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Featured Article

Feasibility of the Remembering Warmth and Safeness Intervention in older ADRD caregivers

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ABSTRACT

Background: The number of older adults in the U.S. living with ADRD is projected to increase dramatically by 2060. As older adults increasingly assume informal caregiving responsibilities, community-based intervention to sustain caregiver well-being is a dementia research priority.
Objective: To evaluate the feasibility of the RWSI among older ADRD caregivers. The RWSI is informed by the Neurovisceral Integration Model, in which memories that engage safety signals cultivate feelings of safety and well-being.
Methods: A within-subjects pre/post-intervention design with older ADRD caregivers to evaluate feasibility (acceptability, demand, fidelity) and empirical promise (well-being).
Results: The feasibility of the RWSI, implemented with fidelity, was strongly endorsed, as participants attended each intervention session, after which reported experiencing feelings of warmth and safeness, and provided the highest possible acceptability ratings. Participant narratives provided corroboration.
Discussion: Findings support the feasibility of the RWSI in older ADRD caregivers, providing the basis for continued research.

Introduction

By 2060, the number of adults in the U.S. aged 65 and older living with Alzheimer Disease and related dementias (ADRD) is projected to increase by 128 % to 13.85 million,[1] substantially increasing the demand for caregiving resources. ADRD is progressive and life-limiting, characterized by functional, cognitive, and behavioral impairment; care recipients may live for years after diagnosis, with increasing reliance on close others as informal caregivers.[2] The home is the nexus for ADRD care; informal caregivers are an essential resource, providing for the care recipient to remain at home from diagnosis to end-of-life.[3] Older adults are increasingly assuming informal caregiving responsibilities, with a critical need for resources which enable them to live well across the dementia trajectory.[4] Given the increasing prevalence of ADRD, community-based interventions supporting older caregivers to sustain their well-being is a priority for dementia research.[5,6]

ADRD informal caregiver intervention research is primarily derived from the stress and coping paradigm, evaluating psychoeducational and cognitive behavioral approaches to manage pragmatic challenges and reduce burden in the context of care demands.[7] A growing body of literature acknowledges the positive aspects of ADRD caregiving, conceptualized as the positive secondary appraisal of managing care demands.[8] Across studies, caregiver well-being is most frequently conceptualized in terms of deficit and burden.[9,10] There is some evidence that caregiving burden, depression, and distress are responsive to intervention, but effects are typically small and are not sustained.[11–13] A systematic synthesis of psychosocial interventions for caregivers providing care in the home reported a lack of evidence of effectiveness for most interventions.[14] Similarly, a systematic review and meta-analysis of interventions fostering positive aspects of caregiving reported no significant effects.[15] Limitations of this research include a deficit orientation in conceptualizing the problem targeted by intervention,[16,17] ill-defined principle-based critical content,[17] and the absence of theory-based mechanisms of change,[13] which leave much of the available evidence equivocal.

Advancing the next generation of ADRD caregiver intervention will require novel theoretical perspectives, clearly defined critical

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content, and mechanisms of change contributing to well-being as a process of growth toward potential.[18,19] The Neurovisceral Integration Model provides a novel theoretical perspective in which feeling safe provides the scaffolding for sustained well-being.[20,21] Feeling safe is a distinct affective regulation system characterized by warmth, contentment, and safeness.[22,23] Compared to positive affect (e.g. activation/happiness) and negative affect (e.g. threat/defense), feeling safe predicts unique variance in perceived stress, social support, and depressive symptoms.[24,25] Feeling safe relies on learned safety signals, cues communicating protection and comfort, which inhibit the threat/defense response.[26,27] Safety signals in familiar patterns and coherence, continuity in sense of self and relationships, and enduring close connections serve emotional and physiological regulatory functions across the lifespan, thereby contributing to well-being.[20,21,28]

