

Developing a nonspecialist-led mental health intervention for female caregivers of young children in rural China

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ABSTRACT

Maternal mental health issues are pervasive in rural China, yet community-based interventions are scarce. To address this gap, we developed the *Thinking Healthy Extended Program*, a nonspecialist-led intervention designed to promote mental health among female caregivers of children under the age of three, including mothers and grandmothers, in resource-constrained areas of China. Drawing on an adapted Stages of Implementation Science framework, this study describes the Exploration and Installation phases of a four-phase intervention development process. During the Exploration phase, we assessed caregivers' mental health needs and preferences for intervention delivery through in-depth interviews. The Installation phase comprised three stages: developing the overall curriculum structure, identifying and validating curriculum topics, and integrating these topics into a comprehensive curriculum based on feedback from interviews, focus group discussions, and cognitive walk-throughs. The development process took place from 2022 to 2024 in a prefecture in southwestern China and involved 73 caregivers of children aged 6–36 months. The resulting 24-session curriculum integrates simplified cognitive reframing techniques, behavioral activation, caregiving skills, and peer support. This study demonstrates the feasibility of a systematic and participatory approach to developing a mental health intervention for low-resource populations.

1. Introduction

In low- and middle-income countries (LMICs), one in four women experiences depressive symptoms during pregnancy or the first year postpartum, yet over 90% of these women lack access to any type of mental health service or social support (Fisher et al., 2012; Mitchell et al., 2023). The estimated treatment coverage for common mental disorders in LMICs ranges from just 7% to 28%, resulting in a treatment gap of up to 93% (Chisholm et al., 2016). This gap is driven by both structural deficits, such as the scarcity of resources and specialists (Razzouk et al., 2010), and social barriers, including low mental health awareness and widespread stigmatization (Semrau et al., 2015).

Maternal mental health significantly affects the well-being and development of young children. Caregivers struggling with mental

health issues are often less able to provide nurturing care for their children (Britto et al., 2017; Weber and Darmstadt, 2023), a deficit linked to impaired cognitive, motor, and social-emotional development among children, as well as issues with attachment and behavioral problems (Gelaye et al., 2016; Pitchik et al., 2020). These negative outcomes are frequently driven by changes in parenting practices because caregivers with mental health symptoms tend to engage less in stimulating activities like storytelling, reading, and singing (Zhong et al., 2021). Furthermore, maternal depression is consistently associated with maladaptive behaviors, such as disengagement (Lovejoy et al., 2000), and is correlated with lower parenting self-efficacy and weaker beliefs regarding the value of caregiver-child interactions (Zhong et al., 2021).

Insufficient nurturing care, driven in part by widespread maternal

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mental health issues, prevents about 250 million children under five years old in LMICs from reaching their developmental potential (Lu et al., 2016). The impact is particularly severe for children under three, as this period marks the most rapid phase of brain development and lays the foundation for future skill formation (World Health Organization and United Nations Children's Fund, 2023). When developmental milestones are delayed during this critical window, the consequences can ripple into adulthood, compromising health and human capital, ultimately perpetuating an intergenerational cycle of poverty (Daelmans et al., 2017; Gertler et al., 2014; Heckman et al., 2010; Knudsen et al., 2006).

To address the critical shortage of mental health professionals, a growing body of research explores task-sharing, or training non-specialists to deliver care in under-resourced settings (Chisholm et al., 2016). A review of 27 trials of common mental disorder interventions delivered by nonspecialists in LMICs found a moderate to strong effect size of 0.49 SD (Patel et al., 2011). Similarly, a meta-analysis focusing specifically on the effectiveness of interventions to improve the mental health of women in the perinatal period (pregnancy to 12 months postpartum) across 13 trials demonstrated a significant reduction in depressive symptoms (effect size 0.38 SD) (Rahman et al., 2013). Taken together, these findings consistently validate nonspecialist delivery as an effective strategy to bridge the mental health treatment gap.

The Thinking Healthy Programme (THP) is one of the few evidence-based perinatal mental health interventions that can be delivered by community health workers without formal psychological training (Sikander et al., 2019). By simplifying core Cognitive Behavioral Therapy (CBT) techniques, the program combines cognitive reframing and behavioral activation. Cognitive reframing helps mothers identify and restructure destructive beliefs, attitudes, and habitual thought patterns, while behavioral activation incorporates strategies such as relaxation and problem-solving into daily routines (World Health Organization, 2015). Designed to promote holistic well-being, THP targets three pillars: the mother's personal health, the mother-child relationship, and the mother's relationship with family members and friends. Evaluations have shown that the THP significantly reduces the prevalence and severity of maternal depression and child diarrhea episodes while increasing immunization rates and the frequency of parent-child interactions (Rahman et al., 2008). As a flagship intervention of the Mental Health Gap Initiative (mhGAP) of the World Health Organization (WHO), THP has been implemented in China (Dai et al., 2025) and several LMICs, including Vietnam (Fisher et al., 2014), Turkey (Boran et al., 2023), and Peru (Eappen et al., 2018). However, because the sessions conclude 10 months after post-partum, the program fails to address mental health challenges that persist or emerge beyond the perinatal period.

Building on THP, the Thinking Healthy Programme–Peer-delivered (THPP) was evaluated in Pakistan and India as a peer-delivered adaptation of the original intervention. Compared with THP, THPP shifted the delivery model to peer facilitators and simplified the intervention content to improve feasibility, with greater emphasis on behavioral activation (rather than the cognitive reframing emphasized in THP) and a reduced number and intensity of sessions. However, compared with the control group, which received enhanced usual care, THPP's effects on maternal depressive symptoms and remission were weaker than those reported for the original THP (Sikander et al., 2019, 2019, 2019). In Pakistan, following completion of THPP at 6 months postpartum, women in the original THPP intervention arm continued to receive the Thinking Healthy Programme–Peer-delivered Plus (THPP+) from 7 to 36 months postpartum as a lower-intensity booster phase, while the original control group continued to receive enhanced usual care (Maselko et al., 2020). THPP+ consisted of bimonthly peer-delivered group sessions focused on maintaining maternal wellbeing and encouraging stimulating parenting practices, rather than CBT-specific strategies (Maselko et al., 2020). At 36 months, THPP+ showed no significant effects on the primary maternal depression outcomes of

depressive symptom severity or remission compared with enhanced usual care, as both groups showed substantial improvements in depressive symptoms over time. Nevertheless, THPP+ was still informative for intervention development because it offered a potentially scalable prototype for lower-intensity, interactive sessions with mothers of infants and toddlers in under-resourced settings. Its evaluation also implied that removing core CBT-based components may have limited its effectiveness, underscoring the need to preserve these components in future adaptations.

