

RESEARCH ARTICLE

Process evaluation of a digital health intervention for dementia caregivers: Integrating active and passive measurements

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Abstract

INTRODUCTION: Research is limited on process evaluation of digital interventions for underserved dementia caregivers. This study reports the design and results from the process evaluation of Wellness Enhancement for Caregivers (WECARE) 2.0, a culturally tailored digital intervention for Chinese American dementia caregivers.**METHODS:** During the 7-week trial of WECARE 2.0, active measurement via weekly surveys and passive measurement via backend tracking were used to assess user engagement, collect timely feedback, and understand intervention mechanisms. These data were integrated to provide complementary insights.**RESULTS:** The intervention achieved a 94% follow-up rate and 82% program completion rate. Participants valued the culturally tailored multimedia content, practical resources, and asynchronous delivery, while also providing suggestions for improvement. Key mechanisms driving the intervention's success included improved caregiving skills, stress reduction, and increased social support.**DISCUSSION:** The study underscores the importance of process evaluation using mixed methods to ensure the usability and effectiveness of digital interventions for underserved dementia caregivers.**CLINICALTRIALS ID:** NCT05992467

KEYWORDS

dementia caregivers, digital health intervention, mixed-method research, process evaluation

Highlights

- Process evaluation was conducted in a digital intervention for dementia caregivers.
- Active and passive measurement were integrated in the process evaluation.
- Wellness Enhancement for Caregivers (WECARE) demonstrated high retention (94%) and program completion rates (82%).
- Data on user experiences, feedback, and intervention mechanisms were presented.

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1 | BACKGROUND

Compared to community-based in-person interventions, digital health interventions offer 24/7 access, personalized content, and greater scalability.¹⁻³ However, these interventions demand a high degree of relevance, usability, and perceived usefulness at the individual level to ensure successful adoption and continuous use.^{4,5} Process evaluation provides critical insights into the intervention process and user experience, identifying adoption barriers and facilitators, and elucidating intervention mechanisms.^{6,7}

In developing and evaluating culturally tailored and user-friendly digital health interventions, particularly for underserved populations, process evaluation serves three critical functions. First, it enables user engagement assessment, which is vital for digital interventions where direct interactions between users (i.e., participants) and program developers are typically absent.⁸ Understanding how users interact with the digital platform informs program adoption and continuous use, which are key determinants of intervention success.^{9,10} Second, process evaluation facilitates timely collection of user feedback. Digital interventions often consist of multiple components and span days, weeks, or even months. If evaluations are conducted only after the intervention concludes, the data may be subject to recall bias and fail to capture users' true experiences during the intervention. Furthermore, post-intervention evaluations often focus on overall program experiences, potentially overlooking specific feedback on individual components.¹¹ Third, process evaluation supports understanding the intervention mechanisms. Although outcome evaluations assesses program efficacy, identifying mediators requires pre-specified appropriately measured variables, which are often unavailable during early development stages, especially for underserved populations.^{4,6} Traditional process evaluation frameworks (e.g., Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) and Medical Research Council (MRC) guidance) were designed for in-person interventions and may not fully apply to digital formats^{12,13}; therefore, mixed-methods process evaluation conducted during the intervention offers comprehensive and in-depth insights into user interactions and behavior change.^{14,15}

Despite the importance, literature on process evaluation in digital intervention remains limited. Within the existing limited literature, two primary data collection methods have been employed. The first is active measurement (e.g., surveys or interviews during or immediately after the intervention), which allows direct feedback and flexible questioning, but may introduce self-report bias, participant burden, and lack of real-time context.¹⁶ The other method is passive measurement (e.g., user activity tracking via apps or sensors), which provides objective unobtrusive data that reduces self-report bias and participant burden, but lacks insights into user experience or contextual barriers.¹⁷ To date, most process evaluations have relied on a single measurement, with few integrating both active and passive measurement.