In contrast to the stress and coping paradigm, the Neurovisceral Integration Model proposes that the default response in humans is threat/defense, with prolonged sympathetic dominance and diminished well-being.[29,30] The threat/defense response is active in the absence of recognized safety signals.[20,21] Prefrontal-subcortical inhibitory neural pathways enact the regulatory response to threat/defense and safety and are linked to the heart via the vagus nerve.[29,30] The neural circuits in the regulatory response to threat/defense and safety include the amygdala, which detects emotionally salient stimuli in the environment; the hippocampus, which is involved in learning and memory; and the medial prefrontal cortex (mPFC), which regulates reactivity of the amygdala.[26,30] Engaging safety signals inhibits the amygdala through the input of the ventromedial prefrontal cortex (vmPFC) and hippocampus, with parasympathetic dominance and the experiential "felt sense" of warmth and safeness contributing to well-being.[21,31,32]

Memories from the past which engage safety signals are associated with feeling safe in the present.[32] In cross-sectional studies with mid-life and older adults, memories of warmth and safeness are positively associated with emotional and social well-being,[33–35] and increased feelings of safety and connectedness.[36–38] In longitudinal studies, memories of warmth and safeness are positively associated with flourishing as a measure of well-being,[39] and better physical and emotional well-being.[40,41] Qualitative research exploring the experience of ADRD informal caregivers document the ways in which memories of warmth and safeness contribute to well-being.[42] Memories of family traditions and familiar everyday rituals provide a sense of coherence, fostering predictability in comforting, close connections.[43–45] Memories promote continuity, a perspective of the self, embedded in close relationships across time, essential for well-being in later life.[46] ADRD caregivers seek continuity in their sense of self and relationships with loved ones; reflecting on memories offers comfort and familiarity in response to an uncertain future.[44,47] Reliving of valued moments was a primary theme among ADRD caregivers better prepared for the death of the care recipient.[48] Memories strengthen social connection and re-experiencing bonds in close relationships, and offset loneliness by increasing a sense of togetherness and mutual support.[49] Eliciting memories of warmth and safeness may make a significant contribution to ADRD caregiver well-being; however, this approach has not been integrated into evidence-based intervention for older ADRD caregivers.

Consistent with these findings, we propose the Remembering Warmth and Safeness Intervention (RWSI), in which engaging safety signals in memories of warmth and safeness cultivate feelings of safety and contribute to eudaimonic well-being, a process of growth toward potential in older ADRD caregivers. Remembering warmth and safeness is distinct from autobiographical approaches in gerontology such as life review and reminiscence.[50] Autobiographical memory is used to construct a life narrative that is linear and coherent by recalling events from the personal past. Life review and reminiscence facilitate problem solving and cognitive reappraisal of challenges to the self or resources in "big stories" of momentous life events, disruption, and turning points.[50,51] Interventions provide for the reconciliation of positive and negative memories, including evaluating and accepting conflicts and regrets.[51] In contrast, Remembering Warmth and Safeness relies on episodic memory to cultivate feeling safe in every day "small stories" which provide a positive self-referential reliving of the past.[52] Rather than attempting to create a single and linear life story, memories of warmth and safeness are linked to a specific time and place, characterized by the experiential felt sense of safety, warmth and comfort.[23,24] This early-stage research aimed to evaluate the RWSI feasibility in the target population. Feasibility studies produce a set of findings which inform recommendation for further testing.[53,54] Here, we address the feasibility of the RWSI among older ADRD informal caregivers in terms of acceptability, demand, fidelity in delivery, and empirical promise.

Methods

Design

We conducted an NIH Stage 1b intervention development study.[55] A single group pre/post-intervention design was used to evaluate the feasibility of the RWSI in community-dwelling ADRD caregivers (Fig. 1). The RWSI was delivered in up to 60-min sessions, once per week for 6 weeks (Week 2-Week 7). Data collection took place at pre-intervention (T1) (Week 1) and post-intervention (T2) (Week 8) in the home or private location, conducted by a trained Research Assistant with established inter-rater reliability using standardized procedures. The Institutional Review Board at Arizona State University approved the study protocol.

