

Tracking Patterns in Sleep Disturbances During Flare-Ups in Patients with Atopic Dermatitis: Insights From an App-Based Digital Health Tracking Study

Connie Zhang, MPH¹, Sarah Villard, PhD¹, Samantha McStocker, BS¹, Hiba Anwar, MPH¹, Amanda Healey, MPH¹
1. Folia Health, Boston, MA, USA

KEY FINDINGS & CONCLUSIONS

- Data from 34 AD patients were analyzed to assess how sleep changes during flares.
- Patients reported **40** unique sleep-related characteristics across several domains including sleep quality, dreams and nighttime experiences, psychological and emotional factors, breathing and snoring, and physical discomfort and pain thus highlighting burden beyond skin symptoms.
- Bad sleep nights associated with AD flares were associated with more severe anxiety and sleep problems than good sleep nights (Figure D).
- Home-reported outcomes (HROs) enable personalized, patient-driven tracking of symptom variability and unmet needs.

BACKGROUND AND SIGNIFICANCE

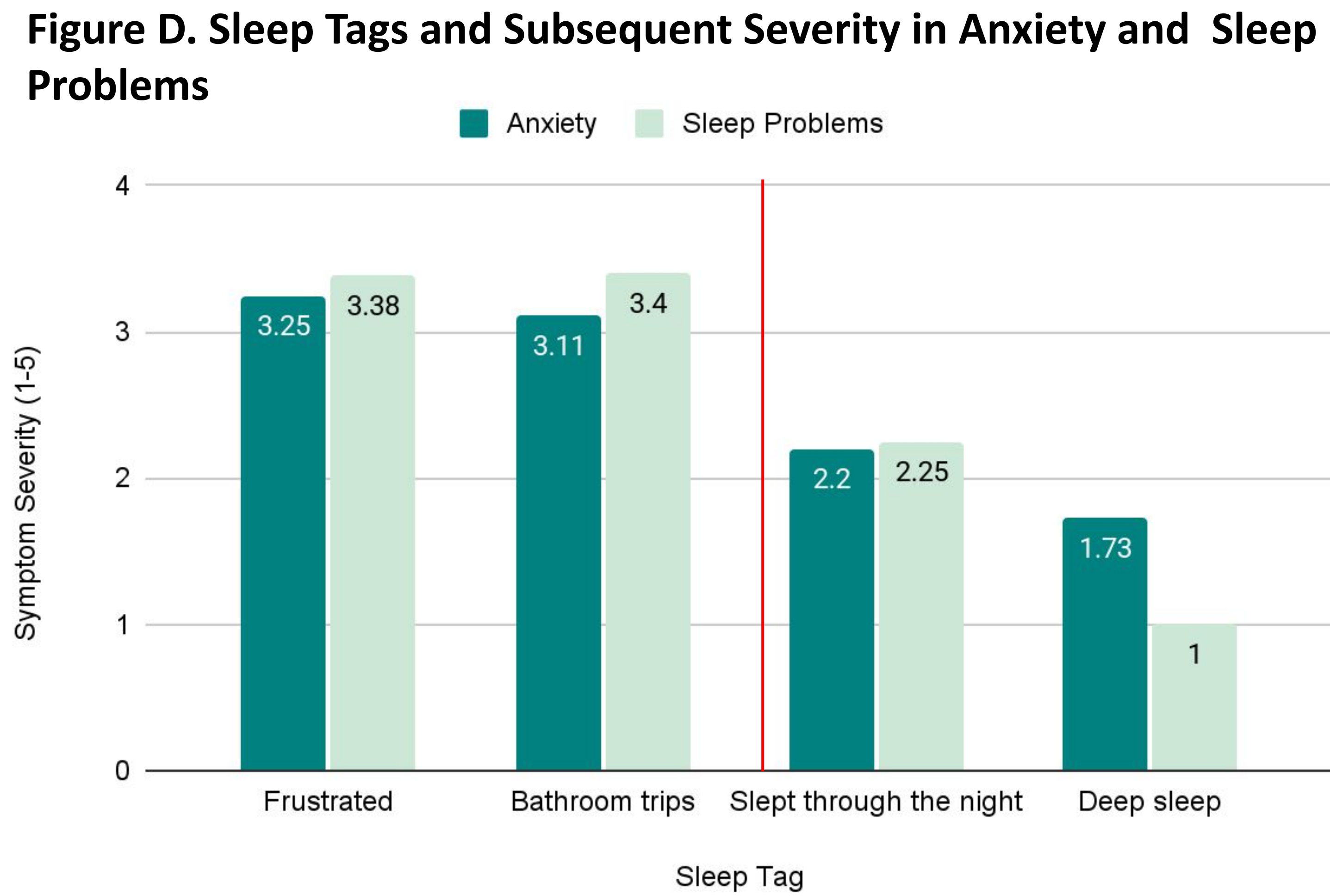
- Sleep disturbances are common in atopic dermatitis (AD), particularly during flare episodes.
- Poor sleep in AD is associated with daytime fatigue, decreased productivity, mood disturbances, and reduced quality of life.
- Understanding how sleep is impacted by AD flares can help improve disease management strategies.

