Supplemental Table for:

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

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

[1]Center for Behavioral Health and Technology, University of Virginia, Charlottesville, VA, USA
[2]School of Medicine, University of Virginia, Charlottesville, VA, USA
[3]National Center on Family Support, University of Pittsburgh, Pittsburgh, PA, USA
[4]School of Nursing, University of Virginia, Charlottesville, VA, USA
[5]School of Medicine, University of Pittsburgh, Pittsburgh, PA, USA
[6]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

Supplemental Table 4: SHUTi User Themes with Representative Quotations

Theme / Code / *Subcategory**	[SHUTi User ID] Representative quotation (Primary care recipient's condition requiring care, proximity to care recipient, last Core completed)
Program feasibility: How usable caregivers found the SHUTi program, and suggestions to improve usability	
Delivery format (Total: Number of caregivers endorsing [N_c]= 13; Number of total quotes [N_t]= 16)	
Satisfaction (N_c= 9; N_t= 10)	[U1] the data was organized in a convenient, easily digestible format (old age, live apart, Core 6) [U2] While the program did not address specific issues related to caregiving, it was well done, had an interesting variety, was easy to follow, and I found it helpful while I've been providing care. (Alzheimer's disease/dementia, live apart, Core 6) [U3] The format is excellent. You vary it so the program does not get boring. The content seems comprehensive. The recommendations seem to be useful because people are different from one another and differ during various challenges of life so we can choose which recommendations will work for us. Of course, we may not always choose correctly, but that is on us, not on your program. (Alzheimer's disease/dementia, bedpartner, Core 6)
Dissatisfaction (N_c= 4; N_t= 6)	[U4] …there need to be varied ways to manage the program. An app, podcasts or other ways to listen to lessons when we are elsewhere. You have no idea how often we just sit in our cars at the store because that is our quiet time. If we have to do this on a computer, it limits our chances of participating. And the time we spend in doctor's office waiting rooms and ERs. If we could access this stuff on our phones or tablets, that would be much easier. (mobility problems, in-home, Core 2) [U5] I think it'd be helpful to have at least some of the program content in an audio format. Since I care for my partner, I've found myself listening to way more podcasts than I did before, because I'm very busy doing house chores and other duties that he can't do by himself. I'm always moving around, and sometimes it's not easy to find the time or the motivation to sit in front of a screen and read… (other, bedpartner, Core 6)
Program flexibility (Total: N_c= 12; N_t= 17)	
Satisfaction (N_c= 10; N_t= 13)	[U6] … I see the built-in flexibility making the program workable for anyone, caregiver or otherwise, who is motivated to [participate]. (mobility problems, live apart, Core 2) [U7] It was very helpful, I was able to start and stop and go back in as needed to finish everything. (cancer, bedpartner, Core 6) [U8] [My caregiving] was not affected at all! The program allowed flexibility that did not interfere with my responsibilities! (brain damage/injury, in-home, Core 6)

Dissatisfaction (N_c= 2; N_t= 4)	[U9] …Program is very structured without flexibility. (developmental/intellectual disorder, in-home, Core 4) *(note: this caregiver provided 3 of the 4 quotes)*
Delivery convenient (N_c= 10; N_t= 14)	[U5] I think the program fits caregivers good. The delivery format is its best feature - the fact that you have three days to enter your sleep diaries, or that you can complete the Cores at your own pace (e.g. maybe you start doing one Core and your caregivee needs you, but that's okay because you can close it and finish it another time), is very helpful. (other, bedpartner, Core 6) [U10] Again that fact that it's available to use or complete at any time is very valuable (stroke, in-home, Core 4) [U11] Easy to do modules and journal when I had the time to do it vs having to watch a Zoom or online content at a specific time. (developmental/intellectual disorder, in-home, Core 6)
Program manageable (N_c= 16; N_t= 21)*	[U12] I was able to follow SHUTi's recommendations even though I had to care for my dad. … Although it was difficult to take time to do so, I was able to follow the program 100%. (brain damage/injury, in-home, Core 6) [U13] …I give care to my wife with dementia. She sleeps 12-14 hours/night. I have plenty of time for SHUTi. (Alzheimer's disease/dementia, in-home, Core 5) [U14] I can't think of any since you don't have to complete the journals at any specific time. Caregivers can just work it in their daily routine (cancer, in-home, Core 6) *Contrasting perspective (dissatisfaction):* [U15] My responsibilities made it more difficult to follow [the] recommendations, but SHUTi also showed me the importance of taking care of [my] needs. (other, bedpartner, Core 5)
Easy-to-use (N_c= 25; N_t= 38)	[U16] I [found] the step by step concept easy to follow flexible and rewarding (Alzheimer's disease/dementia, live apart, Core 6) [U17] [SHUTi] has approaches that would never occur to average person and it's pretty easy to do. Big bang for the effort involved (other, bedpartner, Core 6) [U18] Easy to use and understand (other, in-home, Core 6)

