Original Paper

Designing a Client-Facing Mobile Health App for Survivors of Violence: Mixed Methods Human-Centered Design Study

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Abstract

Background: Hospital-based violence intervention programs (HVIPs) play a critical role in reducing the long-term impacts of violence by linking survivors to resources that address social needs. However, HVIP effectiveness is often hindered by disorganized communication between violence prevention professionals (VPPs) and their clients. Mobile health (mHealth) tools have the potential to improve communication but have not historically been co-designed with survivors of violence to meet their unique needs.

Objective: This study aimed to extend prior mHealth app development aligned with VPP workflows by applying a human-centered design (HCD) approach that centers on client-facing experience and reflects clients' lived realities, preferences, and barriers to engagement.

Methods: We developed the client-facing component using HCD and integrated 3 "ideation phase" methods: participatory design, low-fidelity prototype testing, and high-fidelity prototype testing. Participatory design included semistructured interviews and co-design activities with clients, followed by inductive qualitative analysis to inform the app's initial low-fidelity design. Low-fidelity prototype testing included guided user-testing interviews with probing questions about static wireframes, followed by inductive qualitative analysis to inform the app's initial high-fidelity design. High-fidelity prototype testing used the Rapid Iterative Testing and Evaluation (RITE) method. An impact ratio quantified the proportion of identified usability issues that were addressed through iterative design changes.

Results: Fifteen unique clients participated across 16 testing sessions (one client participated in 2 phases). Participatory design identified six key themes: (1) trust, (2) personal connection, (3) guidance in meaningful decision-making, (4) client empowerment, (5) intuitive and comprehensive design, and (6) dynamic journey and sense of progress. Low-fidelity testing reinforced these themes and identified two additional themes: (7) app personalization and (8) tailored resource curation. High-fidelity testing reinforced themes 1-8 and uncovered 7 more: (9) celebration of client successes, (10) standardization of verbiage and design choices, (11) control over boundaries, (12) legitimization of experience, (13) accessibility of VPPs, (14) gratitude expression, and (15) integration with medical care. High-fidelity prototype testing through RITE identified 98 actionable issues, of which 89 (91% impact ratio) were addressed. The final iteration of the app expanded from 12 initial low-fidelity wireframes to 32 refined high-fidelity wireframes.

Conclusions: The study used HCD and RITE to develop and refine a client-facing app tailored to survivors of violence receiving HVIP case management services. The 91% (89/98) impact ratio indicates that RITE supported rapid prioritization and resolution of usability issues. This approach may be adaptable to developing other mHealth tools for specialized populations, though further research in other settings and with larger samples is needed to assess generalizability. A pilot implementation is underway to evaluate the app's usage patterns, acceptability, and feasibility within routine HVIP workflows. Future integration with electronic health record systems may further support continuity and equity of care for survivors of violence.

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(JMIR Form Res 2026;10:e101895) doi: 10.2196/101895

KEYWORDS

mHealth; mobile health; application; violence prevention; human-centered design; iterative prototyping; RITE method; Rapid Iterative Testing and Evaluation

Introduction

Survivors of violent injury often navigate complex recovery journeys marked by trauma [1], systemic barriers [2], and fragmented care [3]. Hospital-based violence intervention programs (HVIPs) aim to address these challenges by pairing survivors of violence ("clients") with culturally congruent violence prevention professionals (VPPs), who provide mentorship and link clients to vital resources such as housing, mental health care, and employment support [4-6]. However, despite their potential [7], HVIPs and VPPs frequently struggle with inconsistent communication with clients and disorganized coordination, leaving many clients uncertain about their next steps in recovery [8].

Social prescribing, or the act of linking patients with nonclinical services to address adverse social determinants of health, has been shown to improve patient outcomes [9], and using mobile health (mHealth) tools can improve communication and access to resources [10-12]. While several social prescribing mHealth tools exist, we are not aware of any that have been co-designed by and for survivors of violence specifically, positioning them as active collaborators in shaping the client-facing design rather than as end users of a provider-driven tool. Survivors often face deep mistrust of institutional systems [13,14], and without transparent, client-centered design, mHealth tools risk reinforcing the very barriers they aim to dismantle. While many unique factors may prevent people of low socioeconomic status from adopting mHealth tools, co-design is a critical approach to increase adoption among this population [15].

Human-centered design (HCD) offers an inclusive and practical framework for creating technology that is not just designed for, but with, its intended users [16]. Participatory design and user testing accompanied by iterative feedback form the core of HCD, ensuring that the voices of clients inform both the functionality and user experience (UX) of a tool [17,18]. Additionally, the Rapid Iterative Testing and Evaluation (RITE) method allows for rapid iteration and continuous improvement throughout the testing process by implementing immediate design changes after a single user identifies an issue [19]. In populations experiencing disparities, these approaches shift the design process from assumption to collaboration and increase the likelihood that tools reflect user priorities [20,21].

This study presents the design and development of the client-facing component of an mHealth app created to support communication and coordination between clients and their VPPs. This study extends prior research that developed a VPP-facing app [18] by exploring the client experience with case management and navigation after injury recovery to ensure the final app addressed their needs, preferences, and goals. HCD principles and an adapted version of the RITE method [19] were applied to engage survivors of violence as co-designers through a multiphase process. This study aimed to describe the HCD process used to develop a client-facing mHealth app for survivors of violence receiving HVIP case management services and to identify key design themes that can inform the development of ethical, effective mHealth tools for this population.

Methods

Study Design and Setting

This study applied an iterative, mixed methods design to develop the client-facing component of the app. We integrated adapted principles of HCD with the RITE methodology to create an mHealth app intended to improve access to community resources and strengthen communication between clients and their VPPs. At each stage, we solicited client feedback and incorporated it into subsequent iterations. To contextualize this work within the existing landscape of client-facing digital health tools, we conducted an informal scoping review of published and publicly available mHealth apps for populations affected by trauma and people with low socioeconomic status prior to beginning the design process, which confirmed the absence of tools developed through direct co-design with survivors of community violence.

We conducted this study through a partnership between the San Francisco Wraparound Project (WAP) and The Better Lab. WAP is a HVIP at Zuckerberg San Francisco General Hospital and Trauma Center that offers long-term support to survivors of community violence. The Better Lab, housed within the Department of Surgery at the University of California San Francisco (UCSF), is a research laboratory dedicated to improving health care delivery for marginalized communities through HCD.

We collected data and conducted design activities from 2020 to 2025. Due to pandemic-related restrictions, initial phases were conducted remotely via video call in 2020 and 2021. From 2022 onward, we resumed in-person sessions at Zuckerberg San Francisco General Hospital. We conducted participatory design sessions in 2020 and 2021, low-fidelity prototype testing in 2022, and high-fidelity prototype testing in 2024. During the RITE phase, wireframe iterations were implemented between testing sessions, typically within 1 week.

Ethical Considerations

This study was approved by the UCSF Institutional Review Board (protocol #17-23752). Verbal informed consent was obtained from all participants prior to any research activities. For participants younger than 18 years, parental informed consent was obtained alongside participant assent. To protect participant privacy, remote sessions conducted in 2020 and 2021 took place via videoconferencing with participants in private locations, while in-person sessions from 2022 to 2024 were held in private offices at Zuckerberg San Francisco General

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Hospital. All recordings were stored on password-protected servers accessible only to the research team, and participant identifiers were removed from transcripts and replaced with codes. All data were managed in compliance with UCSF data security policies. Each participant received a US $50 Visa gift card as compensation for their time.

Participants

A total of 15 unique clients were recruited to participate in the study. One client (Participant 4) participated in both the participatory design and low-fidelity prototype testing phases, contributing 2 sessions; the remaining 14 clients each contributed one session, for a total of 16 testing sessions (15 clients and 16 sessions). VPPs identified potentially eligible clients from their active caseloads and approached them during regularly scheduled case-management meetings. VPPs briefly described the study's purpose and voluntary nature, and interested clients were referred to the research team, which then reviewed eligibility criteria and obtained informed consent prior to scheduling a session. VPPs were instructed to prioritize referring clients who varied in age, sex, primary language, and stage of recovery to ensure diverse perspectives were captured across phases.

