

Implementation of Sleep Health Promotion Strategies Addressing Sex-specific Factors in Federally Qualified Health Centers

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Background & Objective

- Insomnia is most prevalent sleep disorder¹
Insomnia: self-reported difficulty initiating or maintaining sleep, or early morning awakening → 20-30% prevalence
Chronic insomnia disorder: self-report of ≥1 insomnia symptom, ≥3 nights/week, ≥3 months → 8-10% prevalence
- Across meta-analyses, **insomnia is associated with cardiometabolic outcomes**, including Type II diabetes, hypertension, myocardial infarction, coronary heart disease, cerebrovascular disease, mortality¹
- Women 2x as likely to experience sleep disruptions & insomnia throughout lifespan; racial/ethnic minority populations & those with low socioeconomic status tend to have worse sleep health²
- Cognitive behavioral therapy for insomnia (CBT-I) is **highly efficacious, fast-acting and associated with robust improvements in sleep**,³ yet is **severely underutilized**⁴
- How can CBT-I be implemented in low-resource primary care settings?**
 - Feasibility & acceptability** of collecting objective sleep data among healthcare workers (eventual implementers of CBT-I intervention)
 - Associations** between sleep & cardiovascular metrics (heart rate variability, heart rate)

Methods



Design/population: 80 healthcare workers from 9 FQHCs followed for 6 weeks

• Age ≥18 years, English-speaking, compatible smartphone, attending work during 6-week study period, not pregnant, no pacemaker, no previous diagnosis of atrial fibrillation

Data collection:

- Biostrap:** 6 weeks of 24-hour measurement; sleep onset, wake, awakenings, heart rate, heart rate variability
- Questionnaire:** Baseline & 6-week follow-up; demographics, anxiety/depression symptoms (GAD-2, PHQ-2), burnout (Maslach Burnout Inventory), Rx medications, acceptability

Outcomes:

- Heart rate variability:** beat-to-beat variance in heart rate, physiologic capacity to respond to stress (higher = better)
- Heart rate:** beats per minute; higher = less efficient heart function/lower cardiovascular fitness

Analysis:

- All sleep and heart data recorded in 14-day period following 1st night of sleep data; excluded those with <4 nights of data
- Mixed effects models with random intercept for participant
 - Adjusted for age ≥50, use of sleep or anxiety medication

