Association Of Daily Steps With The Prevalence Of Polypharmacy In Older Adults

Nicholas J. Goode[1], Jiyeon Yoon[1], Elizabeth C. Lefferts[2], Duck-chul Lee, FACSM[1]

[1]Department of Health & Human Development, University of Pittsburgh, Pittsburgh, Pennsylvania, United States of America [2] Department of Kinesiology, Iowa State University, Ames, Iowa, United States of America

Introduction

- Polypharmacy, typically defined as the use of ≥ 5 more medications (though some studies use as few as 3), is common among older adults due to the prevalence of multiple chronic conditions
- Most research currently looking at polypharmacy and physical activity is purely based on subjective measures of PA

Purpose

- To investigate the association of physical activity as measured objectively by daily steps with polypharmacy in older adults.

Methods

Study Population

- Cross-sectional analysis of The Physical Activity and Aging Study (PAAS), a prospective cohort study of older adults aged 65 years and above, initiated in 2015. Cross-sectional analysis was performed.
- The original data set excluded older adults (n=412) with missing, invalid variables from baseline.

Daily Steps

- Step data was considered valid if the tri-axial accelerometer-based pedometer (Omron HJ-321) was worn for ≥10 hours/day for ≥4 days of the week.
- Daily steps were categorized into tertiles
  - Low: ≤4113 steps/day
  - Moderate (Mod): 4114-6662 steps/day
  - High: ≥ 6663 steps/day

Polypharmacy

- Participants self-reported medication usage via a medical history questionnaire
- Polypharmacy was defined as taking ≥ 5 medications (any medication, including over-the-counter medications)

Covariates

- Age, sex, education, race, body mass index (BMI) category, heavy alcohol drinking, smoking status, and marital status.

Statistical Analysis

- x^2 test were used to assess the baseline characteristics (categorical variables) of the participants.
- Logistic regression was used to estimate the odds ratios (ORs) and 95% confidence intervals (CIs) of polypharmacy prevalence by tertiles of average daily steps.

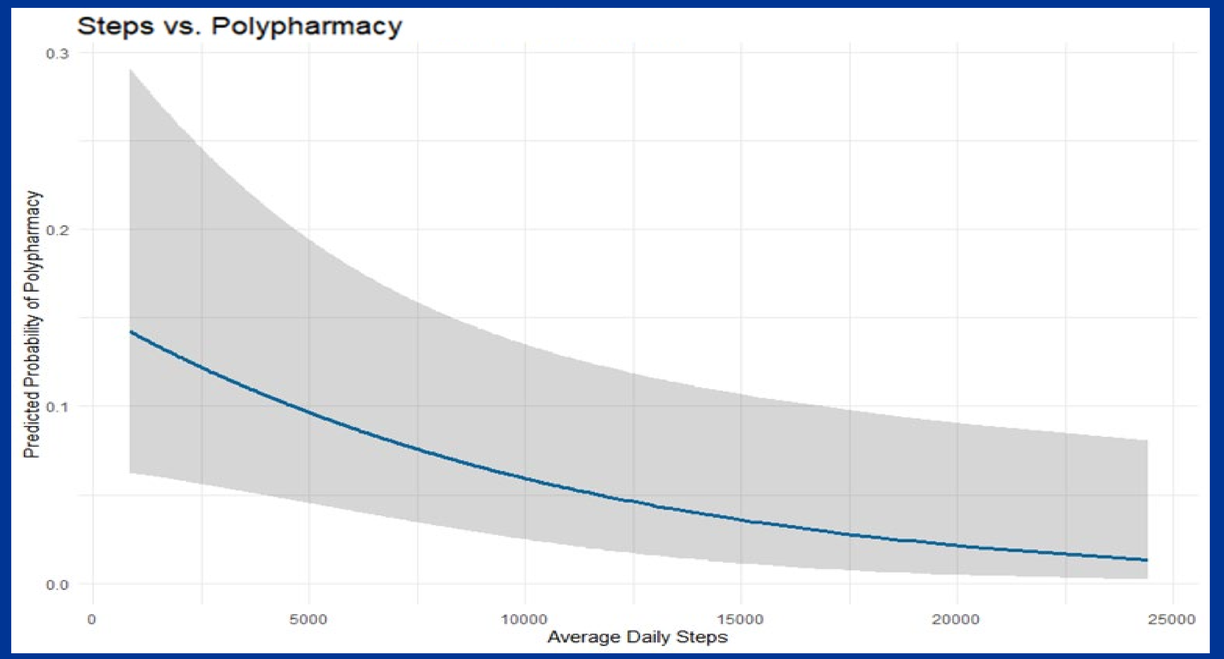

Figure 1 Predicted probability of polypharmacy (≥ 5 Medications) based on pedometer-based daily step count.