We established the following inclusion criteria: (1) current or recent enrollment in WAP, (2) age 13 years or older, and (3) ability to provide informed consent in English or Spanish, or, for participants younger than 18 years, ability to provide assent with parental informed consent.

Sample sizes for each phase were determined based on established norms in HCD and usability research, which suggest that 5-10 participants per iterative testing cycle are typically sufficient to identify the majority of usability issues, given the iterative, feedback-driven nature of the design process [22]. Accordingly, we targeted 4 participants for each of the participatory design and low-fidelity prototype testing phases and a slightly larger sample of 8 participants for high-fidelity prototype testing to account for the increased complexity and interactivity of the prototype and to support the RITE method's iterative feedback cycles.

Before progressing from the early, smaller sample phases to high-fidelity prototype testing, the research team reviewed the consistency of themes and design feedback emerging from participatory design and low-fidelity prototype testing to assess whether the insights gathered from 4 clients per phase were stable enough to inform the next stage of development. Because low-fidelity prototype testing reinforced all 6 themes originally identified in participatory design and surfaced only 2 new themes, the research team interpreted this consistency as an indication that the core client priorities had stabilized, providing sufficient confidence to move forward with a larger, more complex prototype in high-fidelity prototype testing. This approach reflects an iterative validation strategy common in HCD, in which each phase serves as a check on the prior phase's findings before scaling up sample size and prototype fidelity.

HCD

HCD is an iterative methodology, centered on empathetic qualitative research, iteration, and prototyping to design solutions to identified human needs [16,18]. The process consists of 3 phases: the "inspiration phase," the "ideation phase," and the "implementation phase." The "inspiration phase" consists of understanding the problem through qualitative investigation with a variety of key users and stakeholders to uncover opportunities for solutions, which has been described for this project in earlier research [8]. The "ideation phase" requires the research team to use the previously uncovered opportunities to brainstorm solutions and co-design prototypes with users and stakeholders, while iteratively improving the prototypes based on feedback. The "ideation phase" is also described in our previous work with VPPs [18]. Finally, the "implementation phase" tests prototypes in real-world contexts, allowing for further refinement if needed and evaluation.

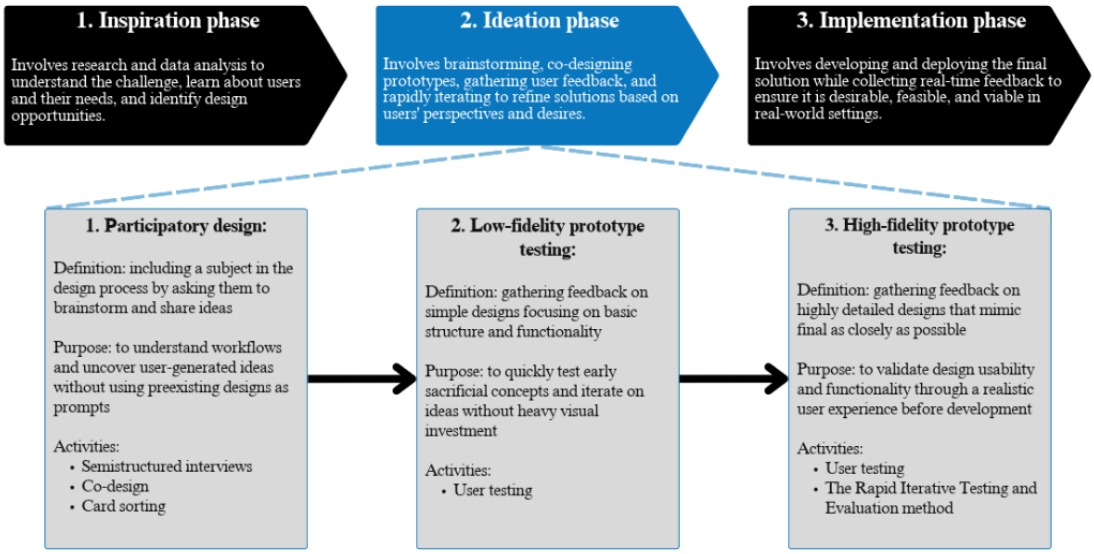
"Ideation Phase" Methods

This study concentrated on 3 key activities within the "ideation phase" of the HCD process: participatory design, low-fidelity prototype testing, and high-fidelity prototype testing (Figure 1). We augmented high-fidelity prototype testing with the RITE method in a manner consistent with the process used to design the VPP-facing interface of the app [18] (Multimedia Appendices 1 and 2). We used a structured, mixed methods process and implemented iterative refinements based on participant input between phases and between RITE sessions. Each phase produced three key outputs: (1) themes identified through qualitative analysis, (2) design features to incorporate into the next phase, and (3) prototype development (wireframes, or pictorial depictions of mobile app screens) for use in the subsequent testing phase. Specifically, participatory design produced initial low-fidelity wireframes, low-fidelity prototype testing produced refined low-fidelity wireframes that were then developed into initial high-fidelity wireframes, and high-fidelity prototype testing produced the final high-fidelity wireframes ready for implementation. Wireframes were developed and tested under an internal working title (WrapApp), which is used in wireframe images throughout this study's figures and appendices but is not the app's formal name.

Throughout the Results section, Multimedia Appendices 3-6 provide detailed, phase-specific documentation of how identified themes were translated into concrete wireframe features; readers may reference these tables alongside the Results section to see specific examples of theme-to-feature translation.

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Figure 1. Overview of the 3-phase human-centered design process (inspiration, ideation, and implementation) used in this study, with emphasis on the 3 methods comprising the "ideation phase": participatory design, low-fidelity prototype testing, and high-fidelity prototype testing (Adapted from Salvatori et al, published in JMIR Formative Research, 2026 [18]).



Phase 1: Participatory Design and Thematic Analysis

Participatory design was used to actively engage clients as co-designers in the creative process rather than passive participants. This approach was selected because it fosters collaboration, rebalances traditional researcher-participant power dynamics, and prioritizes the creation of novel solutions directly informed by users instead of simply refining preconceived concepts without user input [23].

Participatory design activities consisted of a semistructured interview and 2 co-design activities: a card-sorting exercise and a participatory sketching activity. Semistructured interviews were conducted with each client in this phase to explore their personal backgrounds, experiences working with WAP, goals for healing and recovery, and challenges in communication or coordination with their VPPs. The interview guide included open-ended questions such as "Can you tell me about your experience working with your VPP?" and "What has made it easier or harder for you to stay in touch with your VPP during recovery?" Probing questions were used to elicit specific examples and elaborate on communication preferences, technology use, and unmet needs.

Clients were invited to take part in co-design activities [24], during which they shared stories, discussed their needs, and visually expressed their ideas for the app through a card-sorting exercise and guided participatory sketching activity. Clients were first asked to participate in a card-sorting exercise using features elicited in the "inspiration phase" of this study [8]. In this exercise, clients were given physical cards each labeled with a theme elicited from previous interviews with clients [8]: resources, job help, legal help, communication, community, education, and celebration. These 7 themes aligned with potential in-app features. For instance, the communication theme indicated the need for a messaging feature. Through a discussion with the interviewer, clients numerically ranked the features in order of importance for implementing features in the app. Once the participants completed the card-sorting activity, the research team moved on to the guided participatory sketching activity. During this activity, participants were asked probing questions by the research team to take their prioritized features from the card-sorting activity and either sketch directly onto paper templates or guide researchers in drawing their envisioned app features.

We conducted four 60- to 90-minute remote sessions with 4 clients. A team of 3 researchers (AS, DP, and GS) facilitated the sessions: a lead design researcher (AS) conducted the interview while the second and third team members took detailed observational notes (DP and GS). Interviews were audio-recorded for subsequent transcription and analysis, and transcripts from this phase were analyzed by DP and GS as described in the Data Analysis section below. Although the number of participants in the participatory design phase was small, this phase emphasized depth of engagement over breadth, consistent with participatory design methodologies that prioritize intensive cocreation activities with each participant.