Worldwide, more than 55 million people live with Alzheimer's disease and related dementias (ADRD), and the number continues to rise.¹⁸ In the United States, 6.6 million people with ADRD rely on 19

RESEARCH IN CONTEXT

1. **Systematic review:** The authors conducted a literature review using Google Scholar and PubMed. Existing studies on digital interventions for dementia caregivers were cited, but there is limited research on process evaluation of these interventions. Relevant studies reporting process evaluation of digital interventions were included to contextualize the current research.
2. **Interpretation:** This study presents the design and results of a process evaluation for a culturally tailored digital health intervention targeting Chinese American dementia caregivers. By integrating active measurement (weekly surveys) and passive measurement (backend tracking), qualitative and quantitative data were analyzed complementarily to assess user engagement, gather real-time feedback, and explore intervention mechanisms.
3. **Future directions:** There is a critical need for culturally tailored, accessible digital health interventions for underserved dementia caregivers. Process evaluation using mixed-methods approaches can play a pivotal role in ensuring the usability, acceptability, and effectiveness of these interventions, facilitating their broader adoption and scalability.

million family caregivers. These numbers are expected to double by 2050.¹⁹ Family caregivers experience high rates of psychosocial distress and other adverse mental and physical health outcomes due to prolonged and intensive caregiving.²⁰ Minority caregivers, such as Chinese Americans, face additional cultural and systematic challenges, including immigration-related stress and limited access to health and social services, further exacerbating their distress.²¹ As the number of people with ADRD and their caregivers continues to grow, the demand for scalable effective digital interventions to reduce distress and improve quality of life will increase.^{22,23} Existing interventions rely on online meetings and phone calls^{24,25}; digital interventions delivered via smartphones or apps remain scarce,²⁶ although several pilot studies have emerged.²⁷

To address these gaps, this study reports on the design and results of the process evaluation of a digital intervention for dementia caregivers, integrating active and passive measurements. The Wellness Enhancement for Caregivers (WECARE) is a culturally tailored digital health intervention aimed at enhancing psychosocial wellbeing of underserved Chinese American dementia caregivers, delivered via WeChat, a social media app widely used by this population.²⁸ After its initial pilot,²⁹ WECARE 2.0 was developed based on user feedback. A process evaluation was embedded in the pilot of WECARE 2.0 with three objectives: (1) Access user engagement and its association with user characteristics, (2) collect timely feedback on the 7-week program, and (3) gain insights into the intervention mechanisms.

TABLE 1 Active and passive measurements: Data source and type, frequency, and domain of measurement.

	Active measurement	Passive measurement
Data source	Short survey (1–3 questions)	Backend database
Type of data	Text, audio, video, and picture	Numeric
Frequency of measurement	Weekly	Continuously
Domain of measurement	User interaction with the program, personal experience, and reflection	User activities

2 | METHODS

2.1 | Overview

As shown in Table 1, this study employed both active and passive measurements and collected data from a one-arm trial of WECARE 2.0 from October 2023 to April 2024. Passive data collection was through the backend database of WECARE, in which user activities on the program were tracked, including read counts, reading minutes, and program completion. Active data collection was through a brief weekly survey delivered as “private chat” onto participants’ WeChat accounts. These responses included audio recordings, pictures, and texts. Qualitative and quantitative data from passive and active measurements were analyzed separately but complementarily.

2.2 | The WECARE intervention

The 7-week WECARE intervention was developed to enhance the caregiving mastery and psychosocial well-being of Chinese American dementia caregivers. It was delivered via WeChat, a social media app with a penetration rate of 92% among Chinese-speaking smartphone users.³⁰ The WECARE protocol development and key features were detailed elsewhere.²⁸ Briefly, by subscribing to the WECARE official account, participants received six culturally tailored multimedia articles on their WeChat accounts 6 days a week (Monday to Saturday) for 7 weeks, with each week focused on a theme. The seven major themes included (1) facts about dementia and caregiving; (2) enhancement of caregiving skills; (3) effective communication with health care providers, care partners, and family members; (4) problem-solving skills for caregiving stress management; (5) stress reduction and depression prevention; (6) practice of self-care and health behaviors; and (7) social support and local resources. All multimedia articles required 3–6 min of read time. Embedded in the articles were pictures, short video clips, and downloadable forms; all articles were culturally tailored for the target population and accompanied by audio recordings in case some caregivers preferred listening to audio recordings over reading texts. Three moderated group meetings were held at Weeks 3, 5, and 7 to facilitate social networking. Participants could also use the group chats for additional networking and peer support to exchange care-related information and share personal experience. The official account of WECARE had a backend database that man-

aged intervention delivery and tracked user activities.^{28,29} WECARE 2.0 included enhanced features to enhance caregiving mastery and stress reduction. For example, it included case studies illustrating problem-solving strategies and additional video and picture demos on stress management techniques. Location-specific resources were also included to better address user needs.

