

Designing a Multilingual Maternal Health Literacy mHealth Platform Through Co-Creation

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Research Article

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Abstract

Background

Persistent disparities in maternal health outcomes are influenced by gaps in maternal health literacy, language accessibility, and system navigation, particularly among culturally and linguistically diverse populations. Mobile health (mHealth) platforms offer opportunities to improve preparedness and engagement across the perinatal continuum; however, many existing tools lack cultural responsiveness, linguistic inclusivity, and integration with trusted support systems.

Objective

This brief report describes the development of a multilingual maternal health literacy mHealth platform through a community-based participatory co-creation process using Design Studios for Health conducted in Phoenix, Arizona.

Methods

Four Design Studios for Health were conducted between August and September 2025 with approximately 50 women representing diverse racial, ethnic, and linguistic backgrounds. Sessions followed a structured three-movement format within two iterative phases consisting of needs assessment and prototype feedback sessions, facilitating experience mapping, collaborative ideation, and iterative prototype feedback. Data sources included facilitator notes, session summaries, and visual mapping artifacts. An inductive thematic synthesis approach was used to identify cross-cutting priorities and design implications.

Results

Participants identified language accessibility, health literacy support, privacy safeguards, integration of human support, and practical navigation tools as foundational to engagement with digital maternal health platforms. Desired features included multilingual and low-literacy content, audio and visual guidance, customizable reminders, peer support connections, and culturally relevant resources spanning pregnancy and postpartum care. Trust, confidentiality, and user control over personal information were emphasized as essential to adoption. Iterative feedback informed refinements in interface simplicity, personalization, and accessibility.

Conclusions

A community-based participatory co-creation process using Design Studios for Health generated actionable insights for designing a multilingual maternal health literacy mHealth platform that aligns with women's lived experiences. Findings highlight the importance of centering maternal health literacy, privacy, and human connection in digital maternal health interventions.

INTRODUCTION

Persistent inequities in maternal health outcomes remain a critical public health concern in the United States [1–3]. Disparities in maternal morbidity, mortality, and perinatal outcomes are shaped not only by clinical risk but also by structural barriers, including fragmented care systems, limited health literacy, language discordance, transportation challenges, and inadequate continuity of support across the perinatal continuum [4, 5]. These inequities are further compounded by linguistic diversity, cultural variation in maternal practices, and differential access to digital resources [6, 7]. These inequities reflect broader patterns of digital exclusion, where disparities in digital access, digital literacy, and culturally responsive technologies limit the ability of underserved populations to benefit from emerging digital health innovations [8, 9].

Maternal health literacy (MHL)—defined as the ability to access, understand, appraise, and apply information related to pregnancy, childbirth, and postpartum care—plays a central role in navigating complex healthcare systems [4, 10–12]. Limited MHL can impede timely prenatal care initiation, reduce effective communication with providers, and contribute to suboptimal utilization of maternal health services [4, 10, 11]. For culturally and linguistically diverse populations, immigrant, refugee, Black, Indigenous, and other women of color (BIPOC), and other underserved populations, maternal health literacy barriers intersect with language access limitations and digital inequities, amplifying risk [5, 8, 13].

Mobile health (mHealth) technologies have emerged as promising tools to improve maternal education, appointment adherence, symptom monitoring, and care coordination [14, 15]. Yet persistent disparities in digital access, digital literacy, and culturally responsive technology design continue to produce forms of digital exclusion that limit the reach and effectiveness of maternal mHealth interventions among underserved populations [8, 9]. Additionally, many existing maternal health applications are developed without meaningful engagement of end users, resulting in platforms that may lack cultural relevance, linguistic accuracy, trustworthiness, or usability across literacy levels [14, 16–18]. Digital tools that operate in isolation without integration of trusted human support often fail to address the relational and trust-based dimensions of maternal care that women consistently identify as essential for meaningful engagement and sustained use of digital health technologies [8, 13, 19, 20].

Community-based participatory research (CBPR) offers a framework for engaging community stakeholders in the design and refinement of health interventions [21, 22]. Participatory approaches can surface lived experiences, contextual realities, and culturally grounded priorities that traditional top-down design processes may overlook [22–24]. Design Studios for Health (DSH) represent one structured

mechanism for operationalizing participatory engagement through iterative facilitated co-creation sessions [25] that center user voice while maintaining methodological rigor.

This brief report describes the development of a multilingual maternal health literacy mHealth platform through a CBPR-informed co-creation process using four Design Studios for Health conducted in Phoenix, Arizona. Approximately 50 women representing diverse racial, ethnic, and linguistic communities participated in structured design sessions to identify barriers to maternal healthcare navigation, prioritize culturally responsive digital features, and iteratively refine prototype elements. The objective of this brief report is to describe the participatory design process, synthesize cross-cutting themes emerging from the four design sessions, and outline implications for developing culturally responsive maternal mHealth interventions designed to reduce digital exclusion and strengthen maternal health literacy in underserved populations.