Table 2 Odds ratios (OR) of taking ≥ 5 Medications (Polypharmacy) among participants in PAAS based on average daily step count

Variables	Total (N=787)	No. of cases	Model 1*	Model 2†
Daily Step Count Tertile				
Low (≤4113 steps/day)	263 (33)	42 (16.0)	1 (Ref)	1 (Ref)
Mod (4114 - 6662 steps/day)	262 (33)	37 (14.1)	0.89 (0.54-1.44)	1.01 (0.60-1.67)
High (≥6663 steps/day)	262 (33)	21 (8.0)	**0.47 (0.26-0.83)**	**0.49 (0.26-0.89)**
Daily Step Count Tertile				
Male				
Low (≤4113 steps/day)	101 (38.4)	15 (14.9)	1 (Ref)	1 (Ref)
Mod (4114 - 6662 steps/day)	107 (40.8)	19 (17.8)	1.28 (0.61-2.77)	1.52 (0.68-3.48)
High (≥6663 steps/day)	123 (46.9)	12 (9.8)	0.67 (0.29-1.56)	0.70 (0.28-1.73)
Female				
Low (≤4113 steps/day)	162 (61.6)	27 (16.7)	1 (Ref)	1 (Ref)
Mod (4114 - 6662 steps/day)	155 (59.2)	18 (11.6)	0.66 (0.34-1.27)	0.66 (0.34-1.27)
High (≥6663 steps/day)	139 (53.1)	9 (6.5)	**0.35 (0.15-0.76)**	**0.35 (0.14-0.78)**

Data are presented as OR (95% CI) or No. (percentage) of participants.
*Adjusted for age and sex
†Adjusted for model 1 plus education, race, work status, body mass index category, heavy alcohol drinking, smoking status, and marital status.

Can being active reduce the reliance on multiple medications?

Results

- Overall prevalence of polypharmacy was 12.7%
- The most frequently reported drugs were cholesterol management and blood pressure management at 40% and 27%, respectively.

Table 1 Participant Characteristics across Tertiles of Daily Steps

Variables	Average Number of Daily Steps: Low (≤4113 steps/day) (n=263)	Mod (4114 - 6662 steps/day) (n=262)	High (≥6663 steps/day) (n=262)	*P* value
Age, yrs	74.0 (7.2)	71.4 (5.4)	69.7 (4.2)	<0.001
Sex				0.12
Male	101	107	123	
Female	162	155	139	
Race/ethnicity				0.56
White	259	257	257	
Non-white	4	5	4	
Marital status				0.02
Married	182 (69.2)	196 (75.1)	213 (81.3)	
Single	12 (4.6)	13 (5)	11 (4.2)	
Divorced/Separated	69 (26.2)	52 (19.9)	38 (14.5)	
Education level				0.49
Elementary or less	30 (11.4)	28 (10.7)	34 (13)	
Middle school	27 (10.3)	34 (13)	33 (12.6)	
High school	82 (31.2)	97 (37)	91 (34.9)	
College or above	124 (47.1)	103 (39.3)	103 (39.5)	
Smoking status				.30
Never	190 (72..5)	189 (72.4)	183 (69.8)	
Former	69 (26.3)	68 (26.1)	79 (30.2)	
Current	3 (1.1)	4 (1.5)	0 (0)	
Alcohol intake*				0.01
Not heavy drinker	247	228	240	
Heavy drinker	13	30	17	
BMI				0.001
Underweight	116 (44.1)	101 (38.5)	93 (35.5)	
Normal	72 (27.4)	55 (21)	85 (32.4)	
Overweight	36 (13.7)	48 (18.3)	23 (8.8)	
Obesity	39 (14.8)	58 (22.1)	85 (32.4)	

Data are presented as mean SD or No. (percentage) of participants.
*Defined as >14 and >7 drinks/week for men and women, respectively.
BMI = body maas index

Conclusions

- This study suggests that higher steps per day (≥6663 steps/day) is associated with a lower prevalence of polypharmacy in older adults.
- Similar trends were reported in both men and women, though males specifically failed to reach significance.
- Prospective studies are required.

University of Pittsburgh