2.3 | Participation eligibility

WECARE was developed for Chinese Americans dementia caregivers with limited English proficiency. Participant eligibility criteria were (1) 21 years or older, (2) self-identify as Chinese or Chinese American and currently living in the United States, (3) own a smartphone and use WeChat, and (4) currently care for a family member or loved one with ADRD and provide care for more than 8 h a week. The exclusion criteria were (1) signs of severe intellectual deficits or psychotic disorders, or (2) the care-recipient is in hospice care or has less than 6 months of life expectancy.

2.4 | Participant recruitment

Participants were recruited through two sources. One was through our community partners serving people with ADRD and their caregivers in the New York and Washington DC areas. The other was the University of California San Francisco Collaborative Approach for Asian Americans, Native Hawaiians, and Pacific Islanders Research Education registry, a publicly available registry of Asian American older adults interested in ADRD research.³¹ Recruitment flyers were distributed via email or WeChat; individuals who expressed interest in the study were directed to call a designated phone number. A trained research staff conducted a phone screening to assess eligibility based on the criteria outlined.

2.5 | Ethics approval

This study protocol was approved by the George Mason University Institutional Review Board (IRB# 2069332-1). All eligible participants had a one-on-one online meeting or phone call with a research staff who explained the study procedure and answered all questions.

Participants provided verbal informed consent before enrollment. They received a gift card of \$100 for completing the 7-week WECARE trial and pre-post surveys, along with an additional \$5 gift card for each completed weekly assessment.

2.6 | Active measurement on user experience via weekly assessment

Table 1 details the process evaluation measures used in the study, along with data sources, type, and frequency. Prior to the intervention, participants were informed of the weekly brief survey to be sent each Sunday to their WeChat accounts. This strategy leveraged the WECARE program's WeChat platform and its multimedia communication capacities (i.e., text, images, audio, and video). Each survey consisted of one to three simple questions such as "how were you feeling in the past week" and "have you applied what you've learned from WECARE in your life?" Research staff monitored participants' responses and provided support when needed. Figure 1 is a schematic illustration of the private chat of WeChat used for this purpose.

2.7 | Passive measurement on user engagement via the backend database

The backend database of WECARE delivers program components on a preset schedule and tracks the user activities on the WECARE official account (Table 1). Three key indicators were monitored for each participant. (1) Read counts: the number of times program components (e.g., multimedia articles) were opened, measured by week. (2) Reading minutes was the total time (measured in minutes) spent on the program, measured by week. (3) Completion rate was the percentage of all program components completed, measured by week.

2.8 | Data analysis

We organized all the data into a metric and analyzed both quantitative and qualitative data separately complementarily. This allowed us to identify consistent themes that address the preset research questions and capture additional findings related to the predetermined research questions. Data analysis started with linking active measure data (weekly surveys) and passive measurement data (backend database) via participant IDs. Key variables in the dataset included completion rate, read counts, reading minutes, weekly survey responses including text and multimedia, and time stamp of data collection. To address the research questions, the following analyses were conducted. First, we conducted quantitative analysis by analyzing the descriptive statistics, including the number of responses received each week, their relationships with participant characteristics, and the trends over the seven weeks. Missing values were processed with multiple imputations.³² Second, we analyzed the text data using thematic content analysis following the steps outlined by Ryan and Bernard.³³ The thematic anal-