Participants

Treatment-only group designs that involve a small number of cases are recommended for early-stage research prior to randomized-treatment/control group designs. Due to the preliminary nature of the research, the primary aim of feasibility, unknown empirical promise, and limited resources, this study was not powered to evaluate intervention efficacy.[56] Enrollment in the feasibility study was limited to five older adult ADRD informal caregivers to evaluate whether the RWSI could be successfully deployed in a community context,[53,54] In addition, although the sample size is small, Anderson and Vingrys[57] note that statistical inference, which we apply to our participant rated feasibility measures, can be conducted to infer whether sample results apply to a larger population. Change in well-being was also explored to provide a preliminary indication of empirical promise.[55]

Community-dwelling older adult ADRD caregivers were eligible to participate if they met the following inclusion criteria: (a) self-described informal caregiver; (b) $\geq$ 60 years of age; (c) able to speak and understand English; (d) cognitively intact; (e) able to hear; and (f) available to participate in the RWSI protocol over the course of 8 weeks. Age documented in years using the date of birth, ability to speak and understand English, hearing, and availability to participate in the study were evaluated by self-report during screening. Cognitive status was evaluated using the Telephone Interview for Cognitive Status (TICS).[58] The TICS is a widely used telephone evaluation method for evaluation of cognitive function and is highly correlated with the Mini-Mental State Exam.[59]

Procedure

Recruitment of community-dwelling ADRD caregivers used in-person presentations describing the study in partnership with community centers. Those interested in learning more about the study

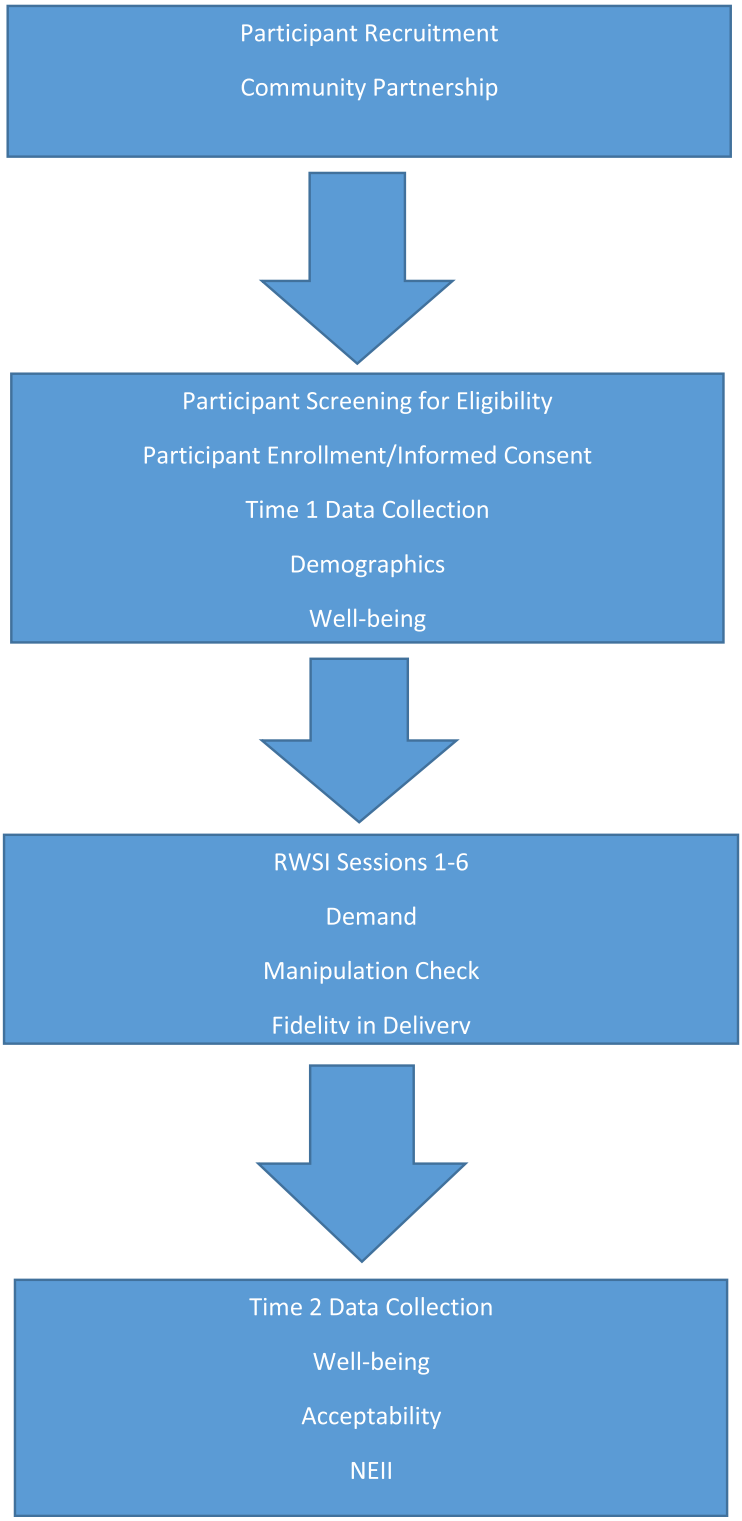

Fig. 1. RWSI Process.

