MEDINFO23

8 – 12 JULY 2023 | SYDNEY, AUSTRALIA

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Quality of Person-Generated Healthy Walking Data: an Explorative Analysis

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Study overview

- Examined the effect of different data filtering methods of armband data on the identification of healthy walking events

Healthy walking (Samsung Galaxy)

Walking that lasts more than 10 minutes

Motivation

- Person Generated Health Data (PGHD): data created and recorded by patients or caregivers to assist in managing their health (ONC).
- Incorporating PGHD in the clinical process can be beneficial.
- Clinical use of PGHD requires resolving many issues in data quality, data interoperability, workflow integration, and evidence generation.
- Especially, **the quality and reliability of PGHD** are of particular concern to clinicians.

Gaps in research

- Despite the well-recognized quality issues regarding PGHD, there is no standardized method for the management and evaluation of PGHD quality.
- Armband data filtering focuses mostly on identifying the cases that wore the device long enough to capture the subjects' health and/or health behavior – what are reliable ways to determine wear time?

Study purpose

- To examine the effects of **different data filtering criteria** for armband data, which were reported in published studies, on
  - ① the identification of "healthy walking" from the data captured through an armband device
  - ② the comparison of "healthy walking" captured by an armband and self-reported by the study participants

Data

- 103 nursing and medical students attending a university in Seoul
- Four weeks of armband data (Samsung Galaxy Fit2)
- Weekly online health diary (total 5 records including baseline)

- Approved by the IRB of the study site

Armband data selection

- Applied three types of data filtering criteria
  1. Heart rate filer (HR8): valid day if the total duration of HR recording during waking hours (5 am ~ midnight) >= 8 hours
  2. Step count of 1000 (SC1000): valid day if daily step count >=1000
  3. Step count of 1500 (SC1500): valid day if daily step count >=1500

AND

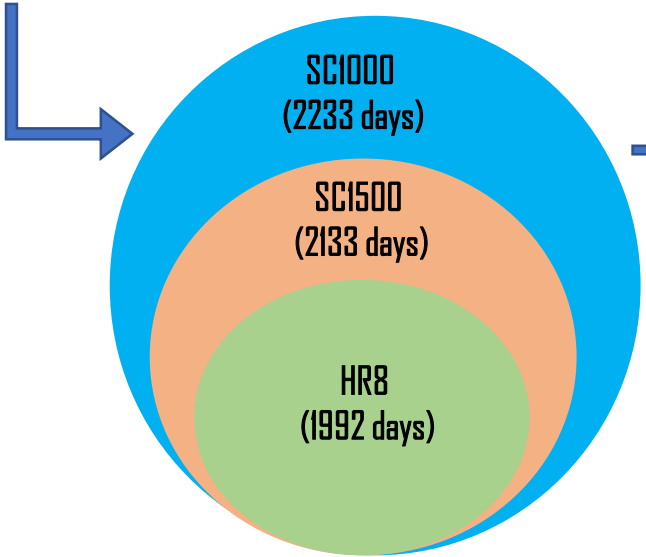
- At least 20 days of armband data retained after the filtering

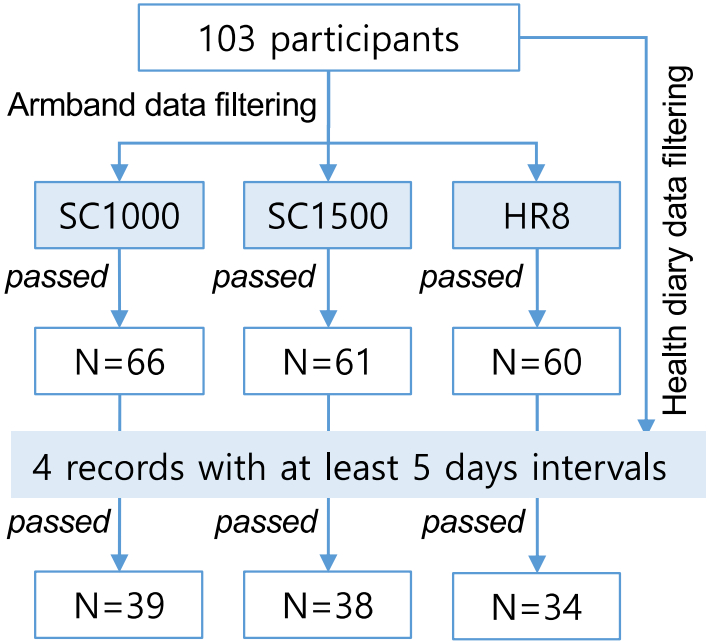
Health diary data

- Self-reporting of health behaviors, moods, & general well-being
- Data items used in this study
  - ① "How many days during last week did you walk more than 10 minutes at once (healthy walking)?"
  - ② "What was the daily average healthy walking minutes of those days?"
- Included only the cases that made all weekly entries, with at least **five days** intervals