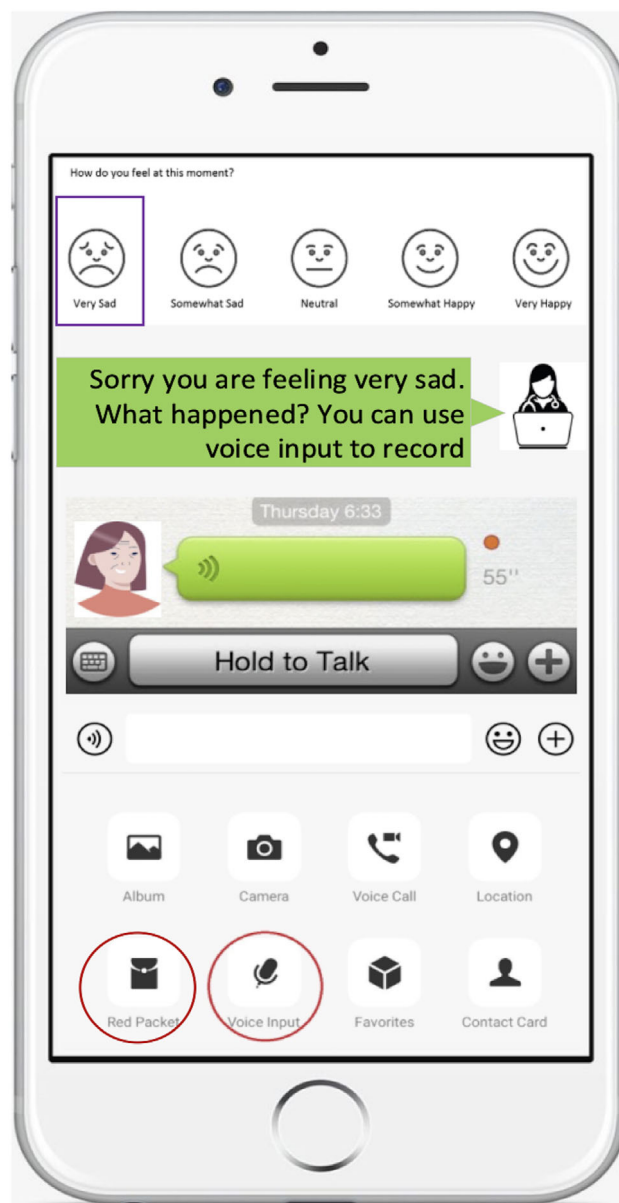


FIGURE 1 This figure illustrates the WeChat interface that participants used to interact with the researchers through private chat. Participants can send messages in various formats, including text messages, emojis, and voice message, to share their comments and reflections.

ysis of the qualitative data followed an inductive approach, allowing themes to emerge directly from participants' responses. To ensure coding consistency, intercoder reliability was established. Two bilingual researchers independently coded the text data and identified themes. A table was then created to summarize major themes, key insights, and illustrative quotes. Then the research team discussed the codes, themes, and quotes to resolve discrepancies until a consensus was reached. And finally, quantitative and qualitative data were compared to identify patterns of engagement and interaction and triangulated to identify additional insights on how different types of content attract readers and foster engagement.³⁴

TABLE 2 Three measures of user engagement by week tracked by the backend database (N = 45).^a

Week	Read count, ^b mean (SD)	Reading minutes, ^c mean (SD)	Completion rate, ^d percentage (SD)
1	13 (4.4)	25 (18.7)	97 (6.2)
2	10 (6.3)	28 (23.3)	92 (16.7)
3	6 (4.3)	15 (21.9)	88 (24.2)
4	9 (5.2)	22 (22.5)	83 (26.2)
5	8 (5.7)	31 (43.8)	77 (34.6)
6	7 (3.9)	20 (31.6)	75 (31.4)
7	6 (3.9)	20 (27.1)	77 (32.8)
Mean	8 (2.4)	23 (4.9)	84 (7.9)

^aNumber of participants who completed the trial.

^bRead count: Average number of times WECARE program was opened each week per participant.

^cReading minutes: Average total reading minutes on WECARE each week per participant.

^dCompletion rate: Percentage of program components completed each week per participant.

