

Supplemental Table for:

**Caregiver Experiences with an Internet-Delivered Insomnia Intervention: SHUTi-CARE  
Trial Primary Qualitative Analysis**

Kelly M Shaffer<sup>1,2</sup>, PhD; Kate Perepezko<sup>3</sup>, PhD, MSPH; Jillian V Glazer<sup>1</sup>, BA; Meghan K Mattos<sup>1,4</sup>, RN, PhD; Julie Klinger<sup>3</sup>, MA; Daniel J Buysse<sup>5</sup>, MD; Lee M Ritterband<sup>1,2</sup>, PhD; Heidi Donovan<sup>3,5,6</sup>, RN, PhD

<sup>1</sup>Center for Behavioral Health and Technology, University of Virginia, Charlottesville, VA, USA

<sup>2</sup>School of Medicine, University of Virginia, Charlottesville, VA, USA

<sup>3</sup>National Center on Family Support, University of Pittsburgh, Pittsburgh, PA, USA

<sup>4</sup>School of Nursing, University of Virginia, Charlottesville, VA, USA

<sup>5</sup>School of Medicine, University of Pittsburgh, Pittsburgh, PA, USA

<sup>6</sup>School of Nursing, University of Pittsburgh, Pittsburgh, PA, USA

**Corresponding Author:** Kelly M. Shaffer, PhD  
PO Box 801075  
Charlottesville, VA 22908  
Ph: 434-982-1022  
Email: kshaffer@virginia.edu  
FAX: 434-244-7516  
ORCID: 0000-0002-9749-8006

Supplementary Table 1: Consolidated criteria for reporting qualitative research (COREQ)

| No. Item                                       | Guide questions/description                            | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------------------------|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Domain 1: Research team and reflexivity</b> |                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <i>Personal Characteristics</i>                |                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 1. Interviewer/facilitator                     | Which author/s conducted the interview or focus group? | n/a – responses collected via Qualtrics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 2. Credentials                                 | What were the researcher's credentials? E.g. PhD, MD   | Kelly Shaffer: PhD, licensed clinical psychologist<br>Kate Perepezko: PhD, MSPH<br>Jillian Glazer: BA<br>Meghan Mattos: PhD, RN<br>Julie Klinger: MA<br>Daniel Buysse: MD, board certified in sleep medicine (American Board of Psychiatry & Neurology, American Board of Sleep Medicine)<br>Lee Ritterband: PhD, licensed clinical psychologist<br>Heidi Donovan: PhD, RN                                                                                                                                                                                              |
| 3. Occupation                                  | What was their occupation at the time of the study?    | Kelly Shaffer: Assistant Professor; University of Virginia (Research)<br>Kate Perepezko: Postdoctoral Fellow; University of Pittsburgh (Research)<br>Jillian Glazer: Research Coordinator; University of Virginia<br>Meghan Mattos: Assistant Professor, University of Virginia (Research)<br>Julie Klinger: Research Coordinator; University of Pittsburgh<br>Daniel Buysse: Professor; University of Pittsburgh (Research, Clinical)<br>Lee Ritterband: Professor; University of Virginia (Research)<br>Heidi Donovan: Professor; University of Pittsburgh (Research) |