Reminders (Total: N_c= 12; N_t= 14)	
Satisfaction (N_c= 8; N_t= 8)	[U15] The email reminders and core segments are essential… (other, bedpartner, Core 5) [U19] Daily reminders the first week to get me on track. (other, live apart, Core 6)
Dissatisfaction (N_c= 4; N_t= 6)	[U10] Maybe a text message reminder (stroke, in-home, Core 4) [U20] Give more alerts for following cores and the goals of each core. Being so busy I can forget my goals (autism spectrum disorder, in-home, Core 6) [U21] Maybe emailing the sleep diary reminder earlier in the morning. Or changing it to having the email say either thank you for completing the diary or time to complete the diary. (Alzheimer's disease/dementia, live apart, Core 6)
Too busy (N_c= 9; N_t= 11)	[U22] I'm not sure how [SHUTi] would work for caregivers who already have too much to deal with. (Alzheimer's disease/dementia, bedpartner, Core 2) [U23] I was overwhelmed at a point and was unable to complete many weeks as a result of being a caregiver. (other, in-home, Core 1) [U24] Just a little too much. Caregivers are doing double duty. I run two homes. Work a full time job. Keep my house clean. Help my 20yrs olds navigate life as a single mom then organize my parents life all while trying to do things to decrease stress in my life. Maybe the program needs shortened or trimmed for us? (cancer, live apart, Core 3)
Program appropriateness: Fit, relevance and compatibility of SHUTi as rated by caregivers	
Barrier nighttime caregiving (N_c= 11; N_t= 17)	[U25] Caregiving definitely made [following SHUTi] more difficult, as many things were outside of my control. Often, I would be awake in the middle of the night not because of my insomnia but because my daughter with disabilities was awake and needed my attention to take care of medical needs. (developmental/intellectual disorder, bedpartner, Core 6) [U26] …As a caregiver the ideas and program are not realistic or useful. I never know how the nights will be and if he will keep me up all night. (Alzheimer's disease/dementia, bedpartner, Core 5) [U27] …when trying to go to sleep during my sleep window, I ended up not sleeping enough because I have nighttime interruptions that are not under my control and are unavoidable. (other, bedpartner, Core 3)
Help for sleep interruptions (N_c= 8; N_t= 12)*	[U8] To include a section with interrupted sleep issues and how to deal with it. (brain damage/injury, in-home, Core 6) [U15] There did not seem to be any way to address problems with sleep due to caretaker duties or interruptions from the one being cared for. In some ways I felt like the "patient" myself. (other, bedpartner, Core 5)

