The Acceptability of Wearables for Atrial Fibrillation Screening: Interim Analysis of the SAFER Wearables Study

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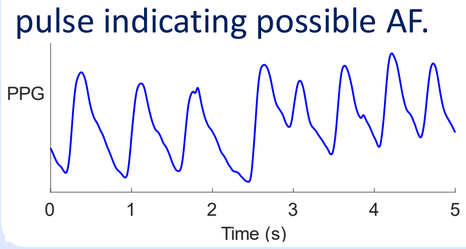
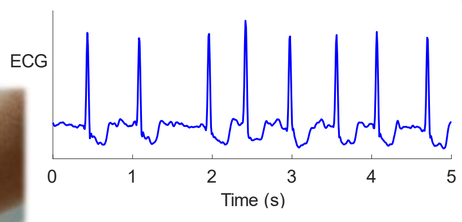
Knowledge Gap

Systematic screening for **Atrial fibrillation (AF)** holds promise for improving diagnosis rates and reducing stroke risk through subsequent anticoagulation.

Wearable devices may have a role to play in AF screening:

Photoplethysmogram (PPG): an optical signal which can identify an irregular pulse indicating possible AF.





Electrocardiogram (ECG): to confirm AF diagnosis.

fancycrave1, https://commons.wikimedia.org/wiki/File:Apple_Watch-.jpg (CC0 1.0)

? However, there is limited research on the acceptability of wearables in older adults, who are the target population for AF screening.

Aim: To identify factors influencing the acceptability of wearables in older adults.

Methods

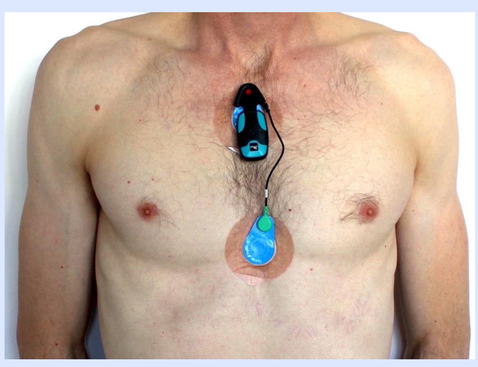
Participants
Community dwelling adults aged 65 and over who had previously been screened for AF were recruited through general practices.

Study Procedures
Devices were delivered by mail, and instructions were provided in a leaflet and telephone call. Informal feedback was collected via telephone calls during the week. Formal feedback was collected through a questionnaire at the end of the week.

Devices: Participants were asked to wear three devices simultaneously for one week:

PulseOn Arrhythmia Monitor
Continuous PPG. Vibrated 4 times per day and upon irregular pulse to prompt ECG recording.

PulseOn OHR
(**O**ptical **H**eart **R**ate Tracker)
Intermittent PPG



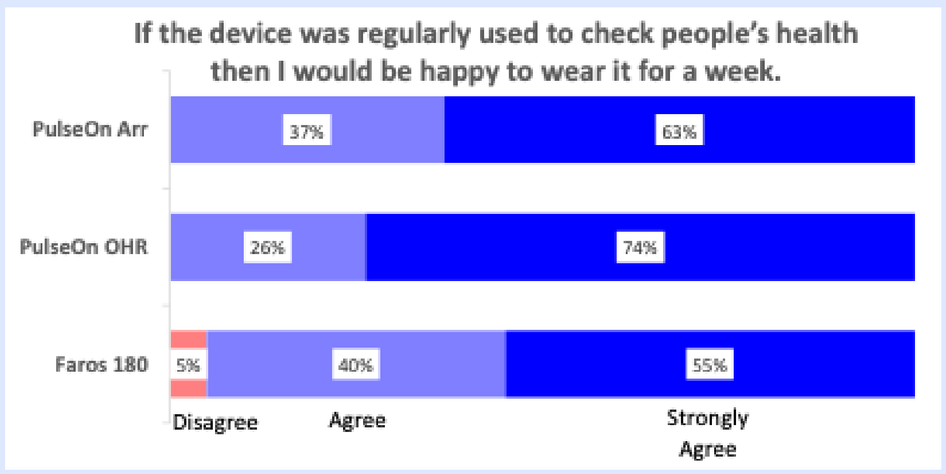
Bittium **Faros 180** chest patch
Continuous reference ECG

Results

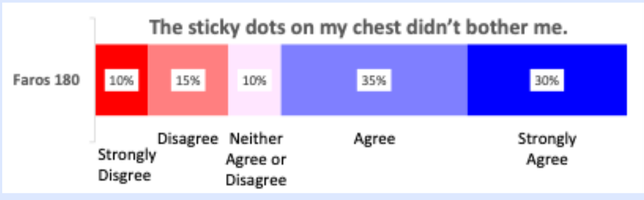
Recruitment and participation
- 75 potential participants invited
- 42 consented to take part (56%)
- 21 had taken part at the time of this analysis

Device removals
Removals:
- 5 (24%) removed Faros 180 due to skin irritation
- 4 (19%) removed PulseOn OHR (3 due to battery running out, 1 due to skin irritation)
- 1 (5%) removed PulseOn Arr due to night-time vibrations

Feedback
Most respondents would be happy to wear any device for a week:



But the chest electrodes irritated participants, with 8 (38%) participants reporting irritation during telephone calls.



Other issues:
- Faros 180: electrodes detached, form factor not suitable for women.
- PulseOn Arr: night-time vibrations.
- PulseOn OHR: battery running out.

Discussion and Conclusions

Possible strategies to improve acceptability:
- Use different chest patch electrodes or locations.
- Inform participants that accidental activation of PulseOn Arr can produce night-time vibrations.

Limitations:
- One-week duration
- Devices worn simultaneously

Conclusion:
Wearable devices were tolerated for one week by older adults, although the chest patch's electrodes caused skin irritation leading to some participants removing it.

SAFER wearables study

Next Steps

Complete SAFER Wearables Study:
- Target recruitment: 130 participants (65 AF, 65 non-AF)
- Assess performance of wearables for detecting AF.

Improve the reliability of AF diagnoses based on single-lead ECGs acquired from wrist-worn and handheld devices:
- Guidelines state that AF diagnoses should be made based on manual interpretation of ECGs.
- However, we have recently observed that when screening for AF using handheld ECG devices in SAFER: for every 100 participants diagnosed with AF by two cardiologists, the cardiologists would disagree on the diagnosis of a further 70 participants.

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