

PPG-Derived HRV as a Stress Marker in Korean American Home Care Workers in Dementia Care



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Background

In-home dementia caregiving is associated with elevated stress, yet Korean American home care workers (HCWs) may underreport their stress due to cultural norms emphasizing emotional restraint. Given their critical role in providing culturally and linguistically concordant care to Korean immigrant populations, an objective and scalable stress assessment is needed.

Aim:

To examine associations between dementia caregiving and daily physiological stress, measured using heart rate variability (HRV) derived from a wearable device, among Korean American HCWs.



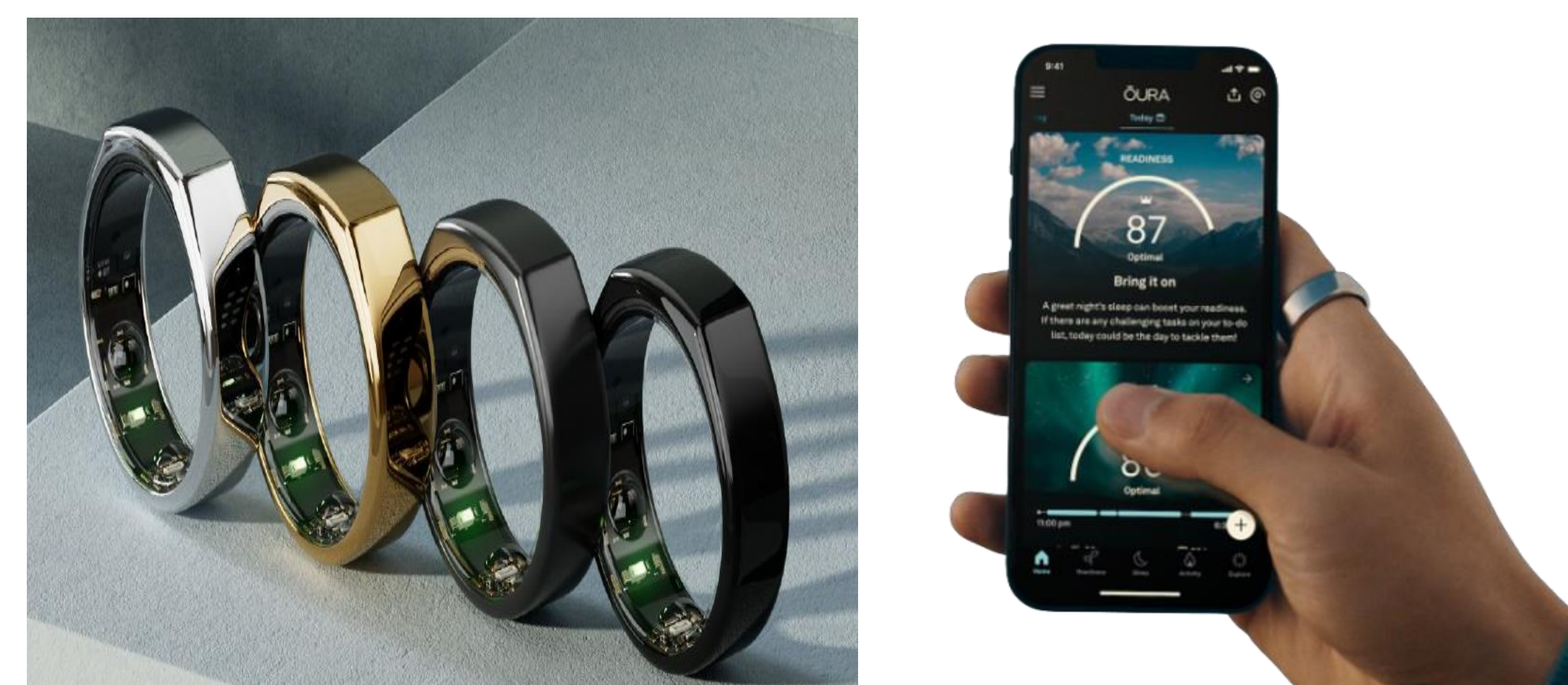
Methods

Sample:

- Fifteen HCWs wore the Ōura ring continuously for 21 days, yielding 14 days of valid nocturnal HRV data following baseline calibration.

Measurements & Data Analysis:

- HRV was measured using nocturnal root mean square of successive differences (RMSSD) derived from photoplethysmography (PPG)–based interbeat intervals. HRV values were standardized within participants.
- Multilevel linear models (MLMs) were used to examine within- and between-person associations between dementia caregiving (binary and total hours) and HRV, adjusting for relevant covariates.