OBJECTIVES

- Utilize home-reported outcomes (HROs) symptom and treatment data collected through the Folia Health app to explore how sleep characteristics change during AD flares.
- Identify specific sleep disruptions associated with flares compared to periods of disease stability.

RESULTS

- 34 participants of various ages and races (**Figures B and C**) were included in the analysis; 27 recorded at least one sleep tag.
 - In total, there were **182** unique participant-days where a sleep tag was recorded
- **40** unique sleep-related characteristics were reported, including **36** pre-defined tags and **4** participant-created tags (listed below).
- Sleep quality was notably worse during AD flares, with clear differences in sleep-related experiences:
 - Better sleep quality tags (more common when not in a flare): “Deep sleep”, “Slept through the night”, “Fell asleep easily”
 - Poor sleep quality tags (more common during flares): “Itching”, “Frustrated”, “Bathroom trips”
- Analysis showed that 'bad sleep' tags were associated with higher levels of anxiety and more severe sleep problems (**Figure D**).



Complete List of Sleep Tags: **Sleep Quality:** good sleep, slept through the night, fell asleep easily, calm sleep, deep sleep, restless sleep, awake all night, trouble falling asleep, woke up before alarm, woke up more than once, woke up once, woke up, didn't fall back asleep, woke up tired; **Dreams & Nighttime Experiences:** vivid dreams, nightmares, no dreams, teeth grinding, itching; **Psychological & Emotional Factors:** increase in stress, frustrated, preoccupied, low self-esteem, increased irritability, mood swings, received positive letter & prospects kept me up, trouble concentrating on tasks; **Breathing & Snoring:** loud snoring, no snoring, inconsistent breathing, CPAP used, no CPAP used; **Physical Discomfort & Pain:** night sweats, too hot, too cold, bathroom trips, woke up from pain, post-surgical pain interrupted sleep, mucus buildup, woke up coughing, uncomfortable

METHODS

- Participants: 34 individuals with self-reported AD tracked their symptoms and sleep characteristics for one month.
- Data Collection: Participants logged their experiences in the Folia Health app using:
 - Flare reports to indicate when they were experiencing an AD flare (**Figure A**).
 - Predefined and custom sleep-related tags to describe their sleep quality and disruptions.
- Analysis: Comparison of incidence and frequency of individual sleep-related tags recorded during flares vs. non-flare periods.