Results

Figure 1. Enrollment and Retention

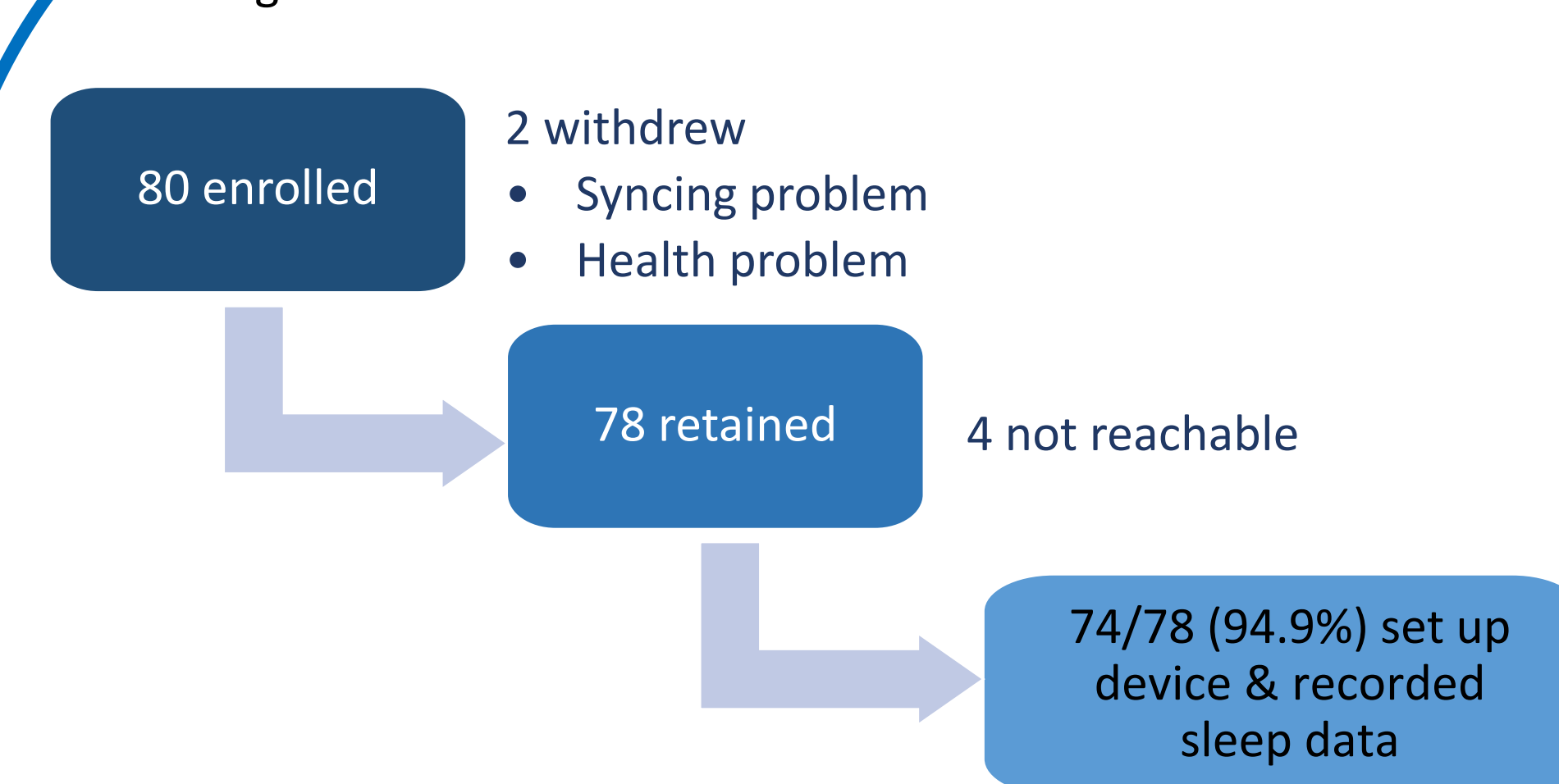


Table 1. Baseline participant characteristics (n=68)

Years in role	11.8 years (SD=10.3)
Years at organization	5.2 years (SD=5.0)
Age ≥50	33.3% (Mean=45.0 years, SD=11.1)
Woman	92.5%
Black	37.5%
Education	High school 22.7%, Associates or Bachelors 37.9%, Masters or Doctorate 39.4%
Annual household income	<\$50K 25.4%, \$50K - <\$75K 40.7%, \$100K+ 33.9%
Rural	39.4%
Anxiety symptoms	29.9%
Depression symptoms	7.5%
Emotional exhaustion	32.8%
On sleep or anxiety medication ¹	37.3%

¹Includes selective serotonin reuptake inhibitors (SSRIs), serotonin-norepinephrine reuptake inhibitors (SNRIs), tricyclic antidepressants (TCAs), and benzodiazepines