This phase produced 3 key outputs to inform the subsequent low-fidelity prototype testing phase: (1) themes: themes were identified through qualitative analysis of interview transcripts; (2) design features: the identified themes were translated into specific refinements and new features for the prototype; and (3) prototype development: the themes and design features were used to create initial low-fidelity wireframes in Figma. Each wireframe was designed to integrate key features proposed by clients during co-design activities and to reflect the broader themes identified through qualitative synthesis. These initial low-fidelity wireframes served as the prototype tested in the subsequent low-fidelity prototype testing phase.

Phase 2: Low-Fidelity Prototype Testing and Thematic Analysis

Low-fidelity prototype testing [25] was used to evaluate the basic structural elements and core functionalities of the initial low-fidelity wireframes developed during the participatory design phase. We selected this method to gather early feedback

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on conceptual designs before investing resources in high-fidelity development. We collected feedback through user testing sessions using the static wireframes produced in the previous phase.

Initial low-fidelity wireframes created in Figma during the participatory design phase were tested. These static wireframes represented key features of the app, including the home page, messaging, and resources. Guided usability sessions were conducted using standardized interview questions to ensure consistency in data collection across participants. Standardized prompts included questions such as "What do you think this screen is for?" and "How would you expect to find [resource/feature] here?" alongside wireframe-specific prompts addressing the alternative home page metaphors described below. While the wireframes were not interactive, they were used as sacrificial concepts to provoke discussion and generate meaningful feedback. For example, clients were shown alternative visual metaphors on the home page wireframe to represent the healing trajectory, such as a car traveling along a road or a garden in bloom, and asked to share their reactions and preferences.

Clients participated in guided user testing sessions during which they reviewed each wireframe and responded to structured prompts regarding functionality and form. A total of four 60- to 90-minute interviews were conducted with 4 clients. A design researcher led the sessions, with other team members observing and taking notes (DP and GS). Interviews were audio-recorded for subsequent transcription and analysis, and transcripts from this phase were analyzed by DP and GS as described in the Data Analysis section below. Although the number of participants in the low-fidelity prototype testing phase was small, the operationalized methodology generated focused feedback that informed concrete design decisions.

This phase produced 3 key outputs to inform the subsequent high-fidelity prototype testing phase: (1) themes: additional themes were identified through qualitative analysis of interview transcripts; (2) design features: the identified themes were translated into specific refinements and new features for the prototype; and (3) prototype development: the themes and design features were used to create a refined low-fidelity prototype in Figma, featuring improved iterations of the 3 original wireframe categories and their embedded wireframes. The revised low-fidelity wireframes were then translated into an initial high-fidelity prototype using Figma. The updated wireframes incorporated partially interactive elements that allowed users to navigate through core app functions, providing a more realistic simulation of the app experience. Visual elements were refined using user feedback from low-fidelity prototype testing and best practices in user interface (UI) and UX design [26]. To ensure accessibility for Spanish-speaking clients, all wireframes were translated into Spanish and reviewed by a native Spanish-speaking member of the WAP team to confirm accuracy and cultural appropriateness.

Phase 3: High-Fidelity Prototype Testing and Thematic Analysis

High-fidelity prototype testing was used to evaluate the usability, functionality, and visual appeal of the initial high-fidelity wireframes [27] developed in the prior low-fidelity prototype testing phase. Two parallel analytical approaches were used in this phase: inductive thematic analysis of user testing interviews and the RITE method for rapid implementation of design improvements. We aimed to identify and address design issues prior to full implementation.

The same adapted version of the RITE method applied in our prior VPP study was used here to enable rapid, feedback-driven iterations that ensured the prototype evolved in response to real user insights [18], as described in the Data Analysis section below.

We held eight 60- to 90-minute sessions with 8 WAP clients to test the initial high-fidelity wireframes. One researcher (MGS) facilitated each session and conducted the interview while taking detailed observational notes. All interviews were audio-recorded and transcribed for analysis by MGS. During these interviews, participants were asked to navigate the interactive Figma prototypes to complete predefined tasks (Textbox 1) while using a think-aloud protocol to verbalize their thoughts, decision-making processes, and reactions in real time [28]. Task performance observation was combined with in-depth discussion, enabling evaluation of how well the prototype aligned with client expectations and generating actionable insights for ongoing design refinements. Following completion of each task, participants were asked structured debrief questions (eg, "How did that compare to what you expected?" and "Was there anything confusing or missing?") to elicit additional feedback beyond what emerged during the think-aloud protocol.

Each usability testing session was recorded, transcribed, and systematically coded by app wireframe and corresponding RITE category by MGS and DP. In parallel with RITE implementation, thematic analysis was conducted on all qualitative data by MGS and DP, as described in the Data Analysis section below.

This phase produced 3 key outputs to inform the final implementation-ready version of the app: (1) themes: themes were identified through qualitative analysis of interview transcripts, building upon and expanding the themes from the low-fidelity prototype testing phase; (2) design features: the identified themes and RITE-categorized feedback were translated into specific refinements and new features for the final prototype; and (3) prototype development: the themes, design features, and RITE-categorized feedback were used to iteratively refine the wireframes between each testing session. Through successive iterations, the wireframe library was expanded and refined to produce the final high-fidelity wireframes. This dual approach of comprehensive thematic analysis and rapid RITE implementation produced the final high-fidelity version of the app which was reviewed by the VPPs and WAP program director for final approval for software development and implementation.

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Textbox 1. Predefined usability tasks assigned to clients during high-fidelity prototype testing, organized by app wireframe (eg, sign-up, home page, care plan, resources, messaging, and Violence Prevention Professional profile). Clients completed these tasks using a think-aloud protocol while navigating the interactive Figma prototype; task completion informed Rapid Iterative Testing and Evaluation feedback coding.

Wireframe titles and key tasks

Sign-up

- Create an account with the mobile health (mHealth) app.

Login

- Login to the mHealth app.

Home page

- Access home page.
- Interact with home page features.

Client profile

- Access personal profile.
- Access client care plan.
- View personal badges.

Care plan

- Access personal care plan.
- Access personal milestones, tasks, and subtasks.
- Edit milestones, tasks, and subtasks.
- Mark progress for milestones, tasks, and subtasks.

Resources

- View employment resources.
- Search for a specific job.
- View new posting details.
- See options for interacting with job posting.
- Add job posting to correct milestone in care plan.
- Search youth resources.

Messaging

- View all messages.
- Navigate to new message.
- Send message to violence prevention professional (VPP).

VPP profile

- Access VPP profile.
- Send badge to VPP.
- Access achievements.

Data Analysis

Across all phases, we conducted inductive thematic analysis [29] in which codes and themes were derived directly from the data rather than applied from a preexisting theoretical framework. For each phase, 2 researchers (MGS and DP) independently reviewed transcripts to generate initial codes capturing discrete concepts present in the data. Codes were compared and discussed to resolve discrepancies before being entered into MURAL, where they were visually clustered based on conceptual similarity through affinity mapping [30]. Through iterative rounds of clustering, discussion, and refinement, related codes were consolidated into broader themes that captured patterns of meaning across the dataset. Themes were then reviewed against the coded data to confirm they accurately represented the underlying codes and were revised, merged, or

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renamed as needed. MURAL served as the primary tool for organizing and visualizing coded data across all phases; no dedicated qualitative data analysis software was used.

To support trustworthiness, 2 researchers (MGS and DP) independently coded transcripts and reached consensus through discussion and maintained a documented audit trail of affinity mapping boards across phases. Additionally, because each testing phase built on themes identified in the prior phase, subsequent rounds of client feedback served as an informal, ongoing form of member checking that helped validate and refine emerging themes over time.