were asked to contact the RWSI Research Office, during which telephone screening for eligibility was scheduled. Eligible participants received an in-person interview by a trained Research Assistant to obtain written informed consent and complete baseline (T1) measures. To address barriers to retention, procedures were used which have yielded excellent retention rates in community-based research with older adults.[60,61] Information shared was written at a 6th-grade level, describing the RWSI, number of sessions, and scheduled data collection. The RWSI was delivered in the home or location chosen by the participant and delivered based on their schedule to minimize burden. Each participant received a detailed calendar with RWSI session dates and times scheduled in collaboration with the Research Team and clearly marked, along with contact information for the interventionist and Research Office, acknowledging that circumstances and scheduled dates might change. Participants received a $20 gift card at each measurement time point.

Remembering Warmth and Safeness Intervention

The RWSI was delivered in up to 60-min sessions, once per week for 6 weeks (Week 2-Week 7), for a total of 6 h of intervention. The RWSI dose is aligned with intervention research targeting well-being as a process of growth toward potential.[62] The RWSI was delivered using a manualized protocol, providing the basis for evaluation of fidelity in delivery.

At each of the six sessions participants were asked to: (a) remember and reflect on a memory of warmth and safeness, characterized by the "felt sense" of safeness, warmth, and comfort and (b) provide a narrative of the memory. The six sessions followed the same protocol. The memory for each session was chosen by the participant; memory prompts reflecting familiarity and coherence, continuity in self and relationships, and enduring close connections were provided at each session[20,28]: (a) memories of childhood (family, pets, schoolmates); (b) memories of shared traditions (family dinners, Thanksgiving); (c) memories of special places (childhood home, travels); (d) memories of social connection (time spent with loved ones, friends); (e) memories of familiar routines (home making, shared rituals); (f) keepsakes associated with memories (photographs, cherished objects). Follow up questions elicited experiential feelings and sensory aspects of the memory; sight, smell, sound, touch, and taste.[63] The RWSI was delivered individually, face to face and in person, emphasizing reciprocal interaction, kind and engaging facial expression, eye contact, and prosodic voice.[64,65] Narratives were audio recorded to evaluate fidelity in delivery and as a manipulation check. Participants were provided with a recording of their narratives at their request; however, participants could choose not to be recorded at any time.

Measures

Data collection took place at pre-intervention (T1) (Week 1) and post-intervention (T2) (Week 8) in the home or private location by a trained Research Assistant with established inter-rater reliability. Data included: (a) demographic data and pre-intervention well-being (T1), and (b) acceptability data and post-intervention well-being (T2). Data addressing RWSI demand and fidelity in delivery were collected throughout the study.

Demographic characteristics at T1 were measured by self-report as: (a) age in years; (b) gender; (c) race; (d) ethnicity; (e) education in years; (f) marital status, and (g) employment status. A health history provided data related to chronic conditions.

Acceptability was evaluated with five items measuring enjoyment, perceived benefit, practicality, fit with values, and opportunity cost (1=not at all, 5=very much).[66] Participant experiences of the RWSI were also explored qualitatively using the Narrative Evaluation of Intervention Interview (NEII).[67] The NEII explores intervention processes and outcomes, including the perceived benefits of the intervention and the ways in which the intervention might be improved, as a guide for future trials.