There is an urgent need for mental health support for caregivers in rural China. A meta-analysis of 95 studies found that 16.3% of Chinese mothers experience perinatal depression, with those of low socioeconomic status at the highest risk (Nisar et al., 2020). This burden persists beyond the perinatal period: among rural caregivers of children aged 6–36 months, 25% report depressive symptoms, while 39% report symptoms of either depression, anxiety, or stress (Zhang et al., 2018). Among children under age three living in rural China, 45% are at risk of cognitive delay, 46% are at risk of language delay, and 36% are at risk of social-emotional delay (Emmers et al., 2021). These findings highlight the need for interventions that address caregiver mental health problems while also promoting nurturing caregiving practices beyond the perinatal period.

In response, we developed the *Thinking Healthy Extended Program* (THEP) to support primary caregivers of young children in rural China, building on insights from the implementation of THP and THPP+. THEP extends THP in three key dimensions. First, while THP focuses on the perinatal period, THEP is similar to THPP+ in that it targets caregivers of children aged 6 to 36 months, offering continuous support through early childhood. Second, while THP is limited to mothers experiencing depression, THEP engages both mothers and grandmothers regardless of their mental health status to minimize the risk of stigmatization. Third, considering that THP and THPP+ have shown limited improvements in child development outcomes (Maselko et al., 2020; Rahman et al., 2008), THEP incorporates in-session and between-session activities to promote supportive caregiving practices with the goal of improving caregiver-child interactions. Compared to THPP+, THEP is a standalone intervention rather than a booster. While selected THPP+ activities and session structures informed the organization of the THEP curriculum, THEP reintroduced THP's simplified CBT by systematically embedding cognitive reframing techniques into structured storylines and guided discussions. In addition, THEP adopted a more structured format with a higher intervention dose. Finally, compared with both THP and THPP+, over half of the topics in THEP were newly developed to better reflect the caregiving experiences in China.

This study aims to document the development process of the THEP curriculum. It first introduces the conceptual framework adapted to guide the curriculum design. It then outlines each stage of development, describing the activities undertaken, insights gained, and how these findings inform subsequent stages of intervention development.

2. Methods

2.1. Development framework

Guided by Fixsen's Stages of Implementation Science (IS) framework (Fixsen et al., 2005), our development process progressed from exploration to full implementation. In the Exploration phase (Stage 1 of Fig. 1), we assessed mental health needs and delivery preferences through in-depth interviews (IDIs). The subsequent Installation phase was expanded into three stages to ensure rigorous curriculum development. We designed the general structure of the curriculum (Stage 2), developed and validated curriculum topics (Stage 3), and synthesized these topics into a comprehensive curriculum (Stage 4) using feedback from interviews, focus group discussions, and cognitive walkthroughs. Then, in the Initial Implementation phase (Stage 5), we piloted the curriculum to assess the feasibility and acceptability of the intervention.

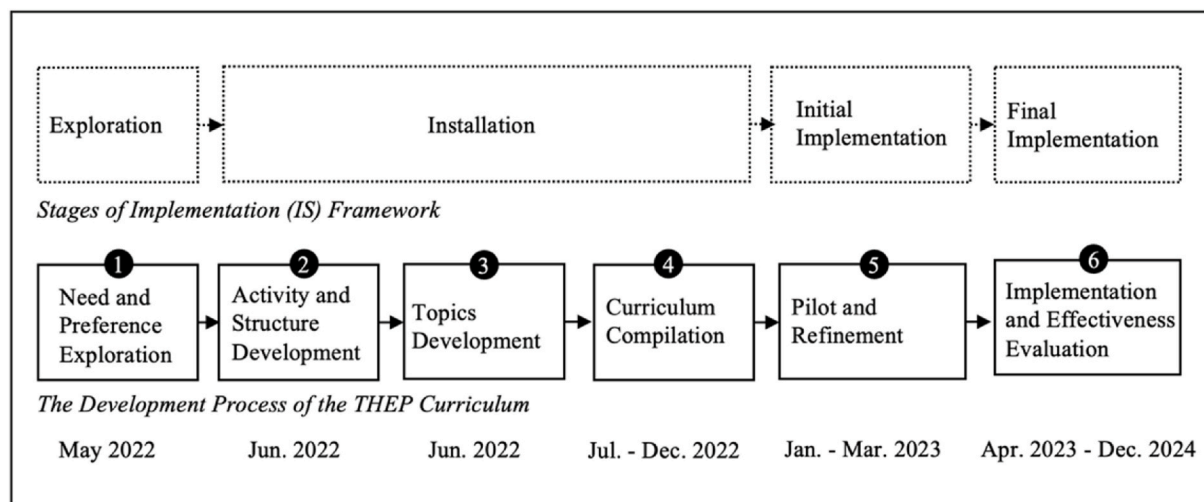


Fig. 1. The development framework of the THEP curriculum.

Note: Stages 1-4 of the THEP development process are reported in the current study, with Stages 5-6 reported elsewhere.

In the Final Implementation (Stage 6), we implemented the intervention through a large-scale randomized controlled trial to evaluate its effectiveness in improving caregiver mental health and child development outcomes. This paper describes the formative development in Stages 1-4, with trial outcomes (Stages 5-6) reported elsewhere.

2.2. Participants and study setting

The Exploration and Installation phases (Stages 1-4) were conducted in Ya'an, a prefecture in Sichuan Province in southwestern China. Ya'an is a predominantly agricultural region with a low average income, ranking 18th out of 21 prefectures in Sichuan in total GDP (Ya'an Municipal Bureau of Statistics, 2026). Participants were recruited from seven early childhood parenting centers in urban and rural areas of Ya'an. These centers are equipped with spacious play areas, toys, children's books, and child-friendly decorations, and are open free of charge to children aged 6-36 months and their families.

Eligibility criteria for recruitment into the study included: (1) being enrolled in one of the participating parenting centers; (2) being a female caregiver (mother or grandmother) of a child aged 6-36 months; and (3) holding rural household registration (hukou), a status that can restrict access to urban public services or having previously lived in rural areas before migrating to urban areas. We used convenience sampling to recruit eligible caregivers from the participating parenting centers, with center staff inviting potential participants to join the study on a voluntary basis.