3 | RESULTS

3.1 | User engagement and its relationship with user characteristics

Of 48 participants enrolled at baseline, 45 (94%) completed the 7-week WECARE program. Table 2 presents three indicators of user engagement by week tracked by the backend database. On average, participants opened WECARE program eight times, spent 23 min engaging with the program each week, and completed 84% of the 42 articles delivered over 7 weeks. Read counts varied from 6 to 13; reading minutes ranged from 15 to 28, and 75~97% articles were completed each week. Weekly data showed that participants were most engaged in Week 5, followed by Week 6 and Week 7. In terms of active measurement of user engagement, participants completed nearly 50% of the weekly surveys, with a range of 42%–58% over 7 weeks. They submitted a variety of responses, including 132 texts messages, 14 audio or video recordings, 9 pictures, and 2 emails, as shown in Figure 2.

Table 3 displays participant demographic characteristics and their relationship with user engagement. Among the 45 participants who completed the intervention trial, the mean age was 64 years (SD = 12), 91% were female, and 80% were married or living with a partner. On average, they had lived in the United States for 29 years (SD = 12), and 27% had difficulty paying for the basics. Their average age of care-recipients was 83 years (SD = 8), and 58% were female. A total of 76% of caregivers and care-recipients lived together, with 36% being spouses and 51% being children. No significant relationship was observed between participant's demographic characteristics and user engagement.

3.2 | User feedback on the program

Participants provided rich, real-time feedback through weekly assessments submitted via WeChat. These multimedia responses—text,

audio, video, images, and emojis—offered valuable insights into their experiences with the WECARE program. Qualitative data were thematically analyzed and organized under three subthemes: Cultural Relevance, Usability and Accessibility, and Perceived Impact of the Intervention. A summary of representative participant quotes is presented in Table 4.

Under Cultural Relevance, participants described how the program reflected their caregiving values and family dynamics. Several noted that the content improved their communication with family members and increased their awareness of culturally rooted behaviors, such as saving face. Others suggested areas for improvement, including the desire for more practical guidance and topics like traditional medicine or palliative care.

In the theme of Usability and Accessibility, participants appreciated the multimedia format, audio narration, and flexible delivery, which made the program accessible even for older adults or those with lower literacy. Many reported replaying videos and using printable resources to support their daily caregiving routines.

The theme Perceived Impact of the Intervention captured how participants applied what they learned. They reported practicing stress-reduction techniques, organizing family discussions, and gaining a greater sense of control and well-being. Some described the weekly assessment as a welcomed “check-in,” helping them reflect and connect with others in similar caregiving roles.

3.3 | Understanding the intervention mechanisms

WECARE was designed to improve caregiving skills and enhance psychosocial well-being of dementia caregivers through addressing modifiable factors at the individual, interpersonal, and environmental levels. The user activities and weekly assessment shed valuable insights into how this multi-component intervention took effect.