Demand was evaluated in terms of the adequacy of inclusion criteria, attendance, and attrition. Attendance Logs were used to track attendance over time. Attrition Logs recorded when and why participants withdrew from the study, to identify acceptable and unacceptable intervention attributes, and to classify attrition as due to death, illness, or at random.[68]

The RWSI was evaluated in terms of fidelity in delivery.[69] Fidelity in RWSI delivery was evaluated by the interventionist following each session using an established Index of Procedural Consistency, specifying the extent to which RWSI sessions were delivered as planned (1=not at all, 3=very well). Field notes addressed the time spent in each session to quantify RWSI dosage and participant response, with attention to the potential for participant burden and/or adverse events.[70] Audiotaped sessions were similarly reviewed ($\geq$25 %) by the Research Team, with deviations in protocol addressed. Manipulation check following each RWSI session evaluated the felt sense of warmth and safeness (1=not experienced, 5=strongly experienced). Transcribed narratives from each RWSI session were explored qualitatively as an indirect manipulation check of critical content in themes of familiarity and coherence, continuity in self and relationships, and valued social connections.[71]

Well-being was measured with the Psychological Well-Being Scale (PWB),[72] an 18-item measure of eudaimonic well-being as a process of growth toward potential . The PWB provides both a total scale score and scores for each of six subscales: (a) Environmental Mastery, flexible integration of experiences, purposeful function in response to environmental demands; (b) Purpose in Life, clarity in sense of self and direction, movement toward personal potential; (c) Positive Relations with Others, trust, care, belonging and connection with others; (d) Self-acceptance, acknowledging and accepting aspects of the self; (e) Personal Growth, self-development, openness to experience; and (f) Autonomy, self-determination, regulating behavior in alignment with personal values. The PWB has established psychometric properties in older adults (α=0.94, α= 0.70–0.84 for subscales).[72]

Data analysis

Descriptive statistics were used to summarize demographic characteristics and quantitative measures of feasibility and empirical promise. In addition, we used a binomial test to assess whether we could infer that a majority of the population (i.e., > 50 %) rate the intervention as acceptable and that intervention sessions engendered feelings of warmth and safeness. To do this, we classified participants into one of two groups: those whose average score for each of these focal measures (acceptability, warmth/safeness) was at or above the midpoint for a given scale (coded as 1) or below the midpoint (coded as 0). We then used a one-sample, one-tailed, exact binomial test for these outcomes, with alpha = 0.05 and null proportion = 0.50. With these specifications, a significant test result indicates that more than 50 % of the population supported the intervention for the variable being rated. Change in well-being, a secondary measure, was assessed using pretest-posttest mean differences (MD) and standardized mean differences (SMD), the latter computed as the raw score difference divided by the baseline standard deviation. For each participant, well-being scores for the total scale and each subscale were obtained by computing the mean score across scale items (with each item measured with a 6-point scale). We also report the number of participants who reported an improvement in well-being from pretest to posttest. Qualitative descriptive methods were used to characterize NEII data and participant narratives in RWSI sessions. Qualitative descriptive methods allow an understanding of participant experience in everyday language and with minimal interpretation.[73] A directed approach to qualitative content analysis provided a systematic process of coding and identifying themes/patterns in the data.[74] Data were coded across transcripts, using constant comparative analysis to group conceptually similar codes into categories reflecting dimensions of intervention acceptability in the NEII, and critical content in themes of coherence, continuity, and connection in memories of warmth and safeness. Codes and categories which fell outside of the critical content were included in analysis, balancing structure with the ability to generate inductively derived categories.

Results

Sample characteristics

Participants were community-dwelling informal caregivers of people with ADRD in the moderate to severe stage. Participants were

aged 68–85 (*M* = 76.2, SD=7.2), 80 % female, 80 % non-Hispanic white, and 20 % Hispanic, with 60 % caring for a spouse, and 40 % caring for another family member. Level of education in years ranged from 12 to 18 (*M* = 14.2, SD= 2.5). All participants had diagnosed chronic conditions (*M* = 4.0, SD=2.4).

Intervention acceptability

Participants evaluated each aspect of the RWSI as very acceptable (*M* = 5.0 for each item). The exact binomial test (*p*=.031) indicated that the percentage rating the intervention as acceptable exceeded 50 % in the population. Participant experiences engaging in RWSI were explored qualitatively using the NEII.[67] NEII qualitative data support the experience of participating in RWSI as very positive:

"The things you don't think about, but then you do think about – it makes me feel good, I mean really good."

"It made me think – remember things I think I'd forgotten. My heart is just so uplifted."