2.3. Ethics approval

This study received approval from the Institutional Review Board of Stanford University (IRB Protocol #63680) and the Institutional Review Board of the Southwestern University of Finance and Economics in Chengdu, Sichuan, China. Oral consent was obtained from all participants prior to participation and audio recordings. Given the sensitive nature of the study topics, procedures were followed to identify and respond to participant distress during interviews and group sessions. Activities were paused or stopped when needed, and participants exhibiting acute risk (e.g., suicidal ideation or self-harm) were referred to local clinics for appropriate care.

2.4. Stage 1: need and preference exploration (Exploration)

In this stage, we assessed caregivers' mental health needs and their preferences for intervention delivery through 23 semi-structured IDIs.

To ensure privacy, interviews were held in dedicated rooms at each center. Each interview lasted 30 to 60 min and focused on two topics: perceived needs for mental health support and preferred intervention formats, including delivery mode (individual vs. group), location, and frequency. The interview guide was provided in supplementary materials.

Interviews were audio-recorded, transcribed verbatim, translated from Mandarin to English, and analyzed using a rapid analysis approach (Palinkas et al., 2019). The rapid analysis approach allowed us to focus our qualitative inquiry and create timely insights to inform decision-making on intervention design. We utilized a structured template based on the main topics from the interview guide to summarize each session immediately, later cross-checking these summaries against transcripts to ensure accuracy. Daily debriefing sessions with the seven-member team facilitated ongoing review and iterative modifications of the interview guide. Upon completion of data collection, summaries were organized into a matrix for comparison (Averill, 2002). Two researchers independently identified themes, resolving any discrepancies through discussion with a third researcher.

2.5. Stage 2: activity and structure development (Installation)

In Stage 2, we developed and tested the structure of the curriculum. Building on the THPP+, the THEP includes four key activities: (1) story-based discussions, in which facilitators presented stories illustrating caregiving challenges, encouraged participants to share similar experiences, and facilitated group discussions on potential solutions using simplified cognitive reframing techniques (i.e., the Thinking Healthy Strategies described in the curriculum); (2) card games, where each card featured a healthy practice, such as "I sleep 7 h per day", and participants randomly drew cards to discuss how each practice could benefit their well-being and their relationships with children, families, and friends; (3) parenting activity demonstration, in which an interactive activity was demonstrated to caregivers during the session for them to practice later at home with their child, with the aim of promoting stimulating parenting practices and strengthening caregiver-child relationships; and (4) a health calendar, which reflects a behavioral activation component, where selected healthy practices introduced in the card game activity were translated into structured at-home practice and reinforced through integration into daily routines. Visual aids tailored to each activity were used extensively as demonstration materials to enhance comprehension and engagement.

To test the feasibility and acceptability of these four activities, we conducted nine cognitive walkthrough sessions, a technique to evaluate

the experiences of participants by walking through the activity and observing their responses (Lyon et al., 2021). Each walkthrough included all four key activities and involved a team of one facilitator and two to four observers, all of whom were research team members. The facilitator briefed the participants on the context and activities being evaluated, guided the participants through each activity, and encouraged engagement and discussions.

The observers evaluated participants' experiences of each of the four key activities across four domains: (a) understanding, or the extent to which participants comprehended the activity; (b) engagement, or the level of active involvement and interest displayed by participants; (c) effectiveness of visual aids (pictures and diagrams) on enhancing participants' understanding of and engagement with the activities; and (d) activity flow, which evaluated the smoothness and logical progression of the activity. We conducted five walkthroughs in a group format with four participants each and four walkthroughs in a one-on-one format to enable structured comparisons between group and individual sessions across these domains. Upon completing all walkthroughs, we compiled observers' notes, summarized the findings, and retained or revised the activities accordingly.

In addition, we organized a brief discussion between participants and facilitators after each walkthrough to collect participants' feedback for the activities, preference for group or individual sessions, and suggestions for improvement. The interview guide was provided in supplementary materials. Discussions were audio-recorded, transcribed verbatim, and translated from Chinese into English. Because these discussions were short and only designed to supplement the walkthrough, we did not conduct formal qualitative analyses. Instead, the research team manually reviewed the responses and summarized key points.

2.6. Stage 3: Topic development (Installation)

In Stage 3, we developed the topics in the curriculum. First, maternal mental health experts from the School of Nursery at Xi'an Jiao Tong University proposed 24 potential topics reflecting common challenges caregivers face across the three pillars of focus from THP: caregiver's personal health, caregiver-child relationship, and caregiver's relationship with family members and friends. Next, six focus groups were conducted to obtain formative feedback on the relevance of the proposed topics to ensure they reflected caregivers' daily lives.

Focus groups were organized separately for mother and grandmother caregivers to facilitate discussion within similar caregiver roles. Participants were recruited from rural households or rural backgrounds, resulting in relatively homogeneous groups and likely minimizing hierarchical differences that could influence participation. Each focus group included 3-5 caregivers who reviewed 6-8 proposed topics and lasted between 50 and 70 min. At the beginning of each session, a facilitator from the research team introduced the background and objectives of the focus group, explained each topic, and invited participants to share whether they had encountered the described challenges and how these challenges had affected their lives and well-being. All focus groups were recorded and transcribed. Due to limited time and budget, we did not conduct formal analyses during this stage. Instead, topics were retained if multiple caregivers in the group reported relevant experiences. The experiences shared in the group were used to inform story development for the story-based discussion activity. The demographic information of caregivers was not collected due to logistical challenges.

2.7. Stage 4: Curriculum compilation (Installation)

In Stage 4, we compiled the curriculum by integrating the session structure and activities established in Stage 2 with the topics developed in Stage 3. For each topic, we developed four activities: story-based discussions, card games, parenting activity demonstration, and health calendar. First, we designed story-based discussions by embedding each

topic into standardized stories and discussion templates. Second, maternal and child health experts developed a card game, the content of which aligns with the challenges presented in the stories and promotes healthy practices. Third, we developed the demonstration of the parenting activities by adapting activities from the THPP+ and *Parenting the Future*, a Chinese adaptation of the *Reach Up* intervention shown to improve parenting practice and child development (Sylvia et al., 2022). Each parenting activity included both a simpler and a more advanced version to accommodate children at different developmental levels within the same session. Across the intervention course, the overall complexity of the activities also increased progressively to reflect children's expected developmental gains over time. Fourth, we created a health calendar, which summarizes key takeaways from each session, and selected one activity from the card game for daily home practice. Caregivers were invited to mark completion on the calendar each day as a check-in mechanism to encourage compliance with the healthy practices at home after the sessions. The examples of these activities were provided in supplementary materials.

