Utility of Mobile Health Applications, Wearable Devices, and Patient Generated Health Data in Menopause Research

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INTRODUCTION

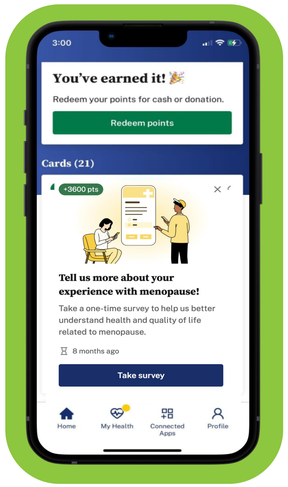
Real-world data may fill gaps in general understanding of menopause symptom burden and better position clinicians to offer more comprehensive individualized support to enhance quality of life among women during menopause. With the widespread availability of personal digital devices, electronic patient generated health data (PGHD) may be one low-burden approach to support such data collection[1].

A better understanding of the suitability of electronic PGHD (e.g., data generated from mobile applications and wearable devices) in population studies in menopausal women is needed.

This study assessed the feasibility of using mobile applications and wearable devices in menopause real-world research, with specific focus on vasomotor symptoms (VMS) and sleep measures.

METHODS

A cross-sectional survey was piloted through the Evidation mobile application, where users are engaged in tracking health behaviors. **Women were included if they were aged 40-65, reported having VMS in the last 30 days, had their last menstrual period at least 12 months prior, and had wearable data on sleep measures for 70% of the past 30 days.** Participants consented to the survey and linkage to wearable data. Exclusion criteria included current breastfeeding, hormonal contraceptive use, hypothalamic amenorrhea, or cancer therapy induced menopause symptoms. **Survey items included VMS burden and sleep disturbances**. Wearable data include sleep duration, wakefulness after sleep onset, and time in bed. We assessed **recruitment time, survey completion**, and **descriptive analyses of VMS burden and sleep measures.**



RESULTS

Table 1

Demographics		All participants (N = 102)
Age (years)	Mean (SD)	56.10 (5.02)
	Median, IRQ	56 (52.25, 60)
	Range	44 - 65
Ethnicity, N (%)	Hispanic, Latino	10 (9.80%)
	Not Hispanic, Latino	92 (90.20%)
Race, N (%)	White	53 (51.96%)
	Black, African American	20 (19.61%)
	Asian	8 (7.84%)
	Other	4 (3.92%)
	Multiple	10 (9.80%)
	Race not reported[1]	7 (6.86%)
Education, N (%)	No high school diploma or equivalent	1 (0.98%)
	High school diploma or equivalent	14 (13.73%)
	Some college, no degree	12 (11.76%)
	Trade/technical/vocational training	3 (2.94%)
	College degree (bachelor's degree or higher)	72 (70.59%)

[1] 7 participants reported Hispanic, Latino ethnicity, but did not report a separate race.

4

≥90%

FINDINGS

In 4 days, participants from diverse racial and ethnic backgrounds and VMS severity levels enrolled and completed the survey - only 8 individuals started and did not complete it.

Wearable data availability was high – **over 90% of participants had sleep data for at least 70% of the past 30 days** prior to completing the survey.

Exploratory analysis **suggested correlations between nighttime hot flash frequency and sleep-related metrics**.

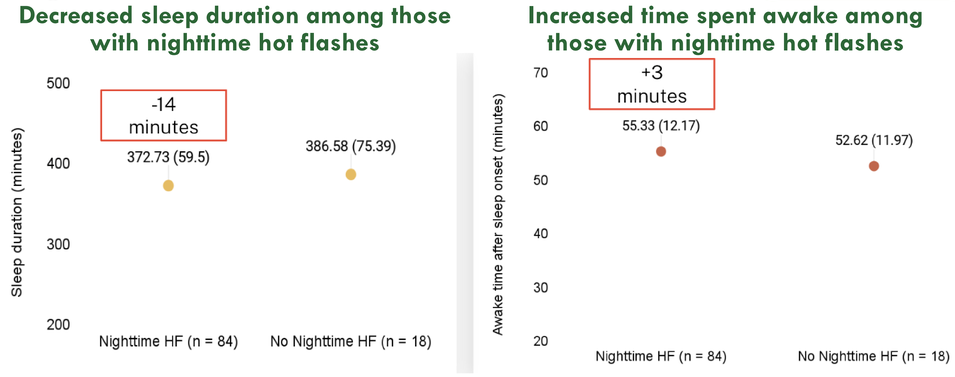
IMPLICATIONS

Mobile health applications that allow users provide information about their health and personal characteristics can enable targeted and efficient recruitment.

Passively collected wearable data can address challenges related to missingness and recall bias typically associated with self-report.

Preliminary insights from pilot data can inform study designs and research questions needed to better understand real world burden of VMS.

Figure 1



LIMITATIONS

The study population may not be representative of the broader population of those who experience menopauses symptoms. For example, the study sample skews towards higher educational attainment (71% hold a college degree).

The study required continuous use of a specific wearable device (Fitbit), which may have resulted in a study population that is more active in tracking their health behaviors, including menopause symptoms, limiting generalizability.

CONCLUSIONS

Mobile health applications may be an innovative, person-centered approach to gain insights on symptom burden during menopause due to the ability to quickly reach a diverse audience relevant to study objectives and to seamlessly aggregate relevant PGHD from surveys and wearable devices to answer a range of research questions.

When paired with the appropriate study design, high density wearable data allows for the examination of novel hypotheses about the relationship between VMS symptoms and sleep over time, as well as behavioral and contextual factors that are difficult to address via self-report.

DISCLOSURES

This study was funded by Bayer AG, Berlin, Germany

REFERENCES

1. Nazi K.M., Newton T., Armstrong C.M. (2024). Unleashing the Potential for Patient-Generated Health Data (PGHD). J Gen Intern Med; 39(Suppl 1):9-13

ACKNOWLEDGEMENTS

The authors would like to acknowledge Evidation Health (San Mateo, CA, USA) for their assistance in processing and analyzing the data and for their assistance with producing this abstract and poster.