Although formal thematic saturation was not assessed within a fixed sample size, each phase was designed to build cumulatively on the prior phase's themes, and the research team informally discussed whether new data continued to yield novel themes or primarily reinforced existing ones. By high-fidelity prototype testing, all themes from earlier phases continued to be reinforced without contradiction, suggesting a stable core set of client priorities even as new themes continued to emerge. When candidate themes overlapped conceptually, the research team discussed distinguishing features and either merged themes reflecting the same underlying concept or retained them separately when they captured meaningfully distinct aspects of client experience.

During high-fidelity prototype testing, this thematic analysis process was conducted in parallel with the RITE method, described above, which provided a complementary framework for rapidly categorizing and acting on usability-specific feedback. The traditional RITE method categorizes feedback into 4 types: (1) issues with clear causes and easily implemented solutions, (2) issues with clear causes but complex or delayed fixes, (3) issues with unclear causes and no immediate solutions, and (4) feedback attributed to external factors [19]. For this study, we introduced 2 additional categories to better reflect the nuances of user input: (5) positive feedback, which captured desirable features that should remain, and (6) conflicting feedback, which flagged when one participant's input contradicted another's (further described in Multimedia Appendix 1). Feedback classified as "Category 1" or "Category 2" was implemented immediately between testing sessions, unless precluded by technical constraints, whereas "Category 3" and "Category 4" items were reviewed and implemented in consultation with the VPP supervisor. If the design team could not implement a fix between sessions, the proposed change was described verbally to subsequent participants to solicit feedback. Conflicting input ("Category 6") was systematically documented and incorporated into targeted follow-up questions in subsequent testing sessions; when disagreements persisted, the design team implemented solutions that supported user choice by enabling customization in feature experience, or the research team and VPP supervisor reached final decisions collaboratively.

Results

Overview

Fifteen unique clients participated across 3 testing phases within the "ideation phase" (Table 1); one client (participant 4) participated in 2 phases (participatory design and low-fidelity prototype testing), while the remaining 14 clients each participated in one phase, yielding 16 total testing sessions. Participatory design included 4 sessions testing an initial concept prior to wireframe development, low-fidelity prototype testing included 4 sessions testing concepts that led to 12 initial low-fidelity wireframes, and high-fidelity prototype testing included 8 sessions testing 23 initial high-fidelity wireframes, which were iteratively refined into 32 final wireframes. Fifteen distinct themes emerged across testing phases (Table 2). Participatory design identified 6 themes; low-fidelity prototype testing reinforced these and added 2 new themes (8 total); and high-fidelity prototype testing reinforced all prior themes and identified 7 additional themes (15 total). In the high-fidelity prototype testing phase, 291 discrete feedback items were captured and coded into 6 RITE categories, with 98 identified as actionable issues. Successive iterations informed by thematic analysis and RITE implementation resulted in the wireframe library evolving from 12 initial low-fidelity wireframes to 32 final high-fidelity wireframes to 32 final high-fidelity wireframes. Additionally, the VPPs and the WAP program director formally approved the completed wireframe set for software development and implementation.

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Table 1. Demographic characteristics of the 15 clients who participated in this study (16 total testing sessions), including testing phases of participation, race, ethnicity, sex, age, and languages spoken[a].

Participant	Testing phase	Race	Ethnicity	Sex	Age (years)	Languages spoken
Participant 1	Participatory design	Other	Hispanic, Latino/a, or Spanish Origin	Male	29	Spanish
Participant 2	Participatory design	Black or African American	Not Hispanic, Latino/a, or Spanish Origin	Male	28	English
Participant 3	Participatory design	Other	Not Hispanic, Latino/a, or Spanish Origin	Male	57	English
Participant 4	Participatory design; low-fidelity prototype testing	Black or African American	Not Hispanic, Latino/a, or Spanish Origin	Male	41	English
Participant 5	Low-fidelity prototype testing	Black or African American	Not Hispanic, Latino/a, or Spanish Origin	Male	31	English
Participant 6	Low-fidelity prototype testing	Black or African American	Not Hispanic, Latino/a, or Spanish Origin	Male	34	English
Participant 7	Low-fidelity prototype testing	Black or African American	Not Hispanic, Latino/a, or Spanish Origin	Male	19	English
Participant 8	High-fidelity prototype testing	Black or African American	Not Hispanic, Latino/a, or Spanish Origin	Male	31	English
Participant 9	High-fidelity prototype testing	Black or African American	Not Hispanic, Latino/a, or Spanish Origin	Male	23	English
Participant 10	High-fidelity prototype testing	Black or African American	Not Hispanic, Latino/a, or Spanish Origin	Male	25	English
Participant 11	High-fidelity prototype testing	Black or African American	Not Hispanic, Latino/a, or Spanish Origin	Male	66	English
Participant 12	High-fidelity prototype testing	White	Not Hispanic, Latino/a, or Spanish Origin	Male	33	English
Participant 13	High-fidelity prototype testing	Other	Hispanic, Latino/a, or Spanish Origin	Male	40	Spanish
Participant 14	High-fidelity prototype testing	Other	Hispanic, Latino/a, or Spanish Origin	Female	21	English and Spanish
Participant 15	High-fidelity prototype testing	Other	Hispanic, Latino/a, or Spanish Origin	Female	17	English and Spanish

[a]One client (participant 4) participated in both the participatory design and low-fidelity prototype testing phases.

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Table 2. The 15 themes identified through inductive thematic analysis across all 3 testing phases (participatory design, low-fidelity prototype testing, and high-fidelity prototype testing), including the phase(s) in which each theme was identified or reinforced, a description of the theme, and a representative client quote.

Themes	Phases identified	Theme description	Example quote
Trust	• Participatory design • Low-fidelity prototype testing • High-fidelity prototype testing	Clients emphasized the importance of trusting their VPPs[a] to create space for vulnerability in the app while maintaining confidentiality.	"I have trust issues on who I can talk to about what happened to me...Because I don't know who they are going to go talk to about this." (P4, Participatory design)
Personal connection	• Participatory design • Low-fidelity prototype testing • High-fidelity prototype testing	Clients expressed a strong desire to build personal connections with their VPPs, particularly through shared lived experiences.	"I want to, to someone to talk to like, someone that's been through a similar experience that would understand." (P4, Participatory design)
Guidance in meaningful decision-making	• Participatory design • Low-fidelity prototype testing • High-fidelity prototype testing	Clients identified a need for guidance in asking the right questions and making informed decisions throughout their healing journey.	"...If you're not educated about your patient rights, you never know to ask: 'What about your patient rights'..." (P3, Participatory design)
Client empowerment	• Participatory design • Low-fidelity prototype testing • High-fidelity prototype testing	Clients voiced a desire to feel empowered by having access to information to support their healing and recovery independently.	"Information is empowering you know...answers to questions, information is very important." (P1, Participatory design)
Intuitive and comprehensive design	• Participatory design • Low-fidelity prototype testing • High-fidelity prototype testing	Clients highlighted that the app should be intuitively designed: simple, well-organized, and easy to navigate.	"I think it should just be simple...maybe sectioned off... just categorize simpler for people." (P2, Participatory design)
Dynamic journey and sense of progress	• Participatory design • Low-fidelity prototype testing • High-fidelity prototype testing	Clients wanted a way to track their progress over time, noting that visible milestones help motivate them toward their goals.	"You reach those little milestones. And you're like, yes, I did it...you're getting closer and closer." (P4, Participatory design)
App personalization	• Low-fidelity prototype testing • High-fidelity prototype testing	Clients emphasized the importance of personalizing the app to reflect their individual recovery journeys.	"Not everyone has the same journey, so being able to adjust things would make it more useful." (P6, Low-fidelity prototype testing)
Tailored resource curation	• Low-fidelity prototype testing • High-fidelity prototype testing	Clients expressed a need for curated, easily accessible resources tailored to them.	"If there was a shortcut or quick link to the most used resources, that would save a lot of time." (P4, Low-fidelity prototype testing)
Celebration of client successes	• High-fidelity prototype testing	Clients highlighted the importance of recognizing and celebrating small achievements along their journey.	"It's like a mini celebration in itself...being able to celebrate little accomplishments, it's always important to keep pushing you in the right direction." (P11, High-fidelity prototype testing)
Standardization of verbiage and design choices	• High-fidelity prototype testing	Clients emphasized the need for consistent language and design throughout the app to avoid confusion.	"Your VPP is-- what's VPP stand for?" (P11, High-fidelity prototype testing)
Control over boundaries	• High-fidelity prototype testing	Clients expressed the need for control over personal information sharing, emphasizing privacy and clear boundaries.	"I don't like people like that really knowing my business..." (P9, High-fidelity prototype testing)