"The bottom line is that it made me very happy to go back and look at all this."

While participants shared some memories involving the care recipient, they valued the opportunity to focus on themselves, framing participation in the RWSI as an act of self-care:

"I have worry, so much worry. But this is something for me – wonderful feelings and meanings and memories."

"Being a caregiver, you're just doing what you can in the moment you're thinking of, like washing the dishes, thinking 'Well I'm going to cook for you, what you can eat, what you can't eat'- here, it's taking all the problems and leaving them to the side, and just kind of remembering things being so nice."

Some participants noted that they were initially hesitant to enroll in the study as they felt that they may not have good memories, important memories, or the "right kind" of memories to share; all were surprised at the memories elicited:

"It's hard to remember the good memories – but now I can think of a lot of them that just start bubbling up."

Participants suggested that the intervention might be improved by providing additional direction and narrative prompts to elicit memories of warmth and safeness; however, they also acknowledged that extensive direction may have changed the experience:

"It would be better if I could be more prepared, but then I don't think that it would be the same."

"If you could say 'ok, these are the memories that we're going to be discussing the first week' I would try to make little notes and put the memories in one place because I was jumping all over the place about my memories."

Intervention demand

All participants recruited met the inclusion criteria and were enrolled in the study. Participant retention was at the highest level possible, 100 % over the six sessions and T1-T2 measurement. Rescheduling of intervention sessions was minimal and due to unforeseen medical appointments.

Intervention fidelity

Fidelity in delivery of RWSI assessed using the Index of Procedural Consistency showed little deviation from critical content (*M* = 2.7, SD= 0.48) across 30 sessions. Review of audiotaped intervention sessions was consistent with the Index of Procedural Consistency, and confirmed that > 80 % of sessions were delivered as planned. No adverse events were reported. Manipulation check following each RWSI session evaluated the felt sense of warmth and safeness as strongly experienced across all 30 sessions (*M* = 4.9, SD=0.25). The exact binomial test (*p* = .031) indicated that the percentage experiencing the intervention as the "felt sense" of warmth and safeness exceeded 50 % in the population. Transcribed narratives from each RWSI session were explored qualitatively as an indirect manipulation check of critical content. Narratives reflected familiarity and coherence, continuity in self and relationships, and affectionate close connections, and were characterized by warmth and comfort. Participants re-visited memories of familiarity and coherence in rituals and traditions centered on home, family, and friends:

"Those were the best times, Thanksgiving, Easter, new clothes for Easter of course. And we would have a big dinner at someone's house. Those were good, good events."

"Mother would take us, it was a big deal, we would go to Woolworths and eat at the counter, and they had a fountain and all."

"On Sundays we would go for a drive. We would get ice cream cones, and you know, sunny day, it was great. It was nothing, but in those days, it meant something to us, you know doing stuff as a family."

Memories brought the past into the present, with continuity in self and relationships:

"I learned to sew when I was about 9 years old and all my life I made everything for the house and for me. If I didn't sew every single day then something was wrong."

"I remember walking down to a picnic area. My mother, the night before, made a large Pyrex yellow bowl of potato salad. Now I look back and I have that set of Pyrex dishes. And the yellow bowl is not as big as I remember when I was little."

In memories of warmth and safety, participants rekindled enduring close connections:

"My grandma was a safe place for me, that feeling of safety. I am playing in the cherry trees. Help them pick the cherry trees, having grandma's cherry pie."

"It was just good times when it was just mother and I. We'd go to church, then we come home, we do things around the house like we did. We still worked on Sundays, but it didn't matter if we had to do things, we would always do it together. We liked to cook – so we cleaned vegetables together and would just talk and you know, listen to the radio."

Well-Being

For the quantitative assessment of well-being, Table 1 shows that the majority of participants (3 of 5) improved on the well-being total score from pretest to posttest, with a standardized mean improvement of *d* = 0.30. Across the well-being subscales, the greatest mean

Table 1
Results for Well-Being ($N = 5$).