Help for sleep interruptions *cont'd*	[U27] SHUTi assumes that your sleep issues are within your control but caring for a medically complex kid means that I need to help her at any hour. I need advice about how to care for my sleep needs when it's possible that I'll be awakened by a malfunctioning feeding tube pump or a child that needs medical attention. (other, bedpartner, Core 3) *Contrasting perspective (satisfaction):* [U8] It was very difficult before with being woken up to perform caregiver duties in the middle of the night and then try to fall back asleep was difficult. The program helped me even after awakenings to be able to fall back asleep quickly for more restful sleep... (brain damage/injury, in-home, Core 6)
Sleep environment (N_c= 9; N_t= 12)	[U5] In my particular situation, my caregivee happens to be my partner, and we sleep in the same room/bed. His health issues affect his sleep patterns, and that ends up affecting my sleep patterns as well (by disrupting them). (other, bedpartner, Core 6) [U28] …I am not able to control my sleep environment, or my wake times, so I was not as successful as I would have been without this flexibility. In particular, my mother whom I care for, needs a warm temperature, while I am always hot. This makes sleeping especially hard. She is also nearly blind, and wants bright lights on day and night. I do sleep with an eye cover, but that's not perfect. I need quiet to sleep, but she is a very noisy sleeper. I would use earplugs, but then wouldn't hear her when she called me to assist her with getting to the bedside commode several times a night. (old age, bedpartner, Core 6) [U29] … my home cannot be too dark. It is a falling risk to my daughter, safety come first so my home has nightlights. I also would not use earplugs or noise cancelling devices since I need to be able to hear just in case I am needed. (brain damage/injury, in-home, Core 6)
Schedule dependent on others (N_c= 7; N_t= 8)	[U2] I usually wake up between 4:00 am and 5:30 am to make sure I can use the bathroom before my mom gets up to take her shower since there's only one in this house. I often have trouble falling back asleep. (Alzheimer's disease/dementia, live apart, Core 6) [U30] It is unpredictable when you are a caregiver when the patient will be awake so that is a variable. (back problems, bedpartner, Core 6) [U31] Being a caregiver, I felt I couldn't adhere to the sleep times. My life is too unpredictable and dependent on my disabled spouse. (Parkinson's disease, in-home, Core 6)

Program fit (Total: N_c= 28; N_t= 40)	
Satisfaction (N_c= 19; N_t= 25)	[U16] I believe the program is well fitted for caregivers and in general people with an ideal sense of ambition (Alzheimer's disease/dementia, live apart, Core 6) [U18] Worked for my [purpose] and was easy to get back into the swing when circumstances got me out of step. (other, in-home, Core 6) [U32] Was able to understand the concepts and apply to my situation. (Parkinson's disease, bedpartner, Core 6)
Dissatisfaction (N_c= 9; N_t= 15)	[U23] I wasn't able to complete the sections. (other, in-home, Core 1) [U26] [SHUTi] did not address my reality (Alzheimer's disease/dementia, bedpartner, Core 5) [U33] [SHUTi] didn't fit for me. (cancer, bedpartner, Core 2)
Personalization (Total[b]: N_c= 32; N_t= 43)	
Satisfaction (N_c= 15; N_t= 17)	[U3] The program gives lots of tools for dealing with different aspects of insomnia. We are all different, and you provide a wide array of things to try for different problems. (Alzheimer's disease/dementia, bedpartner, Core 6) [U17] Each caregiver's experience is different- might be better to keep it general. (other, bedpartner, Core 6) [U29] I think [SHUTi] would work for most. Common sense is to use the advice that fits one's situation and reject what does not. (brain damage/injury, in-home, Core 6)
Dissatisfaction (N_c= 19; N_t= 26)	[U28] Gear the program to specific types of caregiver schedules. Does the caregiver live with their care-receiver, or do they get to go home at night? (old age, bedpartner, Core 6) [U34] The life stories, or whatever they were called, used as examples had no relevance to my circumstances. (Alzheimer's disease/dementia, in-home, Core 2) [U35] I'm sure [a tailored program] would feel more suited to my sleep schedule and my preferences. For instance, I don't get to watch any tv until my mother sleeps, so I watch a lot of tv, tik tok, and stay awake [until] the early morning and generally get up later. My mother sleeps in and likes her morning routine in solitude. I wasn't able to tailor that as much once I started goal setting. (Alzheimer's disease/dementia, in-home, Core 6)