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Themes	Phases identified	Theme description	Example quote
Legitimization of experience	• High-fidelity prototype testing	Clients described the value of the app as an official record to validate their experiences.	"What if someone asked, from a different program, what are you here for? Or...they need a police report or something, and it's already there." (P14, High-fidelity prototype testing)
Accessibility of VPPs	• High-fidelity prototype testing	Clients emphasized the importance of easily accessing a VPP through the app when needed.	"...What if there's another button that says 'Connect to Available Person' and it will just show you who was available." (P15, High-fidelity prototype testing)
Gratitude expression	• High-fidelity prototype testing	Clients expressed the desire to express gratitude for the support they receive.	"...To be thankful for it...On my part, I would like to thank you very much for what you are doing for me." (P13, High-fidelity prototype testing)
Integration with medical care	• High-fidelity prototype testing	Clients emphasized the benefit of connecting their Wraparound support with their medical care team.	"...If somebody has a doctor... they could be looped into the message if they needed to." (P8, High-fidelity prototype testing)

[a]VPP: Violence Prevention Professional.

Phase 1: Participatory Design and Thematic Analysis Results

Four clients participated in the participatory design phase through semistructured interviews, co-design participatory sketching activities, and card-sorting activities to design the mHealth app's features.

Thematic analysis of the semistructured interview transcripts resulted in six key themes: (1) trust, (2) personal connection, (3) guidance in meaningful decision-making, (4) client empowerment, (5) intuitive and comprehensive design, and (6) dynamic journey and sense of progress (Table 2).

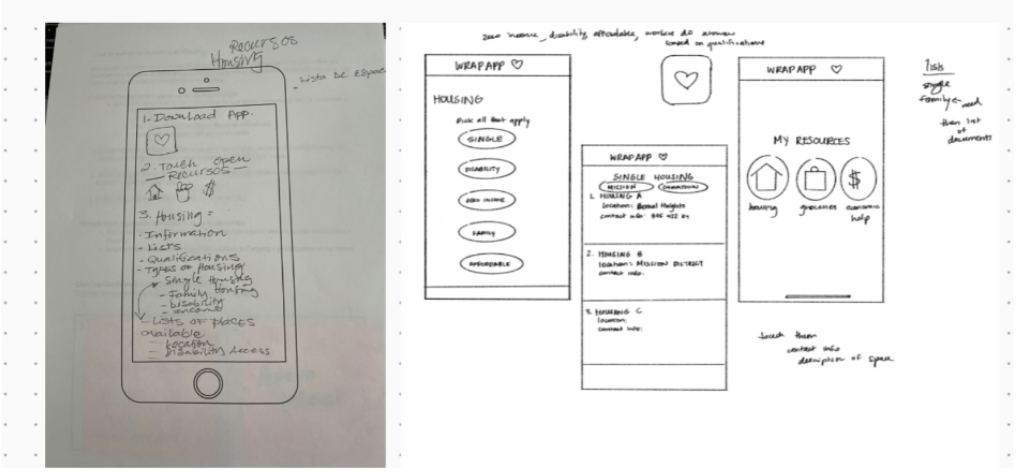
The findings from the card-sorting exercise revealed that clients prioritized features that allowed for relationship building between themselves and their VPPs, specific resources such as legal help, and community connections with other survivors of community violence. Specifically, the feature of "legal help" was included in the top 3 rankings of all 4 clients. All 4 clients included "celebration" in their ranked list but placed it in the last position. These priorities informed feature selection for the initial prototype, ensuring the app included messaging, resource lists, and celebratory features.

Participatory sketching exercises indicated that clients prioritized visual representations of resource navigation to support decision-making and articulated expectations for how the app would guide users through this process. Clients emphasized having various options to organize and sort through resources based on their needs. An example of this activity is shown in Figure 2.

Twelve initial low-fidelity wireframes were created from the themes uncovered from interviews, co-design sketching exercises, card-sorting activities, and specifically requested design features. Wireframes focused on 3 core functions clients prioritized: staying oriented (home page), finding resources (resources), and communicating with a VPP (messaging). Each wireframe integrated key features proposed by clients during co-design activities, such as milestone trackers to visualize progress, resource lists to guide healing, and messaging interfaces to build trust and connection (refer to Table 3 and Multimedia Appendix 3 for detailed wireframe descriptions and theme-to-feature mapping).

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Figure 2. Example of a participatory sketching activity from the participatory design phase, in which a client worked with the research team to sketch envisioned app features directly onto a paper wireframe template.



Client depiction of how they would interact with the app to get a specific resource: housing.

Interviewer or designer depiction of client's description in more detail.

Table 3. Progression of app wireframe development across all 3 testing phases, showing the wireframe categories, key features added at each stage, total wireframe count, and corresponding appendix table with detailed wireframe descriptions for each phase's prototype development output.

Phase and prototype development output	Categories	Key features added	Wireframe count	Appendix reference
Participatory design • Prototype development output: initial low-fidelity wireframes	• Home page • Resources • Messages	• Welcome message and calendar • Dynamic milestone tracker • Resource categories and details • Chat interface with text, voice, and image options	12	Multimedia Appendix 3
Low-fidelity prototype testing • Prototype output 1: final low-fidelity wireframes	• Home page • Resources • Messages	• Milestone roadmap tracker (enhanced) • Calendar with agenda • Search bar for resources • Read and unread messaging status • Enhanced personalization options	12	Multimedia Appendix 4
Low-fidelity prototype testing • Prototype development output 2: initial high-fidelity wireframes	• Home page • Resources • Messages • Sign-up (new) • Login (new) • Client profile (new) • Care plan (new) • VPP[a] profile (new)	• Interactive navigation • Refined visual design (colors, typography, icons) • Five new wireframe categories added • Spanish translation	23	Multimedia Appendix 5
High-fidelity prototype testing • Prototype development output: final high-fidelity wireframes	• All 8 categories with expanded wireframes	• Privacy toggle for personal information • Badge system for celebration and gratitude • Out-of office messaging • Hospital portal integration • Enhanced care plan with task management • VPP availability indicators	32	Multimedia Appendix 6

[a]VPP: Violence Prevention Professional.

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Phase 2: Low-Fidelity Prototype Testing and Thematic Analysis Results

Four clients participated in low-fidelity prototype testing to evaluate the 12 initial low-fidelity wireframes developed during the participatory design phase. Eight themes emerged through inductive thematic analysis, reinforcing all 6 themes from participatory design and identifying 2 additional themes: (7) app personalization and (8) tailored resource curation. App personalization reflected clients' emphasis on the importance of being able to customize the app to reflect their individual recovery journeys, recognizing that each person's needs and experiences are different. Tailored resource curation captured clients' expressed need for curated, easily accessible resources within the app, suggesting that access to resources specifically tailored to their circumstances would make the experience more efficient and user-friendly. All 8 themes along with their descriptions and representative quotes are presented in Table 2.

The first prototype development output involved refining the low-fidelity wireframes in response to the 8 identified themes and specific client feedback obtained during testing sessions, incorporating enhanced functionality such as personalization options for recovery journeys, curated resource lists with search capability, and improved milestone tracking with calendar integration. The refined prototype retained the 3 original wireframe categories (home page, resources, and messaging) with improved iterations of the embedded wireframes. The home page included specific visualizations capturing the client's journey through their recovery and specific tasks that remained for both the client and VPP in that journey. Although the overall structure remained unchanged, with 12 final low-fidelity wireframes in total, usability improvements were implemented in direct response to client feedback (Multimedia Appendix 4).