Results

- Dementia caregiving was not significantly associated with HRV in MLMs.
- HRV exhibited substantial within-person day-to-day variability (intraclass correlation coefficient = 0.20) (**Figure 1**).

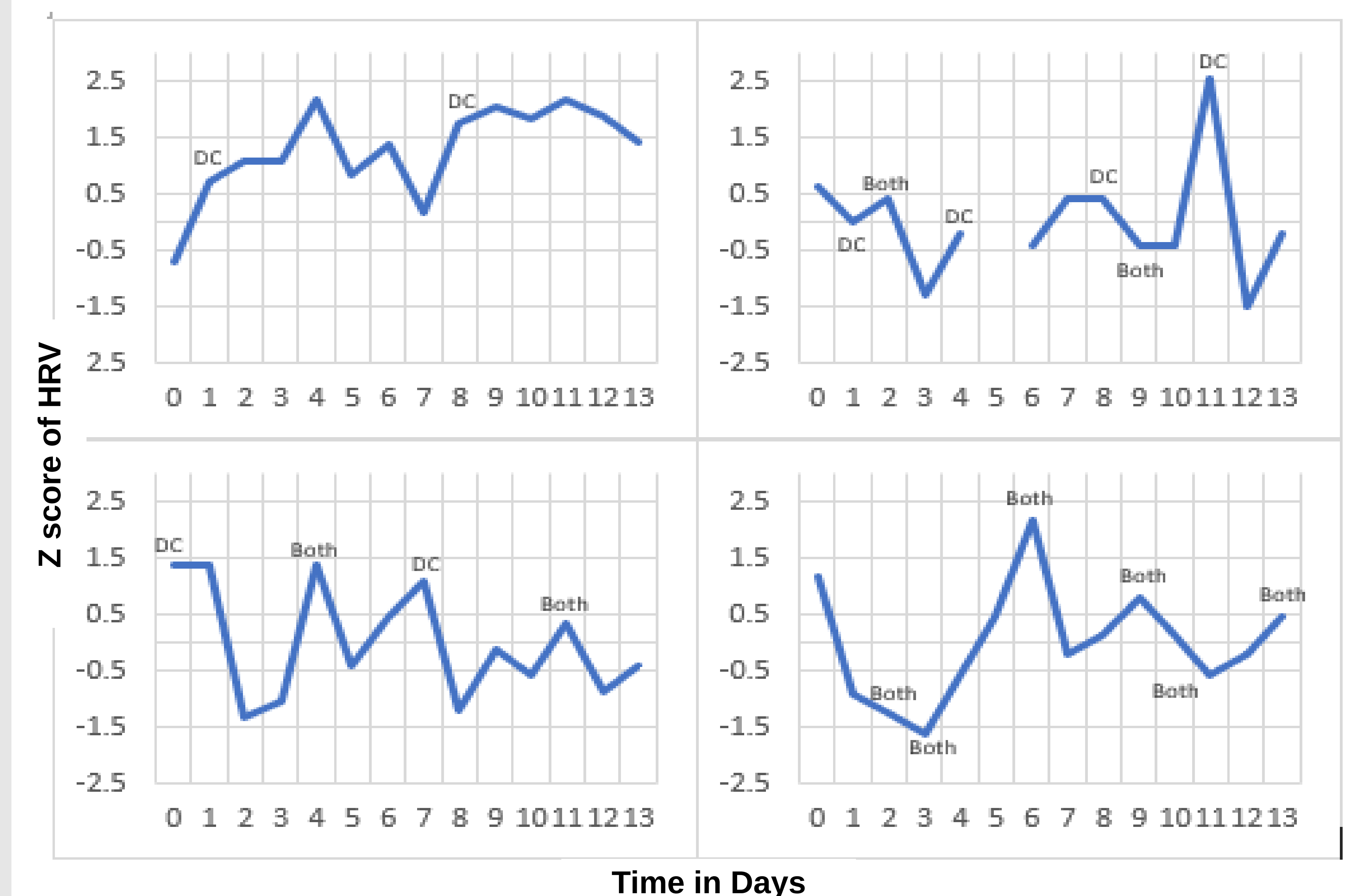


Figure 1. Day-to-day HRV variation

HRV=heart rate variability; DC=dementia caregiving only; Both=dementia & non-dementia caregiving.

Blank sections along the x-axis indicate missing data.

Conclusions

- PPG-derived HRV demonstrated substantial day-to-day variability.
- PPG-derived HRV may capture dynamic physiological stress beyond self-reported measures.

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