Figure 2. Nights recorded

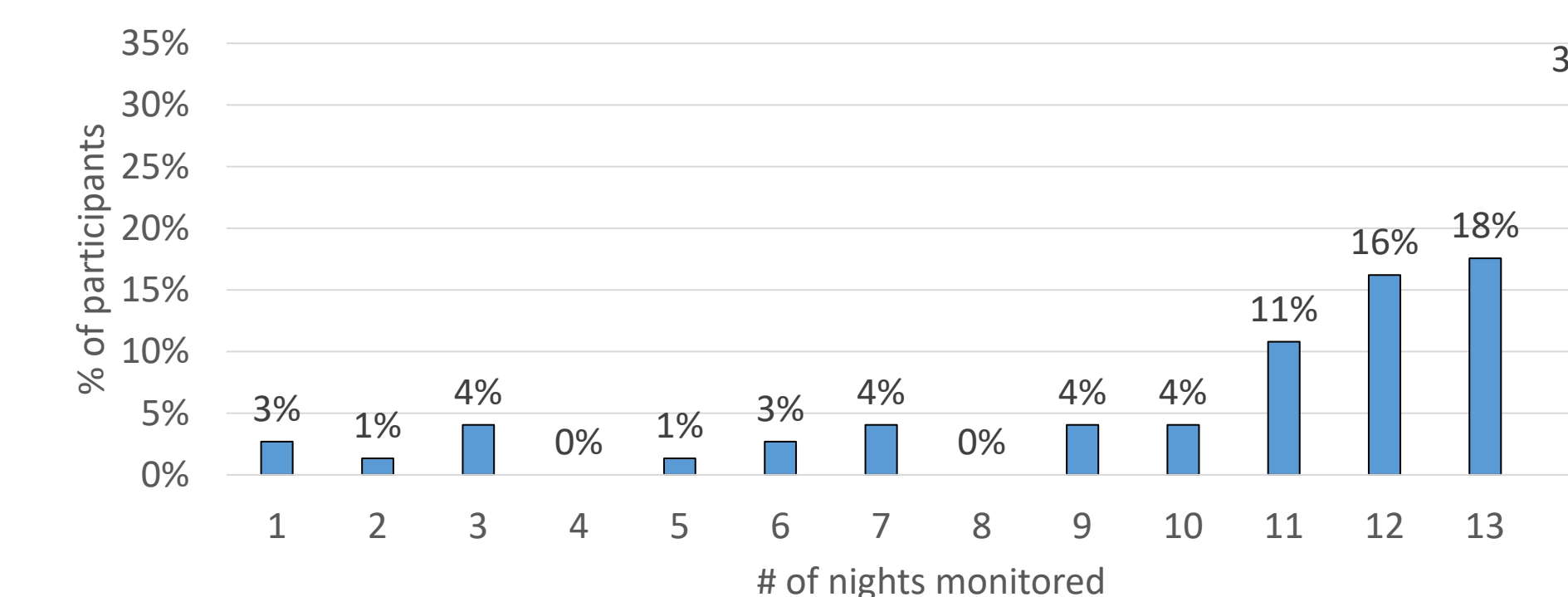


Figure 3. Work role

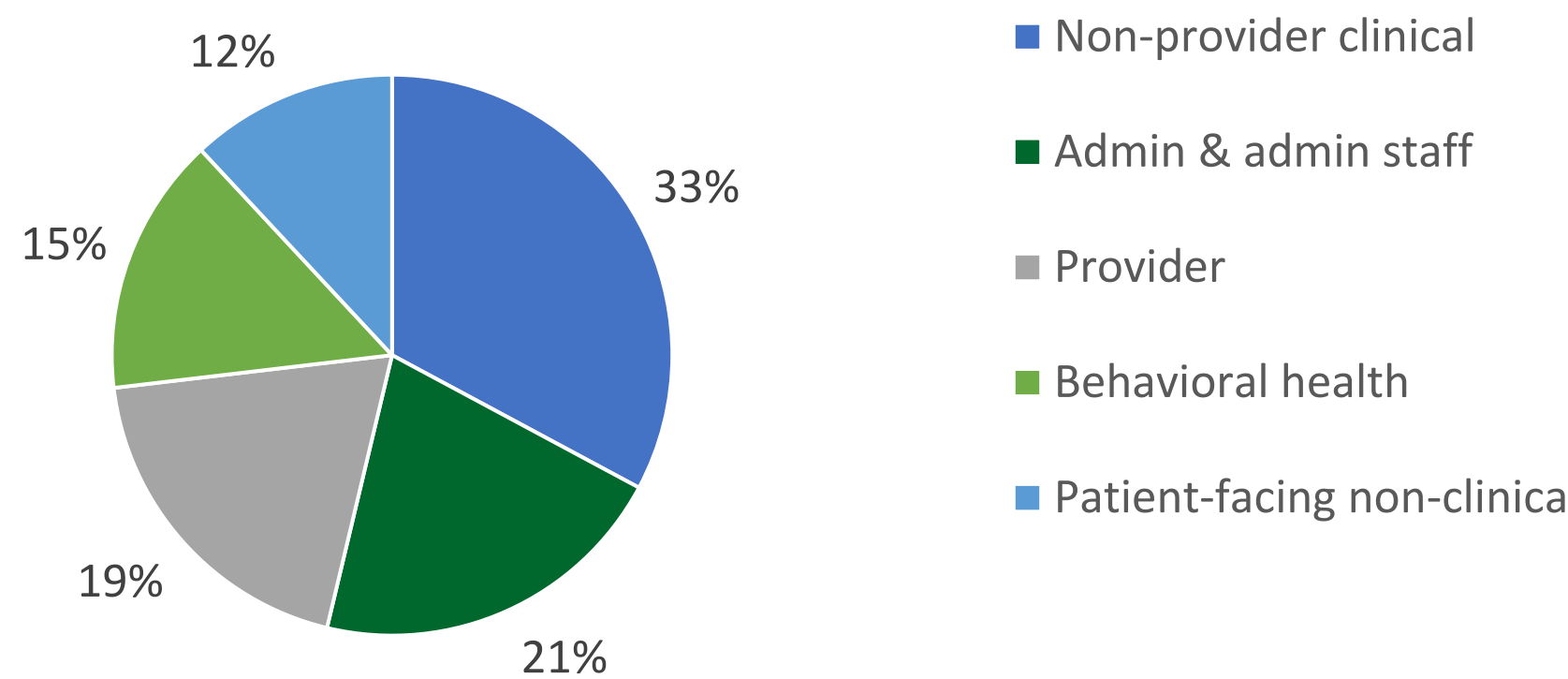


Table 2. Sleep health (n=68)