The second prototype development output of this phase involved further developing the final 12 low-fidelity wireframes into 23 initial high-fidelity wireframes organized into 8 categories: sign-up, login, home page, client profile, care plan, resources, messaging, and VPP profile. These additional wireframes focused on the client UX (sign-up, login, client profile, and VPP profile), as well as further developing existing wireframe concepts (home page, care plan, resources, and messaging). This transition involved three key changes: (1) introducing interactive elements and realistic visual design, (2) expanding from 3 to 8 wireframe categories by adding onboarding and profile features, and (3) translating all content into Spanish with review by a native Spanish-speaking WAP team member (Multimedia Appendix 5).

Phase 3: High-Fidelity Prototype Testing and Thematic Analysis Results

Eight clients participated in high-fidelity prototype testing to evaluate the 23 initial high-fidelity wireframes developed following low-fidelity prototype testing. Fifteen themes emerged through inductive thematic analysis, reinforcing all 8 themes from low-fidelity prototype testing and identifying 7 additional themes: (9) celebration of client successes, (10) standardization of verbiage and design choices, (11) control over boundaries, (12) legitimization of experience, (13) accessibility of VPPs, (14) gratitude expression, and (15) integration with medical care (Table 2). Celebration of client successes emerged as a key theme, highlighting clients' emphasis on the importance of recognizing and celebrating every incremental achievement throughout their recovery journey in the mHealth app. Participants noted that positive reinforcement supported sustained motivation and encouraged continued progress. Standardization of verbiage and design choices captured clients' need for consistent language and design across the app to avoid confusion, suggesting that inconsistencies could create barriers to understanding and engagement. Control over boundaries reflected clients' expressed need for autonomy over how much personal information they share in the app, underscoring the importance of privacy controls and clearly defined boundaries. Legitimization of experience described the value clients saw in the app as an official record capable of validating their experiences, with participants noting that documented proof of their circumstances could facilitate access to additional services and support. Accessibility of VPPs emerged as a priority, emphasizing clients' need for easy access to a VPP, including real-time visibility into VPP availability to enhance timely support and responsiveness. Gratitude expression captured clients' desire to express gratitude for the support they receive, suggesting that such features can strengthen relationships and foster mutual respect. Finally, integration with medical care reflected clients' emphasis on the benefit of connecting their WAP services with their medical care teams, suggesting that integrated communication within the app could improve coordination and better support their healing process. To illustrate how these themes translated into concrete features, the celebration of client successes and gratitude expression themes informed the badge system, which allowed clients to receive and send recognition through the client profile and VPP profile wireframes (Table 4; Multimedia Appendix 6). Similarly, the control over boundaries theme informed the privacy toggle added during sign-up, which allowed clients to mark fields such as nationality or injury details as private (Table 4; Multimedia Appendix 6).

A total of 291 feedback items were collected and categorized across 6 RITE categories during the 8 testing sessions. Of these, 98 (34%) items were classified as actionable, meaning they had a clear cause and an identifiable fix ("Category 1" or "Category 2"), 38 (13%) items were nonactionable, having an unclear cause or one attributable to external factors ("Category 3" or "Category 4"), 136 (47%) items were positive feedback affirming existing design choices ("Category 5"), and 19 (7%) items represented conflicting feedback between participants ("Category 6"). Of the 98 actionable feedback items, 89 (91%) were implemented between testing sessions, achieving a 91% impact ratio (Multimedia Appendix 2). This high impact ratio reflects the extent to which client feedback directly and measurably shaped the final prototype: addressed issues translated into concrete usability improvements such as reduced navigation confusion (eg, clarified badge-sending instructions on the VPP profile wireframe), clearer and more consistent terminology across screens (eg, defining acronyms such as "VPP"), and design changes that better aligned with client expectations (eg, redesigning the out-of-office messaging flow

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after clients expressed confusion about emergency contact options).

Category 3 items (issues with unclear causes and no immediate solutions) were addressed by incorporating targeted follow-up questions into subsequent testing sessions to clarify the underlying issue; for example, client uncertainty about whether the home page's "quote of the day" should be randomized or user-selected prompted additional probing questions in later interviews (Table 4). Feedback attributed to other factors (Category 4) typically reflected situational or environmental issues unrelated to the design itself, such as a participant's difficulty reading wireframe text due to not having their glasses on hand, rather than substantive usability concerns; these items informed minor future considerations, such as font size customization, without prompting immediate design changes (Table 4). Positive feedback (Category 5), the largest category, largely reflected client affirmation of core design decisions already incorporated into the prototype, such as the simplicity of the login flow and the clarity of the home page's milestone tracker, validating that these design choices should be retained without further modification (Table 4). Category 6 items (conflicting feedback) were resolved either by implementing design solutions that allowed for user choice and customization, such as making the display of injury date on the client profile optional, or through collaborative decision-making between the research team and the VPP supervisor when consensus could not be reached through design alone. Representative examples of these translations from feedback to design action are provided in Table 4.

Iterative refinements informed by thematic analysis and RITE implementation between each testing session resulted in an expansion of the wireframe library from 23 to 32 final high-fidelity wireframes. Key additions and refinements included privacy controls for boundary setting, badge systems for celebration and gratitude, out-of-office messaging features for VPP accessibility, and integration points with hospital portals for medical care coordination. While privacy controls, celebration and gratitude, and VPP accessibility were first surfaced as high-level themes during the "inspiration phase" of this research [8], high-fidelity prototype testing allowed these concepts to be translated into concrete, actionable design features. Table 3 presents the final wireframe categories with associated themes and key features (refer to Multimedia Appendix 6 for detailed descriptions of the final wireframes).

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Table 4. Representative examples of client feedback collected during high-fidelity prototype testing, organized by app wireframe, including supporting client quotes, the assigned Rapid Iterative Testing and Evaluation category (refer Multimedia Appendix 1 for category definitions), and the resulting design action taken or notes for future iteration.

Wireframe	Feedback or observation	RITE[a] Category assigned	Steps taken and notes
Sign-up	Clients want the option to mark certain personal information as private. • Supporting quote: "Some people may not want to share their nationality. It depends on who they is... I know for applications, for jobs and stuff, just coming from my background, it's like, no." (P8)	"Category 1": Obvious cause, obvious solution, easy to implement	Added toggle functionality to mark specific fields as private during sign-up.
Login	Login wireframe was clear and easy to use. • Supporting quote: "I feel like it's good. You could sign up. It looks like a usual login screen. It's pretty straightforward." (P15)	"Category 5": Positive feedback	Noted as positive validation; no changes needed.
Home page	Uncertainty about whether the quote of the day should be randomized or user-selected. • Supporting quote: "I would like it just randomly, just like the quote of the day, just to see what happens. But that would also be interesting to see if you could choose. I don't know what options would be there, but just go through it and check it out." (P12)	"Category 3": No obvious cause, no obvious solution	Added related questions to future interview guides to explore user preferences.
Client profile	Mixed opinions on showing date of injury on profile. • Supporting quote 1: "For sure. Most definitely. Because you don't know what might happen. You might need your medical-- and this could be right there on that...that's very important." (P9) • Supporting quote 2: "I don't think…I don't want to be reminded of that. I don't want to see that." (P10)	"Category 6": Disagreement between participants	Gave users the option to include or exclude injury date during onboarding and in-app settings.
Care plan	Layout of care plan was overwhelming and difficult to navigate. • Supporting quote: "I feel a little bit overwhelmed with all the different things here...But for some reason, when I look at it, I'm just-- I know I got ADHD, so it's like, damn, there's a lot." (P12)	"Category 3": No obvious cause, no obvious solution	Revised Figma design with clearer buttons, improved wireframe flow, and enhanced color contrast. Added related interview questions for further feedback.
Resources	User could not read the wireframe due to forgetting their glasses. • Supporting quote: "What? I think my eyes. It's not you…I supposed to read that one?" (P11)	"Category 4": Issue due to other factors	No immediate changes. Noted font size customization as a future enhancement.
Messaging	Confusion over emergency contact options when VPP is unavailable. • Supporting quote: "Call on-call VPP, I don't understand why call 911 is an option right there. Because I need to call the on-call VPP, I don't think I need to call 911..." (P10)	"Category 2": obvious cause, obvious solution, hard	Redesigned entire "out-of-office" messaging flow for clarity and alignment with workflows.
Violence prevention Professionals profile	Unclear instructions for sending badges to a VPP. • Supporting quote: "It says Add Badge, that's not asking me to add a badge, right?...Oh, it is…So are these already here or are these me picking them? Would there be more information?" (P12)	"Category 1": Obvious cause, obvious solution, easy to implement	Added clear badge-sending instructions directly into the wireframe.