To enhance caregivers' understanding of cognitive reframing techniques, we incorporated three additional sessions adapted from the THP curriculum that focused on both conceptual understanding and practical application, adapted from the THP curriculum. Caregivers completed one of these sessions after their first, third, and fifth regular sessions, respectively. Each of those three sessions addressed one of three key domains (caregiver personal well-being, the caregiver-child relationship, and the caregiver's relationships with family and friends). In each session, caregivers explored seven sets of scenarios following a structured cognitive reframing process (i.e., "thoughts—emotions or behaviors—outcomes"). Facilitators guided caregivers to reflect on how these scenarios related to their own lives, highlighting how thoughts influence emotional and behavioral responses and ultimately lead to either positive or negative outcomes for themselves and their children.

The curriculum underwent several rounds of iterative review. First, the research team independently reviewed the curriculum to ensure conceptual consistency and coherence across sessions because multiple researchers participated in the development process. Revisions were made through consensus during team discussions. Second, bachelor-level research assistants assessed the materials for clarity and readability by lay audiences, given that the curriculum was designed for nonspecialist community workers. Third, external psychologists reviewed the content to verify psychological accuracy, appropriateness, and alignment with CBT principles. Revisions were made iteratively following each round of review.

3. Results

3.1. Participants

A total of 73 caregivers participated in Stages 1-4 of the development process, including 23 in Stage 1, 24 in Stage 2, and 26 in Stage 3. Stage 4 did not involve caregiver participants by design. Demographic information for participants in Stages 1 and 2 is presented in Table 1. Three-quarters of caregivers were mothers, with the remaining one-quarter being grandmothers. The mean age of mothers was 29.3 years, and the mean age of grandmothers was 63.3 years. Most participants had rural residency status (44 out of 47). Among the 36 caregivers who reported educational attainment, 24 had completed high school or higher education. Children's ages ranged from 5.8 to 34 months, with a mean age of 25 months. As described in the Methods section, demographic information for caregivers in Stage 3 was not collected due to logistical challenges.

Table 1
Demographic characteristics of participants involved in Stages 1 and 2.

Demographic characteristics (N = 47)	Mean (SD) or n (%)
Caregiver type	
Mother	35 (75%)
Grandmother	12 (25%)
Age (years)	
Mother	29.3 (5.2)
Grandmother	63.3 (9.9)
Hukou ^a	
Rural	44 (94%)
Urban	3 (7%)
Education	
Junior high school or below	12 (26%)
High school or above	24 (51%)
Missing	11 (24%)
Child age ^b (months)	24.5 (15.5)

^a Hukou classifies individuals as having rural or urban residence status and determines eligibility for public services and social benefits.

^b One child was 5.8 months old at enrollment and was considered eligible because their age was rounded to 6 months for eligibility purposes.

3.2. Stage 1: needs and preference exploration (exploration)

3.2.1. Perceived need for mental health support

3.2.1.1. Unaddressed emotional tolls from caregiving responsibilities.

Caregivers consistently reported the need for mental health and emotional support (Table 2, Panel A). Many described a substantial emotional burden associated with caregiving, often characterized by self-blame and frustration when caregiving expectations were not met, such as when children became ill or difficult to manage (Table 2, T1).

Table 2
Summary of needs and preference exploration in Stage 1.

Themes	Quotes	What we learned?
<i>Panel 1: Unaddressed emotional tolls from caregiving responsibilities</i>		
[T1] Caregiving burden, self-blame, frustration	"I can't control myself. I feel like I'm falling short in terms of educating him, so I compensate by buying him things. It's such a stark contrast. I'm either spoiling him or yelling at him, and I don't understand why." (Caregiver 18)	Caregivers experience emotional burden, limited support, and social isolation, indicating a need for structured support addressing caregiver wellbeing and interpersonal relationships
[T2] Limited spousal and family support	[A] "I've already been taking care of the baby all day, and you come home and should share it (caregiving) with me. But he (the husband) is tired too, and I end up feeling like neither of us wins." (Caregiver 18) [B] "My way of getting along in this family is not to expect too much. Don't socialize with them, just live quietly and raise the child." (Caregiver 17)	
[T3] Social isolation	"I don't share with my family. When I'm angry, I just let it out on my own. They don't understand anyway" (Caregiver 23)	
<i>Panel 2: Child-focused mindsets</i>		
[T4] Child-centered identity	[A] "All my heart is on the baby. My husband and I barely have time to care about each other." (Caregiver 2) [B] "I just do my duty well. No matter how my mother-in-law curses me, I don't care. As long as I fulfil my responsibility, that's enough." (Caregiver 22)	Child-centered orientation suggests that intervention should align with child-related concerns to enhance engagement and relevance
[T5] Child concerns dominate caregiver priorities	[A] "With a small fever at night, you sit on the bed, you do not dare to sleep, you check the temperature every half hour." (Caregiver 23) [B] "When he doesn't sleep at night I hit him. As soon as I do, I regret it." (Caregiver 14)	
<i>Panel 3: Intergenerational tension</i>		
[T6] Mother-in-law caregiving conflicts	"My mother-in-law never helped me. She cursed me every day when I was pregnant. My child was almost two and she hadn't even bought him a pair of socks." (Caregiver 22)	Intergenerational tensions highlight the need to incorporate strategies addressing family dynamics and communication
[T7] Conflict avoidance	"My way of getting along in this family is not to expect too much. Don't socialize with them, just live quietly and raise the child." (Caregiver 17)	
[T8] Grandmothers feel undervalued	"My daughter-in-law sometimes says I don't raise the child well. I say, fine, you raise him yourself. Then she says I'm doing fine again." (Caregiver 7)	
<i>Panel 4: Delivery formats and logistics</i>		
[T9] Small group	"I'm outgoing, but some people are shy. In a big group they just won't speak." (Caregiver 15)	Caregivers expressed preferences for smaller groups, community-based settings, and convenient timing
[T10] Community shared space	"Here is better. You know in the countryside the day is always too busy; at home it's hard to focus." (Caregiver 22)	
[T11] Timing	"Four to six in the afternoon. The baby has just woken up; dinner is still a while away - that's the most relaxed window." (Caregiver 16)	

A lack of support from husbands and other family members further intensified this burden (Table 2, T2). Caregivers described prolonged periods of caregiving without breaks, contributing to sustained emotional strain (Table 2, T2-A). Many caregivers adopted coping strategies that involved lowering expectations or withdrawing from family interactions (Table 2, T2-B). In addition, most caregivers lacked a supportive network to help manage daily stress. Social isolation was common, and negative emotions were often managed alone through passive coping strategies such as eating, resting in isolation, or scrolling on mobile devices (Table 2, T3).