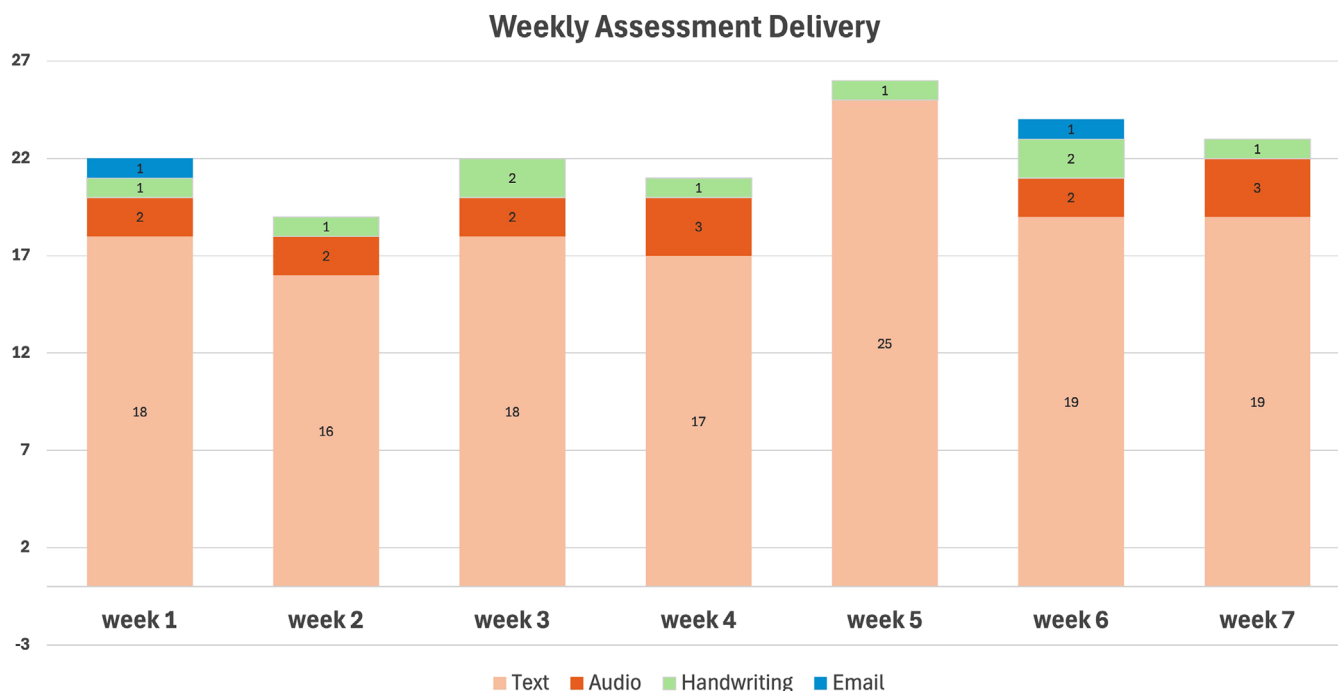


FIGURE 2 This figure shows the number of weekly assessments completed by participants through the WeChat during the 7-week WECARE program. Each bar represents a week, and the color and size of each segment within the bar indicate the number of text messages, audio/video recordings, pictures, and emails submitted that week, respectively. During the course of the intervention, the program received 132 text messages, 14 audio or video recordings, 9 pictures, and 2 emails.

TABLE 3 Participant characteristics and their relationship with user engagement.

	Total (n = 45) ^a	Weekly survey response		Reading minutes	
		High ^b	Low	High ^b	Low
Caregiver (CG) characteristics					
Age, mean (SD)	64.11 (12.49)	65.17 (11.71)	62.00 (14.11)	65.08 (10.73)	62.90 (14.60)
Female sex, n (%)	41 (91%)	26 (58%)	15 (33%)	24 (53%)	17 (38%)
Married or living with a partner, n (%)	36 (80%)	24 (53%)	12 (27%)	21 (47%)	15 (33%)
Years living in US (mean, SD)	29.11 (12.31)	31.43 (12.33)	24.46 (11.27)	29.44 (11.36)	28.69 (13.71)
Limited English proficiency, n (%)	16 (36%)	12 (27%)	4 (9%)	8 (18%)	8 (18%)
Has difficult paying for basics, n (%)	12 (27%)	9 (20%)	3 (7%)	7 (16%)	5 (11%)
Care-recipient (CR) characteristics					
Age, mean (SD)	83.62 (8.01)	85.53 (8.01)	79.80 (6.73)	83.32 (9.23)	84.00 (6.37)
Female sex, n (%)	26 (58%)	18 (40%)	8 (18%)	13 (29%)	13 (29%)
CP and CG live together, n (%)	34 (76%)	22 (49%)	12 (27%)	20 (44%)	14 (31%)
Relationship to CG					
Spouse, n (%)	16 (36%)	10 (22%)	6 (13%)	10 (22%)	6 (13%)
Child, n (%)	23 (51%)	17 (38%)	6 (13%)	11 (24%)	12 (27%)
Relative, n (%)	6 (13%)	3 (7%)	3 (7%)	4 (9%)	2 (4%)

^aTotal number of participants at baseline was 48 and 45 at follow-up with a retention rate of 94%. No significant differences in demographic characteristics between baseline and follow-up participants. Three participants dropped out in the first week without user activity and was therefore removed from data analysis.

^bValues higher than media were categorized as high and the remaining as low.

TABLE 4 Subthemes and representative participant quotes from weekly assessments.