Sleep duration	420 minutes (SD=66)
Insufficient sleep, <7 hr	49%
Insufficient sleep, <6 hr	21%
Weekend minus weekday duration ≥1 hour	40%
Variability (standard deviation) in duration	81 minutes (SD=33)
Efficiency (% of bed hours spent asleep)	90% (SD=4%)
Inefficient (<85% of bed hours spent asleep)	12%
Number of awakenings	3.4 times (IQR=2.6, 4.6)
Minutes of wake after sleep onset (WASO)	50 minutes (SD=25)
WASO ≥30 minutes	76%

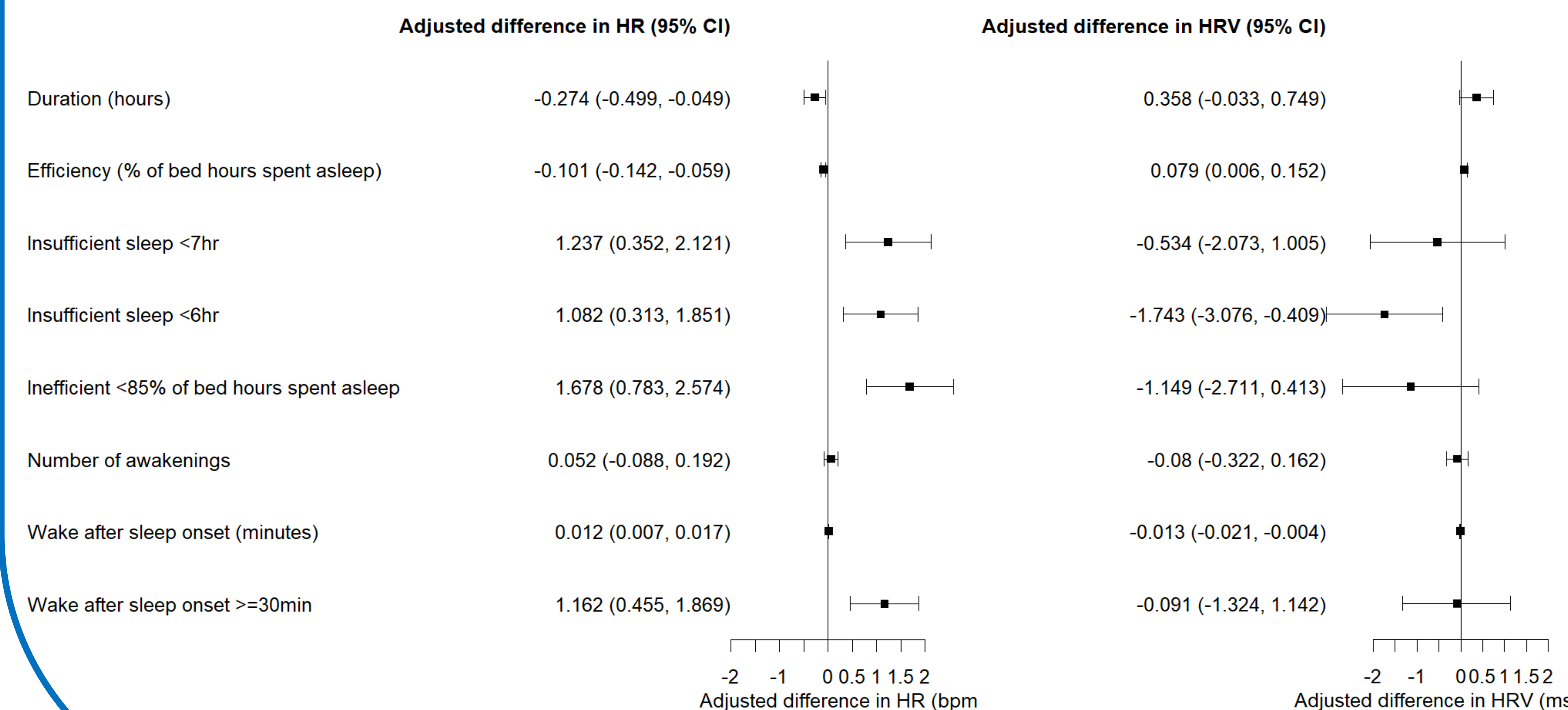
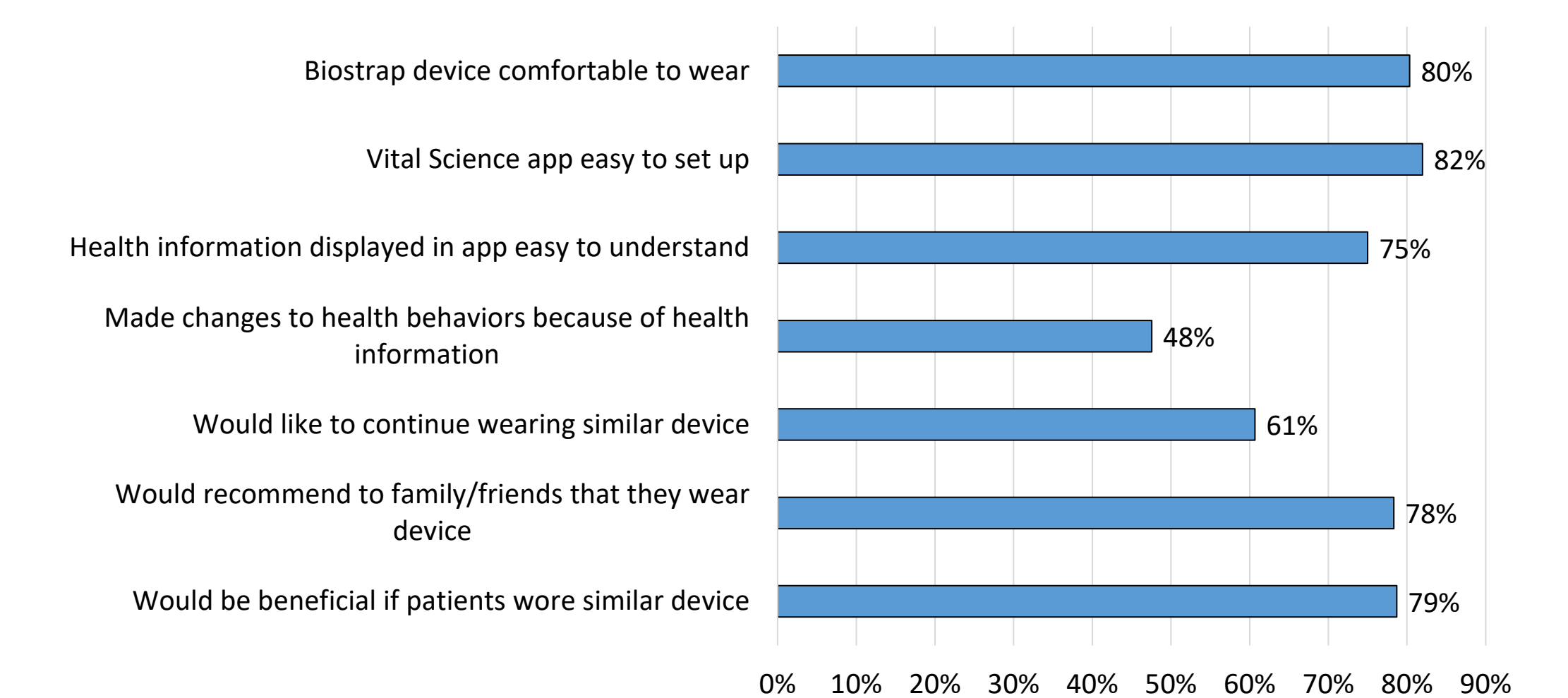


Figure 4. Associations between sleep health and cardiovascular metrics n=818 nights of sleep data across 68 participants; Models adjusted for age ≥50, sleep/anxiety medication

Results

Figure 5. % of respondents (n=61) who agree...



What information from the app was most useful to you?
44/49 (90%) responded sleep data

Conclusions

- In this sample of mostly female FQHC healthcare workers, objective sleep measurement was feasible and acceptable
- Sleep health was associated with better cardiovascular health, including heart rate variability & heart rate
- Further research is underway to determine sex-specific barriers and facilitators to adoption and uptake of CBT-I in low-resource primary care settings to improve cardiovascular health and reduce disparities.

References

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