DEMOGRAPHICS

Figure A, Tagging and Flare Tracking Functionality

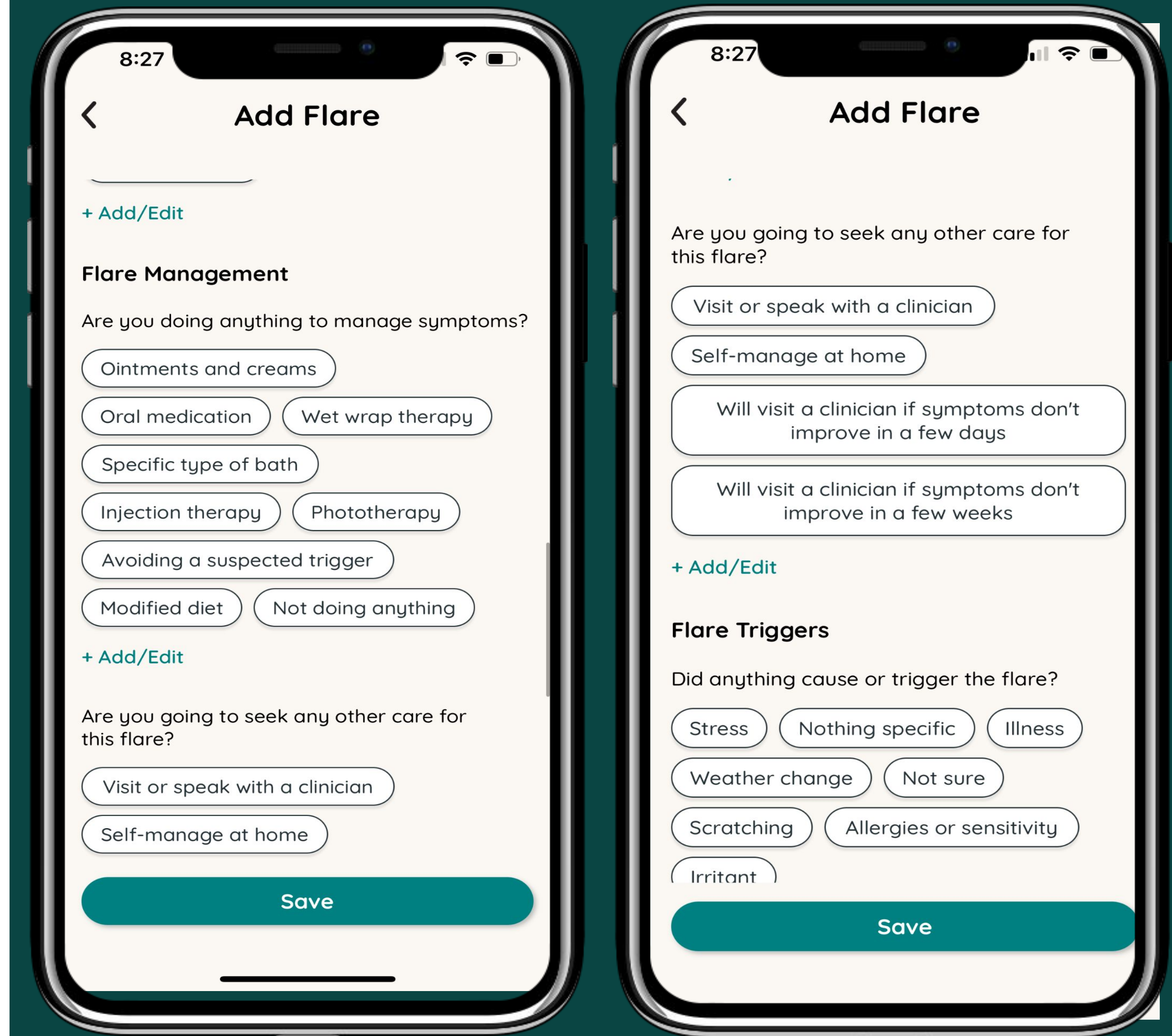


Figure B. Participant Age

