the number of steps that one has walked (i.e., step count) is negatively related to various health problems, the relationship between step count and urinary incontinence and physical ability remains unclear.
- The purpose of the study is to examine the relationship between step count, urinary incontinence, and physical ability among middle-aged and older women.

Methods and Materials

- The study design:** A cohort research
- Subjects:** The subjects were 23 women (Urinary Incontinence Prevention Program during the period of July-December 2018)
- Exclusion criteria**
 - Missing data
 - Receiving treatment of urologic, gynecologic, or cardiovascular diseases at the time of the study
 - With a history of urologic and gynecologic severe diseases
 - Medical conditions that clearly prevent participation in the study
- Survey items**
 - Basic demographic details (i.e., age, height, weight, Body Mass Index [BMI], number of deliveries, presence or absence of urine leakage during the day and night, frequency of urination per day)
 - ICIQ-SF
 - The Skeleton Muscle Mass Index (SMI)
 - Triaxial accelerometer (Figure 1) (OMRON Co., Ltd., Kyoto) (i.e., step count, METs, Exercise)
 - Comfortable walking speed (m/s), maximum walking speed (m/s), and Time up and go test(TUG)
 - "high step count group" : higher than the all participants mean
 - "low step count group." : below than the all participants mean
- Statistical analysis** R 2.8.1 (p<0.05)
 - In order to compare group means, a Shapiro-Wilk test of normality was carried out, following which an independent-samples t-test was conducted.
 - Fisher's exact test was used to compare groups differing in the number of deliveries and urine incontinence (i.e., presence vs. absence).
 - The effect size (r) was calculated to compare effect sizes across survey items. ["no effect" <0.1, "small" 0.1 ~<0.3, "medium" 0.3 ~< 0.5, "large" ≥0.5]



Figure 1. Active Style Pro (HJA-750C)

Table 1. Characteristics of the participants

	High step count group (n=8)	Low step count group (n=12)
Age (years)	64.3±11.1	69.8±9.7
Height (cm)	157.0±7.5	157.0±7.5
Weight (kg)	54.2±12.2	53.9±10.2
BMI (kg/m ²)	22.0±5.3	22.2±4.1
History of childbirth (persons)	6	11
Number of deliveries (times)	1.6±1.2	1.8±1.0
Incontinence (yes/no)	6/2	10/2