Subtheme	Representative quotes
Cultural relevance	<p>"For the first time I learned that communication between family members is very important... I learned when to save face and when not to!"</p> <p>"WECARE is a helpful and useful program, but it's a short-term program. Some information is theoretical, but the challenges we face every day are different."</p> <p>"I suggest weekly homework where caregivers list unresolved caregiving problems and propose solutions... give researchers insight into challenges not covered."</p> <p>"I hope the program can include more topics on herbal medicine, palliative care, and prognosis of dementia."</p>
Usability and accessibility	<p>"This program is so good, easy to understand, even for a 70-year-old. I don't like reading text and can play the recording instead."</p> <p>"I like your how-to videos; I can open them whenever I want and watch them multiple times."</p> <p>"The printable checklist for doctor's visit is very useful."</p> <p>"I follow the step-by-step guide for meditation and breathing exercises before bed. My sleep quality has improved a lot!"</p>
Perceived intervention impact	<p>"This week I practiced problem-solving strategies and organized a family meeting... My family was willing to share the load."</p> <p>"Now knowing about Alzheimer's... I could understand my husband's anger and restlessness. I'm much calmer now."</p> <p>"Thank you for teaching us self-care. I haven't danced for too long. But I tried yesterday, and I felt good."</p> <p>"This platform gave me a chance to connect with people and share my feelings. I really like this."</p>

3.3.1 | Addressing gaps in knowledge, awareness, and caregiving skills

Participants appreciated the systematic knowledge and training on ADRD and caregiving, which enhanced their caregiving abilities. For instance, one participant shared:

"Now knowing about Alzheimer's disease and dementias, I could understand my husband's anger and restlessness. I know how to respond—or not to respond—when he has problem behaviors again. I'm much calmer now."

3.3.2 | Application of problem-solving strategies

Caregivers applied strategies learned from WECARE in their daily life, thereby reducing stress from caregiving and other commitments. A participant shared:

"This week I practiced problem-solving strategies and organized a family meeting. We discussed how to divide caregiving responsibilities. My family was willing to share the load. I'm happy that I found a solution."

3.3.3 | Application of stress-reduction techniques and practice self-care

Participants became more aware of the adverse effects of prolonged stress and adopted stress-reduction techniques such as mindfulness, yoga, and breathing exercises. Backend database revealed frequent replays of stress-reduction videos. One participant reflected:

"Now I prioritize sleep. When it's bedtime, I would stop housework, meditate and relax, so I can have quality sleep."

3.3.4 | Social support through the WECARE community

The sense of community and opportunities for social networking through group chats and online meetings were highly valued. For example, one remarked via an audio recording:

"I don't feel lonely anymore. It felt good talking to people with similar experiences."

3.3.5 | Use of local resources

Participants accessed location-specific resources, such as information on Medicaid and other welfare, transportation, and translation services, and local events for Chinese Americans. The backend database showed frequent downloads of these resources indicating their practical values.

4 | DISCUSSION

4.1 | Principal findings

This study reports the design and results from process evaluation of WECARE 2.0, a culturally tailored digital health intervention for

Chinese American dementia caregivers. The findings demonstrate that WECARE 2.0 was feasible and acceptable for its target users. Strong user engagement was evidenced by a 94% follow-up rate, 82% program completion rate, and a 50% response rate to weekly surveys. These indicators of user engagement were higher than most other similar digital interventions to address psychosocial distress and depressive symptoms of vulnerable populations.^{35,36} User engagement indicators had no significant relationship with demographic characteristics, suggesting that the program was accessible across diverse subgroups of the target population. Participants provided timely and constructive feedback, indicating positive experiences with the culturally tailored multimedia content and practical information, while also offering valuable suggestions for program improvement. In addition, the study identified mechanisms through which WECARE enhanced caregiving skills, reduced stress, and promoted social support.