Anxiety, stress, and overload	
Cognitive load (Total[b]: N_c= 9; N_t= 12)*	[U21] Maybe more specific ways to turn your brain off of your caregiving responsibilities. That's something I still have trouble doing. (Alzheimer's disease/dementia, live apart, Core 6) [U24] The tricky part about following a sleep program while being a caregiver is adding one more thing "to do" to a person's already almost overloaded to do list. I actually thought I could manage it. But honestly the thought of even reading the lessons was overwhelming when I knew I should really be organizing [doctor's appointments], or grocery shopping or cleaning my house or hers. (cancer, live apart, Core 3) [U34] Everyone's experience and circumstances may be different but there are some unifying truths: Profound physical, emotional and psychological exhaustion; challenges with self-care in practice and in theory (Alzheimer's disease/dementia, in-home, Core 2) *Contrasting perspective (satisfaction):* [U36] It made me sleep sounder and avoid getting up in middle of night with my mind racing… (stroke, live apart, Core 3)
Anxiety and stress (Total[b]: N_c= 15; N_t= 25)	
Satisfaction (N_c= 10; N_t= 12)	[U2] The thinking errors are very helpful in life situations—not just for sleep problems. Not catastrophizing or using over generalization have helped when we've encountered health issues and the malfunction of several electronic/appliances. (Alzheimer's disease/dementia, live apart, Core 6) [U20] I've seen myself becoming way more aware, staying positive, looking for triggers especially the mental triggers like anxiety and how to deal with them. I feel like I've got tools and can go back to use them (autism spectrum disorder, in-home, Core 6) [U37] I felt less tired, and less stressed, so [SHUTi] worked well. (other, in-home, Core 6)
Dissatisfaction (N_c= 7; N_t= 11)	[U4] … having to deal with stuff in the middle of the night does really affect our ability to go back to sleep because of anxiety over our situation. (mobility problems, in-home, Core 2) [U7] I would have liked to see how caring for others and the anxiety and worry that comes with that can cause insomnia… (cancer, bedpartner, Core 6) [U38] The hardest thing for me was putting my worries and responsibilities aside to get a good nights sleep. I'm still not doing this every night consistently. (Alzheimer's disease/dementia, live apart, Core 6)

Behavioral therapeutic components	
Sleep window (Total: N_c= 42; N_t= 74)	
Satisfaction (N_c= 28; N_t= 34)	[U11] Helped me to be more serious about a scheduled bedtime and wake up time. My time in bed was more productive for sleep. (developmental/intellectual disorder, in-home, Core 6) [U39] My sleep has been more productive lately. By staying up later, I have been sleeping through the night. But getting up early on my days off is really hard. (mobility problems, in-home, Core 6) [U40] ... I do NOT enjoy staying up that late (2 am) BUT, the sleep that I get now its much better quality than the joke for sleep I had been living with for years now before participating in this study. THANK YOU for teaching me a new way, and enhancing my life tenfold.... (cancer, live apart, Core 6)
Dissatisfaction (N_c= 23; N_t= 40)	[U24] …Plus limiting the window of sleep when you're so exhausted was scary when I was worried about being able to care for my mom if I didn't nap or was so tired to drive her. (cancer, live apart, Core 3) [U31] Being a caregiver, I felt I couldn't adhere to the sleep times. My life is too unpredictable and dependent on my disabled spouse. (Parkinson's, in-home, Core 6) [U41] Towards the end, it got hard to stay on task with the recommended sleep window due to problems resurfacing with my child whom I provide care for (mental/emotional illness, in-home, Core 4)
Sleep routine (N_c= 13; N_t= 17)	[U5] SHUTi helped me to push myself to keep a sleep routine which improved my sleep. It didn't always work out due to my caregiving responsibilities, but my sleep isn't as chaotic as it was before I started this program…. (other, bedpartner, Core 6) [U25] Helping me get into a solid sleep routine with mostly adequate sleep and sticking to a routine of getting up and going to bed at the same times every day (developmental/intellectual disorder, bedpartner, Core 6) [U42] [SHUTi] taught me the importance of maintaining a consistent sleep routine. (Alzheimer's disease/dementia, live apart, Core 6)
Need all sleep possible (N_c= 4; N_t= 7)	[U22] … I cannot give up what little time I have to sleep in the hopes of improving my sleep in the future. I need to be able to function day-to-day. (Alzheimer's disease/dementia, bedpartner, Core 2) [U29] My caregiving sometimes affects my sleep but doesn't usually occur over night. For someone who does a lot of caregiving at night it be would be more challenging. The recommendation to reduce sleep would be difficult to someone who is just trying to catch sleep in whatever moments they can (brain damage/injury, in-home, Core 6)