[a]RITE: Rapid Iterative Testing and Evaluation.

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Discussion

Study Overview and Key Findings

HCD, integrated with RITE, was used to develop a client-facing mHealth app tailored to the needs of survivors of violence receiving case management services through a HVIP. The app required customization beyond typical mHealth tools to reflect the emotional and practical needs of trauma survivors. Across 16 testing sessions with 15 clients, 15 themes emerged that shaped the app's design. During high-fidelity prototype testing, 89 of 98 actionable usability issues (91%) were resolved across iterative sessions with 8 clients. Through this process, the prototype expanded from 12 initial low-fidelity wireframes to 32 final high-fidelity wireframes.

Compared with our prior research with VPPs [18], several overlapping themes emerged, including the need for clear workflows, effective communication, resource integration, and relationship-building tools. However, clients uniquely emphasized autonomy, visibility into their own progress, and the ability to personalize their app experience; features less prioritized by VPPs. This comparison highlights the importance of designing with both sides of the case management dyad in mind, ensuring that digital tools align not only with provider workflows but also with client needs for agency and healing.

Comparison With Existing Research

While prior studies have evaluated digital interventions for resource navigation or behavioral health among marginalized populations [31-34], we are unaware of any studies that have deeply integrated survivors of community violence as part of the design team as co-designers themselves. This gap extends beyond digital health specifically: a recent scoping review found that although trauma survivors have long been engaged in hospital-based injury prevention and violence intervention programs, most of this involvement has centered on survivors serving as peer counselors or program deliverers, rather than as active participants in shaping the tools and technologies used within these programs [35]. Our study addresses this gap by positioning survivors specifically as co-designers of a digital tool intended to support their own recovery, rather than as deliverers of support to others, a distinction that matters because survivor-generated design priorities, such as the emphasis on progress visibility and personalization identified in this study, may differ meaningfully from features prioritized by peer counselors or provider-oriented staff. Our findings support the growing literature that underscores the value of cocreation with marginalized users, particularly to promote trauma-informed care approaches [36]. For instance, consistent with Decker et al [4], clients in our study emphasized the value of connecting with VPPs who share lived experiences and the critical role trust plays in sustained engagement. Unlike traditional user research that often extracts needs from users, this study positioned clients as collaborators, surfacing nuanced preferences around emotional safety, recognition, and individualized recovery journeys. Similarly, work on participatory, trauma-informed research engagement with survivors of intimate partner violence has emphasized the importance of open dialogue and shared power between researchers and survivor-participants throughout the research process [37]. Our use of iterative, RITE-augmented testing cycles reflects a similar commitment to shared power, allowing client feedback to directly and immediately shape the evolving prototype rather than being collected and applied only after the fact.

Engaging survivors of violence in research and design requires deliberate trust-building given this population's heightened vulnerability. Prior participatory research with intimate partner violence survivors emphasizes that trust must be established incrementally, often beginning with lower-stakes engagement before progressing to active co-design roles [38]. Our phased structure, from exploratory interviews through increasingly interactive prototype testing, reflects a similar progression.

Notably, our iterative approach resulted in features clients explicitly requested, such as privacy controls, badge systems for gratitude, and personalized milestone tracking, that are absent from existing social prescribing tools. This suggests that co-designing with end users can uncover needs that designers and providers might not anticipate, particularly around emotional dimensions of recovery such as recognition, agency, and celebration.

Design and Clinical Implications

This prototype has the potential to transform how HVIP services are delivered by improving both the client and VPP experience. For clients, this app introduces a centralized, intuitive platform that replaces fragmented communication and opaque processes with transparent, collaborative tools that center healing. Features like client profiles, care plans, and in-app messaging empower clients to understand and actively participate in their recovery journey, reframing care from something done to them to something done with them. The app makes goals, tasks, resources, and progress visible, which can foster motivation, autonomy, and sustained engagement, all of which are critical to trauma recovery.

Importantly, many design features that clients valued, such as real-time messaging, milestone tracking, and gratitude expression, also support VPP workflows and reinforce the therapeutic alliance. For example, the care plan feature provides clients with a tangible sense of momentum while giving VPPs a shared reference point for setting expectations and tracking progress. This mutual visibility can improve alignment, reduce miscommunication, and support collaborative care.

Looking ahead, the app's planned integration with Epic, the electronic health record system used by the hospital, presents a powerful opportunity to further promote continuity and equity in care. While VPPs currently document progress in Epic, patient access to these notes requires a separate interface with a separate login, which creates a barrier to transparency. This mHealth app could bridge this gap by providing clients with real-time access to the same recovery plan visible to their clinical care team, enhancing transparency and fostering shared accountability. In this way, the app can support a more holistic and dignified model of care, one that respects survivors as active participants in their own healing.

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A feasible integration approach maps selected care plan fields to structured elements exchanged through Epic-supported interfaces (eg, standards-based APIs where available). Implementation would require governance decisions about appropriate bidirectional exchange, role-based access controls for sensitive data, and auditability of staff versus client changes, alongside aligning terminologies, minimizing documentation burden, and managing consent for trauma-related information. These considerations will inform our implementation-phase pilot planning.

This integration raises a tension worth naming: participants expressed deep mistrust of institutional systems and a strong need for control over personal information, reflected in the control over boundaries theme and the app's privacy toggles. Connecting to Epic must therefore preserve, not undermine, that trust. Rather than exposing all client data by default, any future integration should let clients choose which care plan elements are shared with their clinical team, extending the same privacy-toggle logic already in the app, alongside role-based access controls so information disclosed to a VPP is not automatically visible to broader hospital staff.

Successful adoption will require dedicated time for VPP training, technical support during rollout, and mechanisms for ongoing user feedback. Adapting this approach for other HVIPs would require approximately 12-18 months and a multidisciplinary team of designers, researchers, VPPs, and developers, with attention to linguistic and cultural adaptation for diverse settings.

Ethical and Safety Considerations for Survivors of Violence

Deploying a client-facing app for survivors of community violence raises safety considerations beyond standard privacy and consent. Clients may share devices with others, and sensitive content, such as injury details or VPP messages, or push notifications referencing recovery activity could risk unintended disclosure or cause distress if surfaced at the wrong moment. Several design features emerging from client feedback helped mitigate these risks, such as privacy toggles introduced during sign-up that allow clients to mark sensitive fields (eg, nationality and injury details) as private, and the date of injury on the client profile was made optional rather than being default-visible in response to mixed client reactions (Table 4). Notification content represents an area for future design attention, using neutral language (eg, "You have a new message") to reduce the risk of inadvertent disclosure. The app is also Health Insurance Portability and Accountability Act (HIPAA)–compliant, providing an additional layer of protection for the sensitive information clients share within the platform.

Methodological Contributions

This study contributes to the methodological toolkit for co-designing interventions with marginalized populations. By combining HCD and the RITE method, we quickly identified, implemented, and reevaluated improvements from real-time feedback. Adding categories for positive and conflicting feedback allowed more nuanced interpretation, particularly when navigating emotionally sensitive or conflicting input. Rapid-cycle iteration can be resource-intensive, but the approach is adaptable: teams can calibrate implementation frequency to available capacity, and changes need not be comprehensively implemented between every participant, making RITE approachable for organizations with limited resources.