4.2 | Finding interpretation

The findings are consistent with the existing literature demonstrating the feasibility and potential effectiveness of digital health interventions for caregivers.^{24–26} WECARE's higher rates of follow-up and program completion could be attributed to the following. First, the intervention leveraged WeChat, a widely used social media app in the target population, removing the barriers to adopt a new digital tool or mobile app. Second, the culturally tailored program with practical information has proved useful and relevant for the target users,³⁷ as evidenced by the user engagement indicators and user feedback; multimedia content and asynchronous delivery facilitate its adoption and engagement in a group with lower literacy levels and demanding schedules. Third, the online community created through group chats and meetings fosters peer communication and social support, which is particularly appealing for a linguistically isolated socially marginalized group like Chinese American dementia caregivers.²¹

Notably, participant engagement peaked in Week 5, followed by Weeks 6 and 7. This trend may reflect increased relevance and applicability of the content delivered during these weeks, which focused on stress management, self-care practices, and local resources—key areas of concern for caregivers. In addition, participant familiarity with the WECARE platform and rapport built through group interactions may have contributed to sustained and increased engagement over time.

The findings on intervention mechanisms, such as participants' adoption of stress-reduction techniques and problem-solving strategies, were corroborated by user activity data. These findings align with previous research showing that behavioral interventions focused on improving caregiving skills can significantly enhance the psychosocial well-being of caregivers.^{38–40} WECARE has demonstrated the potential of culturally tailored digital intervention to address the unmet needs of underserved dementia caregivers. Policymakers and practitioners should consider broader adoption of similar programs, leveraging digital platforms to reach populations with limited access to traditional in-person services.

4.3 | Implications on research

The findings underscore the importance of process evaluation in developing and piloting digital health interventions for underserved populations. Process evaluation provides detailed data on user engagement, collects timely feedback, and facilitates a deeper understanding of intervention mechanisms.^{4,6} This study highlights the advantages of integrating active and passive measurements to collect complementary data from multiple sources. Active measurements, such as weekly surveys used in this study, captured real-time feedback and contextual information, offering insights into the program's acceptability, feasibility, and specific areas for improvement. Passive measurements, such as backend data tracking used in this study, provided objective metrics on user engagement patterns with minimum participant burden and self-report biases. Integrating these measurements enables a comprehensive and in-depth understanding of the intervention process and user experience and provides valuable insights on program refinement and future dissemination^{24,26}; such mixed-methods process evaluation can be used for future research to develop and implement effective and user-centered interventions for dementia caregivers.

Beyond its relevance for Chinese American dementia caregivers, the WECARE intervention model and process evaluation approach may also be applicable to other racial and ethnic groups with limited English proficiency and culturally specific caregiving experiences.⁴¹ Key elements—such as culturally tailored content, multimedia delivery, audio options for lower literacy users, and integration with widely used social media platforms—can be adapted to suit the language, cultural values, and communication preferences of diverse caregiving communities. Furthermore, the mixed-methods process evaluation strategy used in this study offers a transferable framework for gathering timely feedback and understanding user experience in real time.

4.4 | Limitations

Some limitations of the study need to be noted. First, although the study focused on process evaluation to assess acceptability and feasibility, the one-arm trial design limits the ability to evaluate intervention efficacy. Second, active measurement relied on 50% of weekly survey responses, which may introduce potential testing effects and social desirability biases. Third, passive measurement captured user's time on program components without measurement of active engagement. In addition, varying levels of interest in different topics could influence engagement across a 7-week period. And fourth, the generalizability of the findings is limited as small sample size of community participants along with their response rate for the weekly surveys may not represent the diverse population of Chinese American dementia caregivers, especially those not active on WeChat. Future research should explore innovative methods for active and passive measurements as well as strategies to integrate data from multiple sources to maximize their advantages and address their disadvantages.

5 | CONCLUSION

To conclude, the process evaluation of WECARE 2.0 demonstrates its feasibility, acceptability, and potential of improving the caregiving skills and psychosocial well-being of Chinese dementia caregivers. By integrating active and passive measurements, this study provided valuable insights into user engagement, participant feedback, and intervention mechanisms. These findings underscore the importance of culturally tailored, user-centered designs and demonstrate how digital platforms can be leveraged to overcome linguistic and access barriers. This study offers a novel, mixed-methods process evaluation model that can guide the future development, evaluation, and implementation of digital health interventions for underserved dementia caregivers.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest. Any author disclosures are available in the [supporting information](#).

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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