3.2.1.2. Child-focused mindsets among caregivers. Caregivers overwhelmingly defined their roles in terms of caregiving responsibilities and their child's well-being, often prioritizing these above their own needs or other relationships (Table 2, Panel A). Some caregivers framed their role in terms of duty and obligation (Table 2, T4A), even in the presence of interpersonal conflict (Table 2, T4B). Concerns related to children were articulated with greater detail and immediacy than concerns about caregivers' own health or identity. Common stressors included child illness, feeding, sleep, and behavioral challenges (Table 2, T5-A and T5-B).

3.2.1.3. Perceived intergenerational tension between mother and grandmother caregivers. Among mothers co-residing with in-laws, intergenerational conflict, particularly with mothers-in-law, was frequently reported (Table 2, Panel 3). These tensions often stemmed from disagreements over caregiving practices and perceived lack of support (Table 2, T6 and T7). Conversely, grandmothers described frustration at feeling criticized or undervalued in their caregiving roles (Table 2, T8).

Table 3

Summary of results from nine cognitive walkthrough (Stage 2).

	(1) Understanding of activities	(2) Participant engagement	(3) Effectiveness of visual aids	(4) Activity flow
Story-based Discussion	Most participants understood the story and underlying CBT concepts; emotional resonance was common, though some (especially grandmothers) required additional explanation.	Engagement was generally high; relatable stories facilitated participation, though some participants required guidance to connect emotions with consequences	Visuals supported attention and comprehension, but some were not intuitive.	Sessions generally flowed well, with occasional interruptions due to emotional reactions.
Card Game	Concepts were easily understood, particularly through peer demonstration.	Engagement was strong when content was relatable; relevance to personal experience was key to sustaining participation.	Visuals enhanced comprehension, though some participants (e.g., grandmothers) had difficulty due to small text or limited literacy.	Sessions flowed well; facilitator summaries improved focus and productivity.
parenting activity demonstration	The games were straightforward and easy to follow and understand.	Engagement was moderate without structured interaction; practice opportunities and explanation improved participation. Feasibility concerns regarding home practice (e.g., time constraints, child cooperation) were noted.	Not applicable	Sessions flowed smoothly; absence of children improved flow but reduced engagement.
Health Calendar	Generally understandable after demonstration; specific terms were less familiar to some participants.	Not applicable (practice-based, intended for home use).	Visuals supported understanding of at-home practice.	Sessions flowed well with facilitator introduction; some concerns about adherence to home practice.
Comparisons between group and individual formats	Comprehension was similar across formats, though individual sessions allowed better tailoring to participants' literacy levels	This dimension showed the greatest divergence: group sessions elicited stronger engagement and emotional resonance, whereas individual sessions were more stable but less interactive, particularly when participants faced personal difficulties with the topic.	No meaningful differences between formats.	Individual sessions were more stable and easier to manage, whereas group sessions were occasionally disrupted by emotional reactions or dominant participants.

3.2.2. Preferences for group-based, neutral settings

Caregivers expressed preferences for delivery formats and logistics (Table 2, Panel 4). Caregivers reported that they preferred small group sessions of 3-5 participants, as this format encouraged active participation and engagement (Table 2, T9). They shared that individual sessions might be less open or effective, as the presence of other caregivers often prompts shared experiences and insights. Caregivers preferred attending the sessions in comfortable spaces, such as indoor community centers or outdoor areas during cooler weather, but not private homes, to minimize interruptions from children and other family members (Table 2, T10). In terms of timing, caregivers favored afternoon sessions to avoid conflicts with mealtimes and children's nap times, and they also preferred weekends to accommodate their work schedules and caregiving responsibilities (Table 2, T11).

3.2.3. Lessons learned to inform subsequent development

The final column of Table 2 summarizes key findings from Stage 1 to inform subsequent development. Caregivers reported emotional burden, limited support, and social isolation, indicating the need for structured components addressing caregiver wellbeing and interpersonal relationships. A child-centered orientation, together with frequent intergenerational tensions, suggested that intervention content should align with child-related concerns while incorporating elements addressing family dynamics. Finally, caregivers expressed preferences for smaller group formats, community-based settings, and convenient session timing, informing the optimization of delivery format and logistics to support participation.

3.3. Stage 2: activity and structure (Installation)

3.3.1. Cognitive walkthrough observations on session activities and structure

Session activities and structure facilitated comprehension, engagement, and session flow (Table 3). Most activities were generally understandable to participants, particularly when supported by facilitator

demonstrations or peer observation (Table 3, Column 1). However, some components, especially the story-based discussion, required additional guidance, as not all participants fully grasped underlying concepts, and grandmothers occasionally needed further explanation.

Engagement varied by activity type (Table 3, Column 2). Interactive formats, such as the card game, elicited active participation, particularly when participants could relate content to their own experiences. In contrast, activities with less structured interaction, such as parenting activity demonstration, showed lower engagement unless supported by opportunities for practice and facilitator guidance. Visual aids were generally effective in focusing attention and enhancing comprehension (Table 3, Column 3). A small number of participants, particularly grandmothers who had limited literacy, experienced difficulty with certain materials due to readability constraints.

In terms of activity flow, most sessions proceeded smoothly (Table 3, Column 4). Emotional responses during story-based discussions occasionally disrupted continuity. Facilitator-led summaries and prompts were found to improve focus and maintain productive discussion. Practical constraints, including time availability and the presence of children, also influenced participation and session flow.

3.3.2. Comparisons between group and individual formats

Comparisons between group and individual formats revealed distinct trade-offs across domains in Table 3 (last row). Comprehension was broadly similar across formats, although individual sessions allowed more tailored support for participants with lower literacy. The largest difference emerged in engagement: group sessions elicited stronger participation and emotional resonance, while individual sessions were more stable but less interactive. No meaningful differences were observed in the effectiveness of visual aids. In terms of activity flow, individual sessions were generally smoother and easier to manage, whereas group sessions were occasionally disrupted by emotional reactions or dominant participants.