Limitations and Future Research

This study was conducted within a single HVIP in an urban safety-net hospital, which may limit the generalizability of findings. Although we engaged a diverse group of clients in terms of language (English and Spanish speakers) and age (17-66 years), the majority of participants were male (13/15, 87%). This sex distribution reflects broader demographic patterns in HVIP populations nationally, as community violence disproportionately affects young men (particularly young Black men). However, this skew remains a significant limitation in our study, as women often experience indirect exposure as cosurvivors of community violence [39,40]. Additionally, because our co-design process was shaped predominantly by male clients' perspectives, some app features, such as the framing of milestones, badges, and communication tools, may not fully reflect the priorities or preferences of female survivors. Future studies should expand to include larger, multisite samples with more balanced sex representation, potentially including family members of survivors, and integrate quantitative measures of engagement and health outcomes in postimplementation phases.

Our research team included individuals with backgrounds in design, surgery, public health, and violence prevention. While this interdisciplinary approach strengthened our methodology, we acknowledge that most researchers did not share the lived experience of violent injury. To mitigate this limitation, we positioned clients as co-designers rather than passive participants, and WAP VPPs, many with lived experience, served as cultural brokers throughout the design process. This collaborative structure helped ensure the tool reflected authentic client needs and preferences.

Future Directions

We are currently launching a pilot implementation of the app with 20 clients and 2 VPPs over an 8-month period focusing on app usage patterns, acceptability, and implementation feasibility. Key metrics will include frequency of client-VPP communication, time to resource linkage, app engagement rates, and user satisfaction scores. Pilot findings will inform refinements to the tool before broader rollout across all WAP VPPs. In parallel, we aim to develop training materials to help VPPs integrate the app into their workflows without disrupting client rapport. Following the pilot, we plan to pursue a larger-scale implementation evaluation examining the app's effects on client-reported outcomes, VPP workflow efficiency, and resource linkage over a longer time horizon, using a mixed methods implementation science framework to assess both effectiveness and adoption barriers across sites. In the longer term, this model may serve as a foundation for designing digital case management tools for other high-risk or marginalized populations, including those with histories of incarceration, housing instability, or substance use, where using HCD and co-design are essential to promoting equity.

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Conclusions

This study illustrates the power and necessity of co-designing with, not just for, survivors of violence. Through HCD and the RITE method, we built an mHealth tool that centers client agency, fosters connection, and supports recovery. In doing so, we also demonstrated that digital tools can be emotionally resonant, culturally responsive, and functionally effective when they are rooted in trust, transparency, and lived experience. As violence, inequity, and disconnection continue to shape health care challenges, a pilot implementation is now underway to evaluate the app's real-world usage, acceptability, and impact on resource linkage, with findings expected to inform broader rollout and future effectiveness research. This mHealth tool offers a promising approach for future work.

Acknowledgments

The authors thank the Wraparound Project VPPs and mental health workers for their insights: Sharmaine Quinnine, Albert Losno, Gaynor Siataga, Vanessa Jackson, Ruben Marquez, Julie Orellana, Felicia Cantu, Richard Rodriguez Leon, and Terrell Henderson. The authors also thank The Better Lab researchers for their research assistance: Lara Z. Chehab, Jennifer Reid, and Katherine Chang. The authors thank the current and former Medical Directors of the Wraparound Project for their organizational support: Caitlin Collins, Rochelle Dicker, Rebecca Plevin, and Catherine Juillard. The authors thank alumni of The Better Lab for their design support: Adrienne Baer, Sravani Khanal, Sarah Park, Hannah Pingol, Molly Fowkes, Azja Czajkowski, Sanjanaa Shanmugam, and Arisa Hayashi Del Monte. The authors thank the software engineering team at Alternova, Inc, for their initial software development contributions, and the team at Nitid for their continued development support. The authors thank the University of California, San Francisco Department of Surgery Scientific Writing Core Director, Pamela Derish, for her editing support.

Funding

Funding for this project was provided by the California Violence Intervention and Prevention Program, cohort #4.

Data Availability

The datasets generated and analyzed during this study are not publicly available due to the sensitive nature of the data and the need to protect the confidentiality of participants, who are survivors of community violence, a vulnerable population for whom even deidentified qualitative data may carry a risk of reidentification. Additional data are available from the corresponding author on reasonable request, subject to University of California San Francisco Institutional Review Board approval and execution of a data use agreement.

Generative AI Use

The authors declare that generative AI was not used in the preparation of this manuscript.

Authors' Contributions

Conceptualization: AS (lead), DP (equal), MT (support)
Data curation: MGS (lead), DP (equal), GS (supporting)
Formal analysis: MGS (lead), DP (equal), GS (supporting)
Funding acquisition: AS (lead), DP (equal)
Investigation: DP (lead), MGS (equal)
Methodology: AS (lead), DP (equal), GS (equal), MGS (supporting)
Project administration: MGS (lead), DP (equal)
Resources: AS (lead), MGS (equal), DP (equal), MT (supporting)
Software: MGS (lead), DP (equal), GS (supporting)
Supervision: MGS (lead), DP (equal), AS (equal), MT (supporting)
Validation: MGS (lead), CDvH (supporting), AS (supporting), MT (supporting)
Visualization: MGS
Writing – original draft: MGS (lead), DP (supporting), CDvH (supporting), MP (supporting)
Writing – review & editing: CDvH (lead), MP (equal), MGS (supporting), DP (supporting), AS (supporting)

Conflicts of Interest

AS is the owner and founder of The Empathy Studio, LLC, a human-centered design consultancy. During the study period, DP was a part-time design consultant for The Empathy Studio, LLC.

Multimedia Appendix 1

Rapid Iterative Testing and Evaluation (RITE) Method Categories. Classic RITE categories (1-4) were adapted from Medlock [19]. Categories 5-6 were added for this study to capture positive feedback and conflicting user input [18].

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[PDF File (Adobe PDF File), 158 KB-Multimedia Appendix 1]

Multimedia Appendix 2

Number of Feedback items during RITE Method Testing.
[PDF File (Adobe PDF File), 130 KB-Multimedia Appendix 2]

Multimedia Appendix 3

Initial low-fidelity wireframes, associated themes from 'Participatory Design', Associated wireframe actions and features, and detailed wireframe images.
[PDF File (Adobe PDF File), 247 KB-Multimedia Appendix 3]

Multimedia Appendix 4

Final low-fidelity wireframes, associated themes from 'Low-Fidelity Prototype Testing', associated wireframe actions and features, and detailed wireframe images.
[PDF File (Adobe PDF File), 241 KB-Multimedia Appendix 4]

Multimedia Appendix 5

Initial high-fidelity wireframes, associated themes from 'Participatory Design' and 'Low-Fidelity Prototype Testing', associated wireframe actions and features, and detailed wireframe images.
[PDF File (Adobe PDF File), 405 KB-Multimedia Appendix 5]

Multimedia Appendix 6

Final high-fidelity wireframes, associated themes from 'High-Fidelity Prototype Testing', Associated wireframe actions and features, and detailed wireframe images.
[PDF File (Adobe PDF File), 409 KB-Multimedia Appendix 6]

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Abbreviations

HCD: human-centered design
HIPAA: Health Insurance Portability and Accountability Act
HVIP: hospital-based violence intervention program
mHealth: mobile health
RITE: Rapid Iterative Testing and Evaluation
UCSF: University of California San Francisco
UI: user interface
UX: user experience
VPP: violence prevention professional
WAP: Wraparound Project

Edited by L MacNeill; submitted 20.May.2026; peer-reviewed by MB Patel, AM Rubiano, K Becerro de Bengoa Losa; comments to author 22.Jul.2026; revised version received 14.Sep.2026; accepted 30.Sep.2026; published 19.Nov.2026

Please cite as:
Salvatori MG, Patel D, von Hippel CD, Somaratne G, Presser M, Texada M, Sammann A
Designing a Client-Facing Mobile Health App for Survivors of Violence: Mixed Methods Human-Centered Design Study
JMIR Form Res 2026;10:e101895
URL: https://formative.jmir.org/2026/1/e101895
doi: 10.2196/101895
PMID:

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