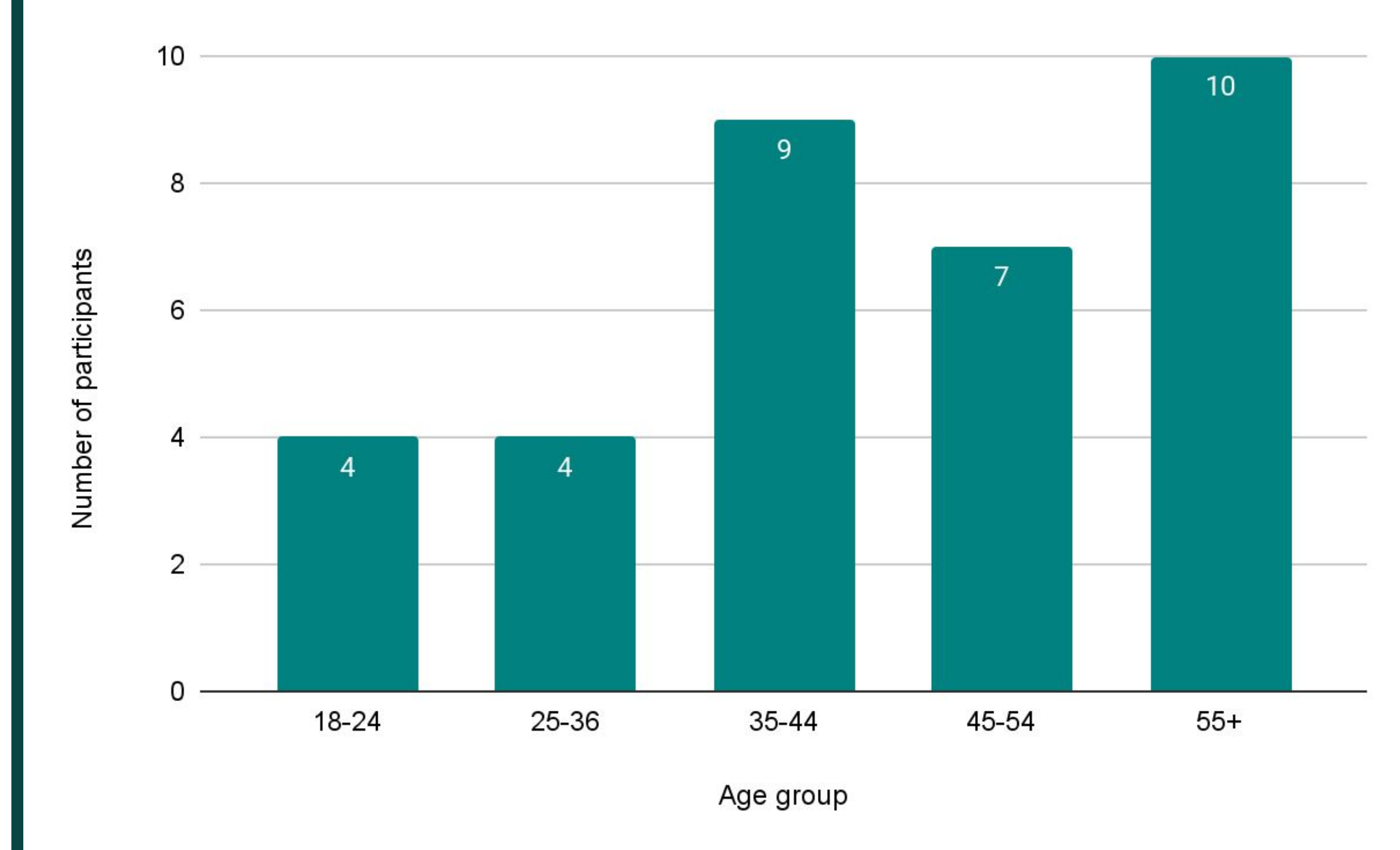
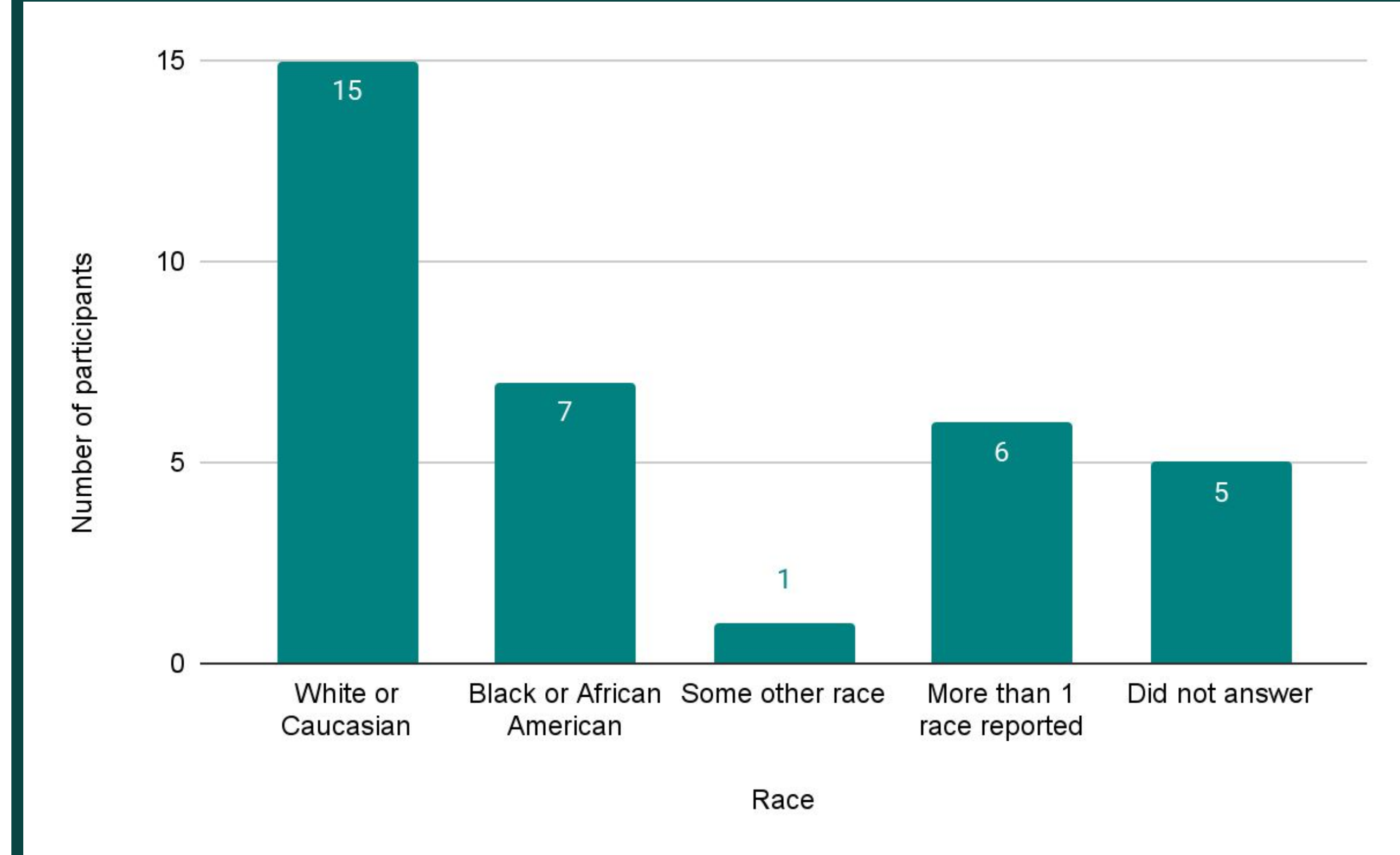


Figure C. Participant Race



Acknowledgements

We thank the patients, clinicians, research coordinators, community-based organizations, and other study participants for their support and insights.