3.3.3. Post-walkthrough discussions on session feedback and delivery formats

3.3.3.1. Discussions on session feedback. Participants generally found the content easy to understand. However, caregivers anticipated challenges in implementing and sustaining healthy behaviors, primarily due to time constraints, limited motivation, and competing daily demands. Many caregivers also highlighted emotional benefits, particularly opportunities for sharing experiences and feeling understood through group discussions. Supporting quotes are provided in [Appendix 3](#).

3.3.3.2. Discussions on delivery formats. Consistent with Stage 1 findings, most caregivers preferred small-group formats, valuing opportunities for peer learning, shared experiences, and mutual support. However, a minority expressed concerns regarding privacy and the accommodation of individual differences in emotions and opinions. In terms of location, caregivers favored community-based venues, such as village committees, citing greater trust, focus, and convenience, whereas home-based or open public settings were generally less preferred.

3.3.4. Lessons learned and related refinements

We synthesized findings from all Stage 2 activities, including cognitive walkthroughs and post-walkthrough discussions, and used these insights to inform sequence refinements ([Table 4](#)). For the session activities, to address gaps in conceptual understanding ([Table 4](#), A1-A), cognitive reframing techniques were more explicitly linked to each story and discussion question, and the sequence of activities was standardized to enhance consistency and clarity across sessions. As illustrated in [Fig. 2](#), the standardized storyline first presented a challenge and prompted caregivers to identify the character's unhealthy thoughts and their consequences. Caregivers then reflected on similar thoughts in their own experiences. The story subsequently introduced healthier alternative thoughts and illustrated their potential benefits, followed by discussion of how caregivers could apply these alternatives in their own lives. Each story-based discussion concluded with a brief summary reinforcing the cognitive reframing strategy illustrated in the story.

Additionally, to improve the clarity of visual materials ([Table 4](#), A1-B), visual aids were refined to more clearly convey key messages. To increase relevance and usability of the card game ([Table 4](#), A2-A and A2-B), content was adapted to better reflect caregivers' daily experiences,

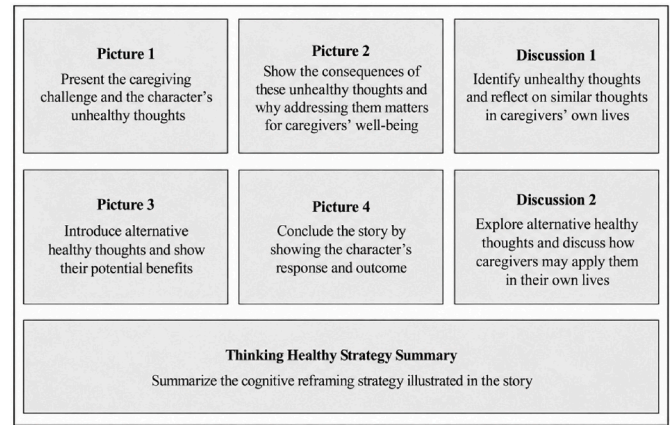


Fig. 2. Standardized storyline and visual structure for story-based discussion activities.

with larger font sizes and added facilitator guidance to support comprehension when needed. To strengthen participation in parenting activity demonstration ([Table 4](#), A3), activities were simplified and facilitators incorporated structured caregiver rehearsal during the sessions, allowing participants to practice the activity themselves before trying it later at home with their child. Finally, to address unfamiliar terminology and anticipated challenges in home practice ([Table 4](#), A4-A and A4-B), the health calendar was revised to adopt more intuitive language and a simplified, structured format to support ongoing use at home.

Regarding delivery format and logistics, group sessions elicited stronger engagement and emotional resonance but were also more susceptible to disruptions, while caregivers expressed a preference for small-group, community-based formats ([Table 4](#), A5). These findings informed the decision to retain group-based delivery, with refinements focusing on strengthening facilitator training to better manage group processes and emotional dynamics. In addition, to enhance engagement and address potential disruptions observed during sessions ([Table 4](#), A6-A and A6-B), ice-breaking activities were incorporated across sessions, and facilitator training included guidance on managing participants' emotional reactions during story-based discussions.

Table 4
Lessons learned and planned refinements (Stage 2).

Category	Aspects	Lessons learned	Planned refinements informed by the sample session
Session activities	[A1] Story-based discussion	[A] Participants understood stories but did not consistently grasp underlying CBT concepts. [B] Images improved attention and comprehension but were not always intuitive.	[A] To strengthen conceptual understanding, CBT techniques will be more explicitly linked to each story and discussion question, and the sequence of activities will be standardized to improve consistency (Fig. 2). [B] Visual aids will be refined to more clearly convey key messages.
	[A2] Card game	[A] Less relevant or abstract scenarios reduced engagement. [B] Some grandmothers experienced usability challenges.	[A] To improve relevance, card content will be adapted to better reflect caregivers' daily experiences. [B] Font sizes will be increased, and facilitator guidance will be added to support comprehension when needed.
	[A3] Parenting activity demonstration	Guided practice and clear explanation of benefits improved participation.	Activities will be simplified, and facilitators will incorporate structured hands-on rehearsal practice to reinforce learning and build caregiver confidence.
	[A4] Health calendar	[A] Some key concepts were unfamiliar to grandmothers. [B] Caregivers anticipated challenges in sustaining practices at home.	[A] Terminology (e.g., "home practice", "check-ins") will be adapted to more intuitive language. [B] A structured calendar with user-friendly designs will be developed to support tracking of home practices.
Delivery format and logistics	[A5] Delivery format	[A] Group sessions elicited stronger engagement and emotional resonance but were more susceptible to disruptions related to group dynamics and emotional responses. [B] Caregivers preferred small-group sessions in community-based settings.	Group sessions were retained due to their stronger engagement and emotional resonance, with refinements focusing on strengthening facilitator capacity to manage group dynamics and emotional responses. No other refinements will be made.
	[A6] Logistics	[A] Ice-breaking activities improved engagement. [B] Emotional reactions to stories and discussions could interrupt sessions.	[A] Ice-breaking activities will be incorporated into all sessions. [B] Facilitator training will include guidance on managing emotional distress during sessions.

Table 5

The 20 topics included for the THEP curriculum, informed by six focus groups (N = 26 caregivers).