Mean ± SD

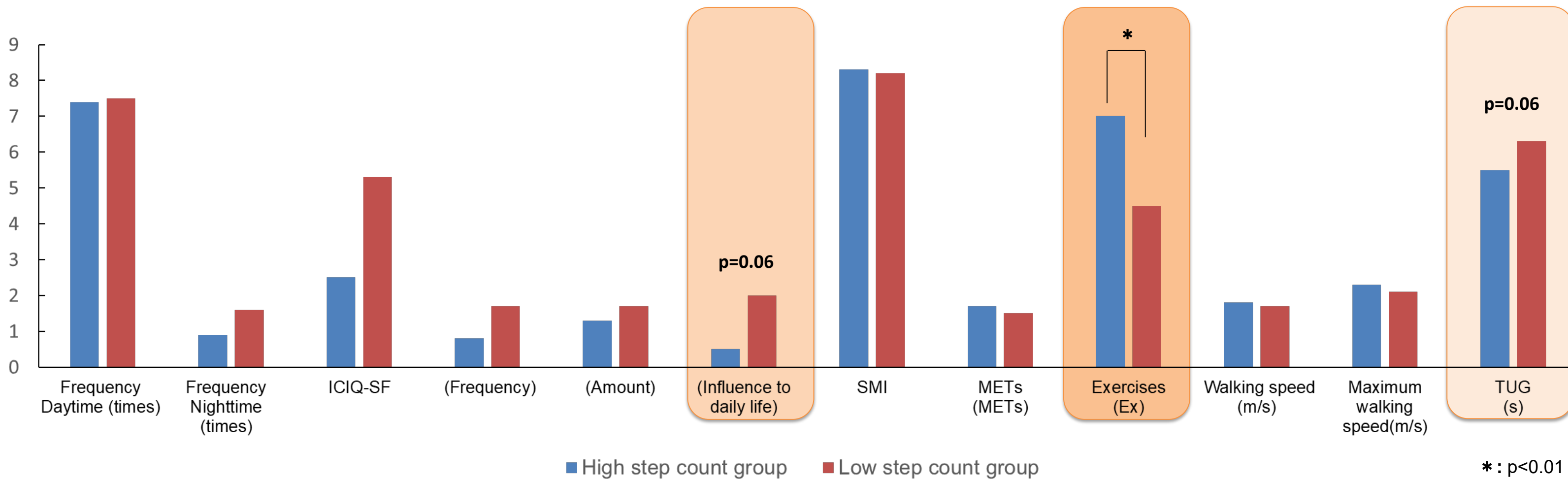


Figure 3. Comparison of survey items in high and low step count group

Results

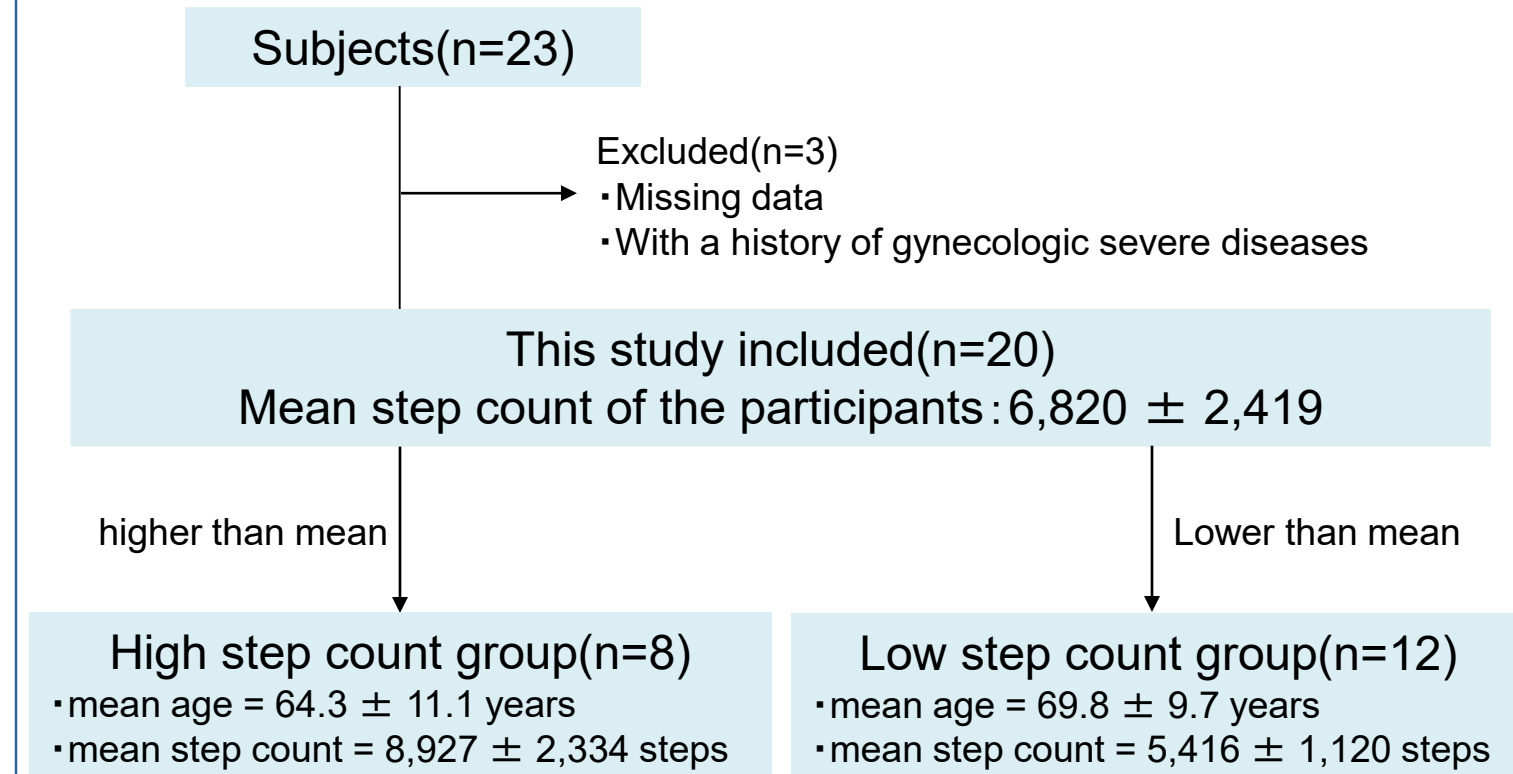


Figure 2. Design and flow of participants

- No significant differences in basic attributes emerged between these two groups (Table 1).
- Comparison of survey items in high and low step count group (Figure 3).
 - Exercise was found to be significantly lower in the low step count group (p = 0.002, r = 0.64).
 - The low step count group scored higher than the high step count group on the ICIQ- SF score (Influence to daily life), although the difference was not statistically significant (p = 0.09, r = 0.39).
 - TUG test were marginally higher for the low step count group, although the difference was not statistically significant (p = 0.06, r = 0.43).

Discussion

- Exercise**
 - Sample's mean step count : 6,820 ± 2,419 steps
 - Exceed that of Japanese women's mean step count(5,867).
 - Tend to be more careful about their health than the average woman.
 - Low step count group was lower levels of exercise (i.e., intensity of physical activity × time)
 - No significant difference in METs between the two groups
 - Time of physical activity may be affecting
- ICIQ-SF**
 - Low step count group may have great anxiety about the impact of urinary incontinence on daily functioning.
 - The low step count group may have an impact on daily life because of urinary incontinence. Therefore we think that securing of physical activity time may be difficult.
- TUG**
 - Low step count group showed a larger TUG value than the high step count group. This suggested that there may be differences in overall physical abilities.

Conclusions

- A limitation of this study is related to sampling bias, as the sample consisted of participants who were probably interested in urinary incontinence.
- In order to prevent or manage urinary incontinence, it is important to regularly and long time engage in exercises such as walking everyday.