|                                       |                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------------|-------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4. Gender                             | Was the researcher male or female?                          | The following researchers identify as female: Kelly Shaffer, Kate Perepezko, Jillian Glazer, Meghan Mattos, Julie Klinger, Heidi Donovan<br>The following researchers identify as male: Daniel Buysse, Lee Ritterband                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 5. Experience and training            | What experience or training did the researcher have?        | Kelly Shaffer: CBT-I, caregiving, digital health, qualitative research methods<br>Kate Perepezko: caregiving, qualitative research methods<br>Jillian Glazer: qualitative research methods<br>Meghan Mattos: caregiving, digital health, qualitative research methods<br>Julie Klinger: caregiving, qualitative research methods<br>Daniel Buysse: digital health, sleep medicine, CBT-I<br>Lee Ritterband: digital health, CBT-I<br>Heidi Donovan: caregiving, digital health, qualitative research methods                                                                                                                                         |
| <i>Relationship with participants</i> |                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 6. Relationship established           | Was a relationship established prior to study commencement? | Caregivers were recruited through several different pathways. Most pathways, such as online advertisements, social media postings, and newsletter postings, were not targeting individuals with an existing relationship to the study team. However, caregivers were also recruited via the University of Pittsburgh Caregiver Research Registry, a longitudinal research cohort of self-identified caregivers in the Western Pennsylvania region, as well as the University of Pittsburgh Alzheimer's Disease Research Center caregiver database. These caregivers were familiar with these caregiving research groups at University of Pittsburgh. |

|                                             |                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7. Participant knowledge of the interviewer | What did the participants know about the researcher? e.g. personal goals, reasons for doing the research                                                 | During the informed consent process, participants were told that the study was being conducted to “better understand the unique sleep problems that occur when caregiving,” as well as to “to understand how well SHUTi treats these sleep problems for caregivers.” This information was also available on the study website, where interested individuals could learn about the study.                                                                                                                                                                                                                       |
| 8. Interviewer characteristics              | What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic                | n/a – there was no interviewer / facilitator, as responses were entered online via open-ended text prompts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Domain 2: study design</b>               |                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <i>Theoretical framework</i>                |                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 9. Methodological orientation and Theory    | What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis | Content analysis by way of rapid qualitative analysis and matrix analysis methodologies                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <i>Participant selection</i>                |                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 10. Sampling                                | How were participants selected? e.g. purposive, convenience, consecutive, snowball                                                                       | Convenience sampling using online US-national recruitment methods                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 11. Method of approach                      | How were participants approached? e.g. face-to-face, telephone, mail, email                                                                              | Participants may have learned about our trial from any of the multiple recruitment pathways: (1) seeing in-clinic flyers or handouts within select clinics at University of Virginia or University of Pittsburgh health systems; (2) receiving a letter about the trial through the University of Pittsburgh Center for Social and Urban Research Caregiver Research Registry; (3) receiving a letter about the trial through the University of Pittsburgh Alzheimer’s Disease Research Program; (4) matching with the study through the University of Pittsburgh Clinical and Translational Science Institute |

|                                  |                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                  |                                                                                   | Pitt+Me Research Registry; (5) seeing a trial advertisement on Facebook or Instagram through a paid University of Virginia-sponsored campaign; (6) seeing a trial posting on other social media platforms (i.e., Reddit, Twitter); or (7) seeing a trial posting through local and national non-profit organizations that provide care to family caregivers.                                                                                                                                                   |
| 12. Sample size                  | How many participants were in the study?                                          | 100 caregivers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 13. Non-participation            | How many people refused to participate or dropped out? Reasons?                   | Fourteen potentially eligible caregivers declined to participate prior to completing eligibility screening by phone; one caregiver was lost to follow-up during the baseline assessment period; one caregiver withdrew during the intervention period (due to work change); and 10 caregivers were lost to follow-up during the post-assessment period. See Figure 1 (CONSORT chart) for more details.                                                                                                         |
| <i>Setting</i>                   |                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 14. Setting of data collection   | Where was the data collected? e.g. home, clinic, workplace                        | Online surveys completed at survivors' convenience.                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 15. Presence of non-participants | Was anyone else present besides the participants and researchers?                 | It is unknown whether survivors completed online surveys in the presence of others.                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 16. Description of sample        | What are the important characteristics of the sample? e.g. demographic data, date | Participants were enrolled beginning January 2022 and all data collection was completed in March 2023. See Table 1 for demographic and caregiving characteristics of the sample. As discussed in Limitations and Future Research, the participant sample was disproportionately non-Hispanic white and highly educated relative to national estimates of the broader population of family caregivers. Focusing largely on research registries to identify caregivers may have contributed to these imbalances. |