No.	Topic	Caregiver-reported challenges	Alignment with the original THP and THPP+
<i>Pillar 1: Caregiver's Personal Health</i>			
1	Rest and self-care	Perceiving difficulties managing childcare and household tasks while striving for perfection, leaving little room for rest or self-care	Aligned with THP Session 2.1
2	Healthy eating and nutrition	Perceiving difficulties maintaining personal health and nutrition due to childcare and household duties, resulting in fatigue and discomfort	Aligned with THP Session 3.1
3	Addressing postpartum health concerns	Believing postpartum health issues are inevitable and untreatable, leading to reduced self-care and worsening physical conditions	Newly added topic
4	Maintaining self-confidence and well-being	Feeling insecure about postpartum body changes and starting to doubt oneself	Newly added topic
5	Managing fatigue and physical weakness	Believing a weak immune system is innate and unchangeable, leading to persistent fatigue and limited energy for childcare	Newly added topic
6	Reducing fatalism about child health	Believing a child's poor health is innate and difficult to improve, reducing efforts to enhance nutrition or seek medical care	Newly added topic
7	Seeking reliable healthcare	Perceiving an over-reliance on unreliable online information instead of seeking timely medical care, potentially delaying proper treatment for child	Aligned with THPP + Story 2.2.3
<i>Pillar 2: Caregiver-Child Relationship</i>			
1	Managing the emotional toll of caregiving	Perceiving frustration toward motherhood due to chronic pain, unresolved postpartum issues, and the emotional toll of caregiving	Aligned with THP Session 3.2
2	Balancing parenthood and personal goals	Perceiving regret over parenthood for derailing employment, causing frustration and emotional distance from the child	Newly added topic
3	Navigating perceived caregiving obligations	Feeling obligated to provide childcare while sick, worsening one's health and perceiving the child as becoming overly dependent	Newly added topic
4	Managing time and bonding with the child	Feeling overwhelmed by chores, lacking energy to bond, and perceiving a growing emotional distance from the child	Aligned with THP Session 5.2
5	Recognizing children's emotional and developmental needs	Believing young children don't need interaction, potentially overlooking emotional and developmental needs in favor of personal time	Aligned with THP Session 2.2 and THPP + Story 2.3.5-2.3.7
6	Managing sibling relationships	Perceiving frustration in maintaining a positive relationship between children, as prioritizing the younger child's needs often contributed to recurrent sibling conflicts	Newly added topic
7	Finding meaning in parenthood	Perceiving regret over motherhood due to its impact on quality of life	Newly added topic
8	Strengthening parental involvement in childcare	Perceiving an over-reliance on elderly family members for childcare, prioritizing personal leisure over parenting involvement	Newly added topic
<i>Pillar 3: Caregiver's Relationship with Family Members and Friends</i>			
1	Strengthening spousal support	Perceiving a lack of support from a spouse, leading to frustration, resentment, and frequent arguments	Aligned with THP Session 5.3
2	Managing intergenerational childcare conflicts	Perceiving disagreements with elders over childcare, creating tension in family	Newly added topic
3	Coping with social isolation after childbirth	Feeling distanced from friends and socially isolated after childbirth	Aligned with THP Session 1.3
4	Building trust and sharing childcare responsibilities	Perceiving concerns about elder caregivers' beliefs and skills, and feeling reluctant to share childcare responsibilities	Newly added topic
5	Accessing and trusting public support services	Perceiving public health services as inconvenient or untrustworthy, resulting in missed opportunities to access resources	Newly added topic

3.4. Stage 3: Topic development (Installation)

Of the 24 originally proposed topics, 20 were retained for the THEP curriculum (Table 5). The four topics that were removed are presented in the supplementary materials (Appendix 4). Among the 20 retained topics, 8 were aligned with existing THP or THPP + curriculum components, while 12 were newly added based on caregiver-reported needs identified through the focus groups (Table 5). Within Caregiver's Personal Health, newly developed topics addressed postpartum health concerns, maternal self-confidence and wellbeing, fatigue and physical weakness, and fatalistic beliefs about child health. Within Caregiver-Child Relationship, new topics focused on balancing parenthood with personal goals, navigating caregiving obligations, managing sibling relationships, finding meaning in parenthood, and strengthening parental involvement in childcare. Within Caregiver's Relationships with Family Members and Friends, newly added topics addressed intergenerational childcare conflicts, trust and sharing of childcare responsibilities, and access to and trust in public support services. Caregivers shared detailed examples on each topic during the focus groups, which were used as formative material to develop stories for the story-based discussion activity.

3.5. Stage 4: Curriculum compilation (Installation)

The final curriculum comprises 24 fortnightly sessions, including one

introductory session to orient participants to the program and three sessions focusing on cognitive reframing techniques. Each session begins with an ice-breaker activity and a review of the previous session, followed by four structured activities. To enhance scalability and consistency in implementation, we developed step-by-step instructions for each activity, including scripts with suggested wording, for the facilitators. Existing literature on mental health-related stigma in China informed the decision to avoid terms such as “mental health” or “depression” in the curriculum (Xu et al., 2018; Yin et al., 2020). This approach was also supported by input from local stakeholders during the development process. Instead, it adopts more culturally acceptable language centered on “self-care” and the “well-being of caregivers and children”. To ensure inclusivity in group-based sessions, the story-based discussions in the curriculum include tailored prompt questions for both mothers and grandmothers, while other activities are standardized regardless of the caregiver's relationship to the child.

3.6. Theory of change

The THEP has four core components to improve caregiver mental health (Fig. 3). First, the Thinking Healthy Strategies use cognitive reframing techniques to help caregivers identify unhelpful and negative beliefs, attitudes, and habitual thought patterns, replacing them with more constructive ones. Second, behavioral activation integrates activities, such as physical exercise, relaxation, caregiver-child bonding, and

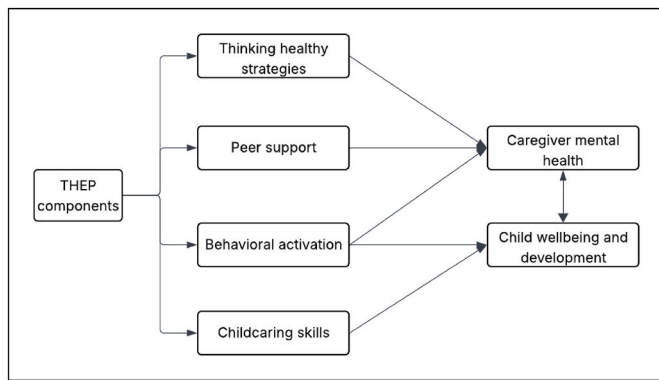


Fig. 3. Conceptual framework of THEP core components and hypothesized pathways linking the intervention to child wellbeing and development and caregiver mental health.

problem-solving, into the daily routines of the caregivers. Third, a group-based format encourages experience sharing and enhances mutual emotional support among the participating caregivers. Finally, parenting activity demonstration, experience sharing during sessions, and healthy practices at home may enhance caregivers' awareness and skills related to childcare and stimulation, which may improve child well-being and development and, in turn, further support caregivers' mental health.