Variable	Pretest *M* (*SD*)	Posttest *M* (*SD*)	*MD*	*SMD*	n^a
Well-being total	4.58 (0.43)	4.71 (0.64)	0.13	0.30	3
Well-being subscales					
Autonomy	4.93 (0.55)	4.80 (0.51)	−0.13	−0.24	1
Environmental mastery	4.40 (0.89)	4.73 (0.95)	0.33	0.37	4
Self-mastery	5.00 (0.41)	5.00 (0.85)	0.00	0.00	3
Personal growth	4.67 (1.13)	4.60 (1.32)	−0.07	−0.06	1
Positive relationships	4.27 (1.01)	4.60 (1.32)	0.33	0.33	3
Purpose in life	4.20 (0.87)	4.53 (1.28)	0.33	0.38	4

Note: *MD* = mean difference; *SMD* = standardized mean difference, computed as the raw score difference divided by the baseline standard deviation. For each participant, scores for each scale (or subscale) were obtained by computing the mean score across scale items (with each item measured with a 6-point scale).
n^a is the number of participants whose score increased from pretest to posttest.

increases occurred for environmental mastery ($d = 0.37$, with 4 participants improving), purpose in life ($d = 0.38$, with 4 participants improving), and positive relations with others ($d = 0.33$, with 3 participants improving).

Discussion

This early-stage study supports the RWSI feasibility in older ADRD caregivers.[55] The RWSI was found to be highly acceptable to older ADRD informal caregivers in this study. Specifically, each participant gave the highest possible rating for each item on the acceptability scale, including enjoyment, perceived benefit, practicality, fit with values, and opportunity cost.[75] Qualitative data from the NEII provided an additional understanding of the ways in which participants may have benefitted from the RWSI, as well as provided information for improvement in recruitment materials and RWSI narrative prompts. Participant recruitment was conducted in partnership with community centers serving older adult caregivers, which is a strength in intervention research with older adults.[76] The delivery of RWSI was feasible in ADRD caregivers living independently in the community setting, advancing understanding of the realities of community-based intervention in early research. Demand for RWSI was evidenced by appropriate inclusion criteria, excellent attendance and no attrition. The RWSI was delivered as planned; fidelity in intervention delivery was supported based on the Index of Procedural Consistency and evaluation of audiotaped RWSI sessions. While older ADRD caregivers had diverse life experiences and memories, the Neurovisceral Integration Model informing the RWSI specifies the regulatory brain-heart response to safety signals, including the experiential "felt sense" of warmth and safeness contributing to well-being.[21,31,32] Indeed, manipulation checks confirm that participants strongly experienced warmth and safeness in the RWSI sessions. Participant narratives remembering warmth and safeness reflected familiarity and coherence, continuity in self and relationships, and valued close connections. While some memories involved the care recipient, the narratives elicited did not position participants in the role of caregiver or address pragmatic challenges in caregiving demands. Rather, narratives reflected "small stories" of warmth and comfort from the life of each participant. The majority of memories were from childhood through young adulthood. In a phenomenological study of the embodied experiences and existential reflections of the oldest old, van Rhyn and colleagues[77] note the frequency with which participants recalled vividly detailed memories of childhood. Indeed, among the oldest old, memories of loved ones, belonging, shared places, and love provided a sense of peace and enduring comfort. The RWSI may improve eudaimonic well-being, with empirical promise for increase in the well-being total score, and subscales of environmental mastery, purpose in life, and positive relationships with others. When considering variation in participant response to the PWB subscales, it may be that the critical content of the RWSI align most closely with environmental mastery, purpose in life, and positive relationships. Environmental mastery, or the sense of being able to manage the environment and meet personal needs, is aligned with memories of warmth and safeness reflecting coherence and familiarity in rituals and traditions centered on home, family, and friends. Positive relationships with others, or warm, satisfying, trusting relationships, is aligned with memories of warmth and safeness reflecting enduring close connections. Purpose in life, or a sense of directedness linking the past and the present, is aligned with memories of warmth and safeness reflecting continuity in self and relationships, linking the past and the present.