|                                        |                                                                               |                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Data collection</i>                 |                                                                               |                                                                                                                                                                                                                                                                                                                                                |
| 17. Interview guide                    | Were questions, prompts, guides provided by the authors? Was it pilot tested? | Survey prompts are available online at <a href="https://bit.ly/SHUTiCARE-project">https://bit.ly/SHUTiCARE-project</a> . These prompts had been previously used in a feasibility study of SHUTi among cancer caregivers [38].                                                                                                                  |
| 18. Repeat interviews                  | Were repeat interviews carried out? If yes, how many?                         | n/a                                                                                                                                                                                                                                                                                                                                            |
| 19. Audio/visual recording             | Did the research use audio or visual recording to collect the data?           | n/a                                                                                                                                                                                                                                                                                                                                            |
| 20. Field notes                        | Were field notes made during and/or after the interview or focus group?       | n/a                                                                                                                                                                                                                                                                                                                                            |
| 21. Duration                           | What was the duration of the interviews or focus group?                       | n/a                                                                                                                                                                                                                                                                                                                                            |
| 22. Data saturation                    | Was data saturation discussed?                                                | n/a                                                                                                                                                                                                                                                                                                                                            |
| 23. Transcripts returned               | Were transcripts returned to participants for comment and/or correction?      | n/a                                                                                                                                                                                                                                                                                                                                            |
| <b>Domain 3: analysis and findings</b> |                                                                               |                                                                                                                                                                                                                                                                                                                                                |
| <i>Data analysis</i>                   |                                                                               |                                                                                                                                                                                                                                                                                                                                                |
| 24. Number of data coders              | How many data coders coded the data?                                          | Each quote was separately coded by 2 of the following coders: Kelly Shaffer, Kate Perepezko, Jillian Glazer, Meghan Mattos, Heidi Donovan. Discrepancies were resolved by the consensus of a third coder.                                                                                                                                      |
| 25. Description of the coding tree     | Did authors provide a description of the coding tree?                         | n/a                                                                                                                                                                                                                                                                                                                                            |
| 26. Derivation of themes               | Were themes identified in advance or derived from the data?                   | Pre-registered <i>a priori</i> codes were: whether the quote was caregiving-specific or not; whether the quote was specific to SHUTi (Internet-delivered CBT-I), CBT-I (in any delivery format), or digital health (of any therapy). Through the rapid qualitative analysis process, additional codes were derived through inductive analysis. |

|                                  |                                                                                                                                 |                                                                                                                                                                                                                                           |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 27. Software                     | What software, if applicable, was used to manage the data?                                                                      | Quotations were exported from Qualtrics, then individually coded using a standardized, pilot-tested coding form in Qualtrics – see materials at <a href="https://bit.ly/SHUTiCARE-project">https://bit.ly/SHUTiCARE-project</a>           |
| 28. Participant checking         | Did participants provide feedback on the findings?                                                                              | Synthesized member checking was carried out with SHUTi Users – see materials at <a href="https://bit.ly/SHUTiCARE-project">https://bit.ly/SHUTiCARE-project</a> ; see Supplementary Table 5 for member checking participant descriptives. |
| <i>Reporting</i>                 |                                                                                                                                 |                                                                                                                                                                                                                                           |
| 29. Quotations presented         | Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number | Representative quotations are available in Supplementary Tables 3 & 4. Tabled quotations are identified with a participant identification number.                                                                                         |
| 30. Data and findings consistent | Was there consistency between the data presented and the findings?                                                              | We aim to discuss data representatively in our Results and Discussion sections.                                                                                                                                                           |
| 31. Clarity of major themes      | Were major themes clearly presented in the findings?                                                                            | We aim to discuss data comprehensively in our Results and Discussion sections.                                                                                                                                                            |
| 32. Clarity of minor themes      | Is there a description of diverse cases or discussion of minor themes?                                                          | We discuss discrepant findings in our Results and Discussion sections.                                                                                                                                                                    |