4. Discussion

This study documented the development of the Thinking Healthy Extended Program (THEP), a nonspecialist-led mental health intervention targeting female caregivers of young children living in resource-constrained areas of China. Our key finding from the initial stage was that there was a great demand for mental health support among caregivers, including those from the general population without clinically identified depressive symptoms. These findings were consistent with prior evidence showing a high prevalence of depression, anxiety, and stress symptoms among caregivers of children aged 0-3 years in rural China (Zhang et al., 2018). Furthermore, our results highlighted the need for greater attention to mental health needs beyond the perinatal period, which has been the primary focus of existing research and policy (Herba et al., 2016; Maselko et al., 2015).

Cognitive walkthroughs conducted in Stage 2 indicated that sessions in which children were not present had better flow and fewer disruptions. The absence of children at the sessions could minimize interruptions to individual reflection and group activities. This arrangement might be infeasible, however, when the participating caregiver is the sole caregiver of their child. Moreover, previous studies that integrated mental health support with parenting training showed that children's presence facilitated caregiver-child interactions and improved child development outcomes (Engle et al., 2007; Pitchik et al., 2021). Integrating the sessions with daycare providers or offering childcare services during sessions might make the intervention more accessible for sole caregivers while preserving its potential benefits for parenting practices and child development. However, affordability remained a key concern, as such interventions are typically implemented in resource-limited settings (Garcia et al., 2021).

Development activities in Stages 2 and 3 inspired several adaptations that distinguished the THEP from the THP. First, whereas the THP was designed for delivery through individual home visits (World Health Organization, 2015), findings from the current study indicated a preference for group-based sessions. Group delivery was also adopted in other THP adaptations, including implementations in Afghanistan (Tomlinson et al., 2020), the Thinking Healthy Program Peer-delivered (THPP) in India and Malawi (Ng'oma et al., 2024; Sikander et al., 2019),

and the THP-Brief Group Version in Turkey (Boran et al., 2023). Evidence from multi-component interventions that integrated THP with other nurturing care approaches and compared group-only with mixed delivery formats further suggested that group sessions might yield more promising effects in reducing caregiver depressive symptoms (Pitchik et al., 2021).

Second, THEP retained the three core pillars of THP while substantially adapting the specific content to caregivers' reported needs and priorities. The newly added topics largely focused on caregivers' physical wellbeing related to pregnancy and childcare, balancing parenthood with personal development, and navigating intergenerational conflicts in childcare. These themes may reflect important features of rural China and, potentially, China more broadly. The emphasis on caregivers' physical wellbeing may partly reflect the relatively limited duration of routine postpartum maternal health services in China, typically through 42 days postpartum, while the latter two themes may reflect women's high participation in the workforce and the common involvement of grandparents in childcare. (Qiao et al., 2021; Slomian et al., 2017; Zhang et al., 2019). Together, these adaptations underscore the importance of careful contextual tailoring to ensure the cultural relevance and appropriateness of interventions (Alderdice and Newham, 2016).

Most importantly, THEP was designed to reintegrate the simplified cognitive reframing techniques from THP into the activity prototypes originally developed for THPP+. This combination distinguishes THEP from both curricula and allows its theory of change to draw on the therapeutic components of each. However, our findings showed that caregivers found cognitive reframing concepts relatively difficult to understand, consistent with findings from previous studies on the implementation and evaluation of THP (Singla et al., 2021; Waqas et al., 2025). To address this challenge, THEP used standardized storylines based on caregiving scenarios relevant to the study context and incorporated guided reflection and discussion to support caregivers' understanding and application of cognitive reframing techniques.

Our findings should be interpreted with some limitations. Participants were recruited through convenience samples from one prefecture in China, which may limit the generalizability of the findings, thus affecting the application of the interventions to a broader setting in China. Following a rapid analysis approach, we used summary templates to analyze qualitative data, which may be prone to confirmation bias. However, we allowed new and emerging categories or themes to arise from the data, and the analysis team met weekly to review findings, discuss discrepancies, and finalize themes. This team-based, interactive approach to rapid qualitative analysis was supported by methodological work emphasizing the role of group engagement in enhancing both rigor and efficiency (Hsu et al., 2024). Finally, we did not specifically examine how caregiver parity shaped intervention needs or experiences. First-time caregivers may face distinct challenges due to limited prior caregiving experience, and future adaptations could further consider whether intervention content should be tailored to caregivers with different caregiving histories.

Despite these limitations, this study had several key strengths. First, it used a multi-stage development process informed by implementation science to guide intervention development, incorporating iterative refinement and testing to ensure theoretical grounding in CBT techniques and responsiveness to participant feedback. Second, we actively involved the target population throughout intervention development, conducting extensive fieldwork to ensure that the curriculum addressed the real-life challenges faced by female caregivers of young children. This participatory approach enhanced the relevance, acceptability, and engagement of THEP. Finally, by explicitly documenting the development process, this study also promotes transparency and reproducibility in intervention research.

5. Conclusion

This study presented the development of the *Thinking Healthy*

Extended Program, a mental health intervention delivered by non-specialists that targeted female caregivers of young children in resource-constrained areas of China. THEP was designed as a universal intervention that addressed common caregiving challenges across caregivers, regardless of prior mental health status. Through a reflexive development process, we incorporated prompts tailored to both mothers and grandmothers to promote inclusive participation. The intervention was developed using an adapted Stages of Implementation Science framework, demonstrating a systematic approach to designing mental health interventions for underserved populations. By explicitly documenting the development process, this study promoted transparency and reproducibility in intervention research and called for future research to report and examine the development phase of implemented interventions.

CRediT authorship contribution statement

Qi Jiang: Conceptualization, Methodology, Data curation, Formal analysis, Project administration, Writing – original draft, Writing – review & editing. **Lei Yang:** Conceptualization. **Yiwei Qian:** Writing – review & editing. **Esther O. Chung:** Writing – review & editing, Methodology. **Hanwen Zhang:** Writing – review & editing. **Scott Rozelle:** Writing – review & editing, Funding acquisition. **Lia Fernald:** Writing – review & editing, Supervision, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

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