Several limitations highlight directions for future research. The study was limited by the use of a pretest-posttest design with no comparison group. Alternative explanations for improvement in well-being involving threats to internal validity are possible. While the RWSI showed empirical promise in improved well-being, these results are preliminary and do not provide for a full test of the Neurovisceral Integration Model mechanisms of change.[20,78] Research is needed to test the mechanisms of change that contribute to sustained well-being.[79] The manipulation check of the RWSI sessions was aligned with research evaluating momentary feelings of safety.[80] However, future research might be strengthened by measurement characterizing change in the extent to which older ADRD caregivers experience their world as safe, warm, and soothing.[81] The sample was homogenous in terms of gender, race and ethnicity, limiting the generalizability of study findings to other older adult populations. ADRD caregiver intervention research is limited overall in racial and ethnic diversity, contributing to knowledge gaps in intervention efficacy.[82] As an exponential increase in ADRD is projected among older Black, Hispanic, and Native populations compared with non-Hispanic whites,[83] future testing of the RWSI will increase participant diversity, to better represent the population of older ADRD caregivers. Some participants shared concerns that they might not have "the right kind" of memories for the study. Blix[84] raised similar concerns when addressing the reasons that stories remain untold. Older adults may think that their experiences are not significant or worth storying, while others may have stories that do not fit with assumed norms of linearity and importance comprising a "life story."[84] Given these findings, a participatory co-design approach to the development of recruitment materials would strengthen future research. Involving older ADRD caregivers as part of the Research Team may address these concerns in future research.[76] Lack of long-term follow up in the RWSI limits current understanding of sustained effects on well-being. This is a limitation of the ADRD caregiving intervention literature in general.[18] Longer-term evaluation of RWSI effects on well-being will begin to address these gaps. In summary, the limitations of this feasibility study will inform future randomized controlled trials in terms of: (a) recruitment and enrollment representative of the larger ADRD population; (b) participatory co-design of recruitment materials and RWSI narrative prompts; (c) longitudinal design; (d) evaluation of the Neurovisceral Integration Model mechanisms of change; and (e) evaluate the sustainability of the experiential feeling of warmth and safeness.

Implications for research and practice

In the coming decades, the number of adults in the U.S. aged 65 and older living with ADRD is projected to increase dramatically, with a concomitant increase in the number of older caregivers.[1] Theory-based intervention research supporting older ADRD caregivers to sustain their well-being is a priority for dementia research.[5,6] However, data informing ADRD caregiver-related outcomes of well-being are lacking.[85] Current ADRD informal caregiver intervention research

is primarily derived from the stress and coping paradigm, with caregiver well-being conceptualized in terms of deficit and burden.[9,10] The narrow focus on burden and deficit has led to an equally restrictive view of caregiver well-being.

The RWSI has several implications for research and practice supporting well-being in older ADRD caregivers. The RWSI is responsive to calls for ADRD intervention which advance novel theoretical perspectives, clearly define critical content and mechanisms of change, and contribute to well-being.[18,19] The Neurovisceral Integration Model informing the RWSI provides a relevant theoretical and mechanistic perspective on cultivating feelings of safety as contributing to well-being.[20,21] Well-being in the RWSI is aligned with the eudaimonic tradition, as a process of growth toward potential.[72] As very few ADRD caregiver interventions evaluate eudaimonic well-being,[9,19] the RWSI may make a meaningful contribution to the literature. Memories of warmth and safeness may be a precious resource for older ADRD caregivers that can be accessed at any time, even when social opportunities are limited. Eliciting memories of warmth and safeness may make a significant contribution to ADRD caregiver well-being; however, this approach has not been integrated into evidence-based intervention for older ADRD caregivers. In the RWSI, older caregivers navigate the present by reflecting on the past; cultivating safety in memories of familiar patterns and coherence, continuity in sense of self and relationships, and enduring close connections. This early-stage study supports the RWSI feasibility and empirical promise in older ADRD caregivers, providing the basis for continued programmatic research.

Declaration of competing interest

Submission Declaration and Verification: This work has not been published previously, is not under consideration for publication elsewhere, is approved by all authors. If accepted, it will not be published elsewhere in the same form.

CRediT authorship contribution statement

Julie Fleury: Writing – review & editing, Writing – original draft, Project administration, Methodology, Investigation, Data curation, Conceptualization. **Pauline Komnenich:** Writing – review & editing, Resources, Project administration, Conceptualization. **David W. Coon:** Writing – review & editing, Resources, Methodology, Conceptualization. **Keenan Pituch:** Writing – review & editing, Methodology, Formal analysis, Data curation.

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