Sleep diary (Total[a]: N_c= 34; N_t= 50)	
Dissatisfaction (N_c= 6; N_t= 7)	[U3] I also think that a person cannot accurately report all the sleep times you request without a band such as FitBit or Amazon's Halo. (Alzheimer's disease/dementia, bedpartner, Core 6) [U9] Some days I was just too busy and tired to record or enter all the data. (developmental/intellectual disorder, in-home, Core 4) [U43] Sleep diary interrupted morning routine. (Alzheimer's disease/dementia, bedpartner, Core 6)
Satisfaction (N_c= 29; N_t= 43)	[U2] It was helpful to have the flexibility of entering my sleep diaries when I had time. I modified the chart for recording my sleep diary for a week at a time. I printed them and kept a copy handy to record accurate information. As a caregiver, I have many responsibilities and I am on duty 24/7. The diaries are easy to enter into the system, and doesn't take much time when it's completed each day. (Alzheimer's disease/dementia, live apart, Core 6) [U14] I mostly did not have problems completing the journals or recommendations. I did them around my schedule with my husband (cancer, in-home, Core 6) [U44] The diary made me much more aware of my sleep habits and reduced the stress of worrying about sleep. (mobility problems, live apart, Core 5)
Stimulus control (Total: N_c= 9; N_t= 12)	
Dissatisfaction (N_c= 3; N_t= 3)	[U29] The advice which I did not take was to get up and do something if I could not get back to sleep. I know myself and that would be something which would cause me to not return to sleep at all. Instead I chose to limit my stimulus, get up and get my sleep mask or apply lotion to help me relax… (brain damage/injury, in-home, Core 6) [U31] If my husband needed me in the middle of the night, I often would not be able to go back to sleep. It was difficult to go in another room and to read. (Parkinson's disease, in-home, Core 6)
Satisfaction (N_c= 7; N_t= 9)	[U28] The most helpful things were learning about the impact of listening to radio or TV while in bed. I did find that stopping this behavior helped me to fall asleep easier. … (old age, bedpartner, Core 6) [U33] Many don't understand that just sleeping in it being lazy in bed can hurt your sleep pattern (cancer, bedpartner, Core 2) [U45] I think people don't realize they aren't sleeping the right way. I always used my bedroom for just sleeping. I know lots of people that watch tv and read [books] in their bedrooms. I don't do that. I never realized it makes a huge difference. (mobility problems, in-home, Core 6)

Healthy sleep tools (Total: N_c= 36; N_t= 56)*	[U3] All the different tools for getting to sleep. The sleep rules, especially setting up a before-bed routine, not napping, and getting up if not asleep after 20 minutes. Telling me not to try to go to sleep. Don't go to bed unless you are sleepy... (Alzheimer's disease/dementia, bedpartner, Core 6) [U17] [SHUTi] has approaches that would never occur to average person and it's pretty easy to do. Big bang for the effort involved (other, bedpartner, Core 6) [U46] I liked the tips and guidance on actions to try to improve quality and amount of sleep. (Parkinson's disease, live apart, Core 6) *Contrasting perspective (dissatisfaction):* [U41] …the recommendations were generally helpful but not tailored enough to my personal situation…. (mental/emotional illness, in-home, Core 4)
Sleep hygiene (N_c= 7; N_t= 7)	[U18] Better schedule and before bed habits (other, in-home, Core 6) [U28] The sleep regimens, and information on environmental influences, could benefit people who don't practice these. (old age, bedpartner, Core 6) [U42] The sleep diaries were a helpful technique to train me to pay attention to my sleep hygiene.... (Alzheimer's disease/dementia, live apart, Core 6)

Note: Themes, codes, and subcategories are listed in order of presentation in-text, which is ordered largely to present concepts in order of frequency. Words in brackets have been modified for clarity or spelling

*Quotes presented broken down by (dis)satisfaction subcategories only when ≥3 quotes within each subcategory – asterisk denotes where quotes reported altogether

[a]Includes 1 additional quote that did not clearly fit within the *Dissatisfaction* or *Satisfaction* domains

[b]Includes 2 additional quotes that did not clearly fit within the *Dissatisfaction* or *Satisfaction* domains