Data filtering results

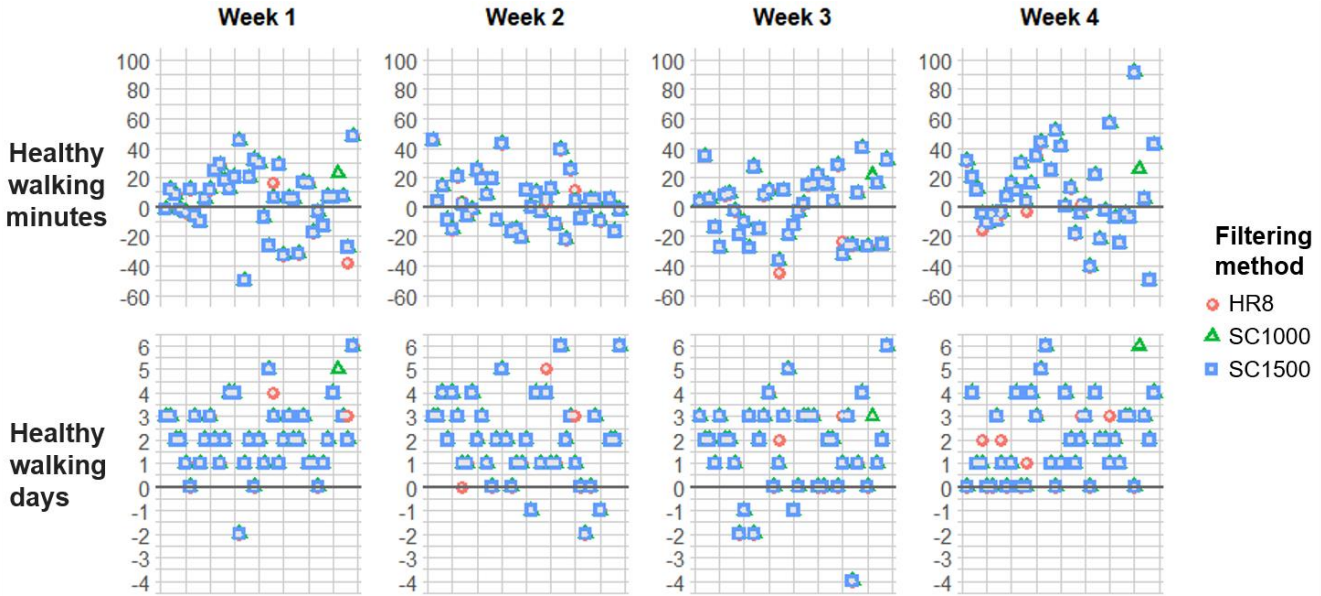
- 2402 days of armband data





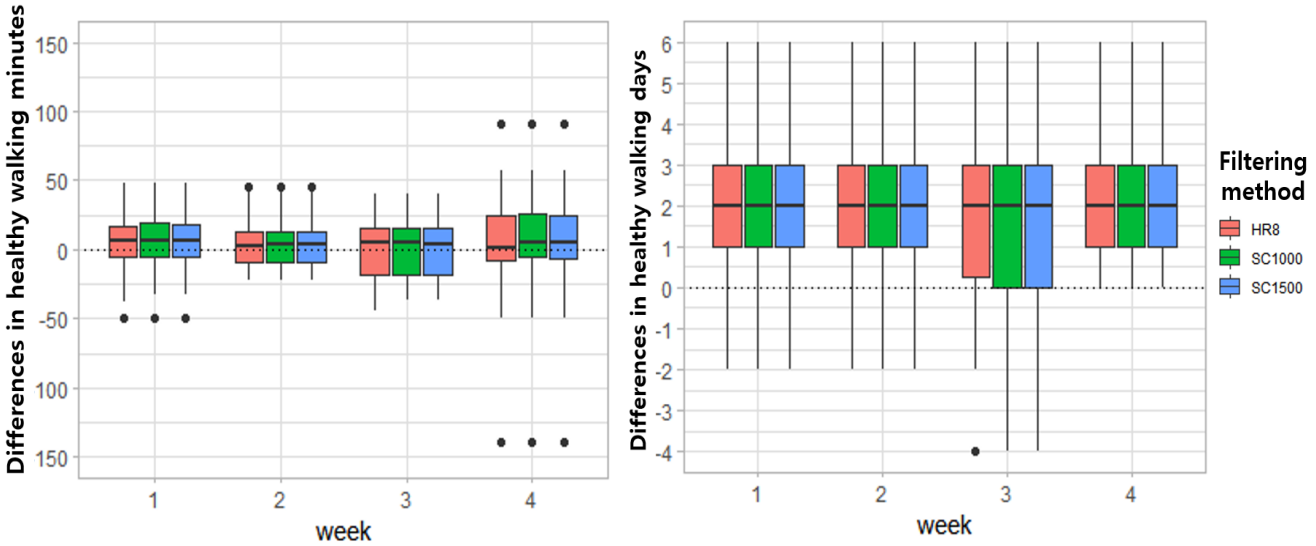
Healthy walking minutes and days: differences by the methods of data capture

- Health diary data tended to show more activities
- Significant weekly average healthy walking minutes and days (Wilcoxon signed rank test)



Healthy walking minutes and days: differences by the methods of data capture

- No significant differences resulted by the armband data filtering methods



Discussion & summary

- Three armband filtering methods produced slightly different datasets.
- Participants tended to report more physical activities, especially on active days
- The three armband data filtering methods did not significantly affect the comparison analysis.

Discussion & summary

- Limitations: small sample size, arbitrary filtering criteria
- Data quality issues that wear-time-based data filtering methods cannot address
- Future studies need to evaluate the impact of data filtering methods on health outcomes or intervention effectiveness.

Thank you

Q&A

Contributors:
Eunyoung Im, RN, MPH; Gain Ahn, RN, BSN

Funding support:
National Research Foundation of Korea
(grant number: 2022R1A2C2011360l1)

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