METHODS

Study Design and Setting

The report draws on a community-based participatory research (CBPR) approach implemented through Design Studios for Health (DSH), a structured participatory framework used to engage end users in the co-creation of health interventions. Four DSH sessions were conducted between August and September 2025 in Phoenix, Arizona, a large and rapidly growing metropolitan area characterized by significant cultural, linguistic, and socioeconomic diversity. The design sessions were part of a broader initiative to develop a multilingual maternal health literacy mHealth platform responsive to the needs of women across the perinatal continuum.

The four Design Studios were conducted in two iterative phases, each consisting of a needs assessment session followed by a prototype feedback session (see Fig. 1). The first phase (Design Studios 1 and 2) engaged refugee and culturally and linguistically diverse (CALD) populations, while the second phase (Design Studios 3 and 4) engaged a broader population of women in Phoenix, Arizona. Each subsequent session built on insights from the previous session, allowing for iterative refinement of platform concepts and features.

Participant Recruitment and Sample

A total of approximately 50 women participated across the four design sessions. Participants were recruited through community leaders, maternal health advocates, and community-based networks in Phoenix, Arizona. Recruitment efforts were conducted in collaboration with trusted community partners and leaders to ensure inclusion of women from diverse racial, ethnic, and linguistic backgrounds, including women from immigrant, refugee, and historically underserved communities. Recruitment materials were shared through community centers, maternal health programs, and local networks to reach women with varied experiences navigating maternal healthcare systems.

Eligibility criteria included: (1) being a woman of reproductive age (18 years or older), (2) residing in the Phoenix metropolitan area, and (3) willingness to participate in a facilitated design session focused on maternal health experiences and digital health solutions. Participation was voluntary, and women received information about the purpose and nature of the sessions before attending.

Design Studios for Health (DSH) Structure

Each of the four DSH sessions followed a consistent three-movement structure designed to facilitate iterative co-creation and collective reflection. Sessions were conducted in community-accessible settings and facilitated by trained moderators using participatory engagement techniques.

While each session followed a three-movement format, the function of sessions differed across phases. In each phase, the first session focused on needs assessment and experience elicitation, while the second session focused on prototype feedback and refinement based on insights generated in the preceding session. This iterative structure enabled progressive development and validation of platform features across participant groups.

Movement 1: Experience Mapping

Participants were invited to share and reflect on their experiences seeking maternal healthcare, including barriers encountered, sources of support, and points of confusion or stress. Guided prompts encouraged discussion of communication challenges, system navigation, cultural expectations, and emotional experiences across pregnancy and postpartum care.

Example prompts included: “Can you walk us through what seeking maternal care looked like for you or someone in your community?” These discussions elicited insights into structural barriers such as language discordance, fragmented care systems, and challenges navigating healthcare services.

Movement 2: Visioning and Ideation

Participants engaged in collaborative brainstorming to envision improvements to maternal healthcare experiences. Discussions focused on identifying desired supports, services, and resources that could address the challenges described in Movement 1. Participants explored how digital tools could enhance access, trust, and continuity of care.

Example prompts included: “If you had a magic wand to change one thing in the maternal care experience, what would it be?” This movement elicited participant-driven visions of culturally responsive, integrated, and supportive maternal care systems, including the role of technology in enhancing access and coordination.

Movement 3: Prototype Feedback and Co-Creation

Participants provided feedback on conceptual and early prototype elements of a maternal mHealth platform. This movement emphasized usability, language accessibility, privacy, cultural relevance, and integration of human support systems. Women discussed desired features, interface preferences, and conditions under which they would trust and use the platform.

In needs assessment sessions, Movement 3 focused on identifying desired features for a maternal health application (e.g., “What kind of support or information would you want from a maternal health mobile app?”). In subsequent prototype sessions, Movement 3 focused on structured feedback on platform usability and content (e.g., “When you first open the app, what stands out to you?” and “Is the language selection clear and appropriate?”). This progression enabled direct incorporation of participant feedback into iterative platform refinement.

Across all sessions, participants were organized into small discussion groups to encourage inclusive participation and ensure that all voices were heard. Facilitators documented group discussions, key ideas, and emerging priorities using structured note-taking templates and visual mapping tools.

Data Collection and Synthesis

Data sources for this brief report included facilitator notes, session summaries, visual mapping artifacts, and structured digests generated after each design session. Rather than relying on verbatim transcripts, this report synthesizes thematic insights derived from the collective outputs of the four sessions. An inductive thematic synthesis approach was used to identify recurring priorities, shared concerns, and design implications across sessions.

The iterative structure of the Design Studios allowed themes identified in earlier sessions to be refined, expanded, and validated in subsequent sessions, strengthening the credibility and consistency of findings across participant groups. The research team reviewed session outputs iteratively to identify cross-cutting themes related to maternal health literacy, digital accessibility, trust, privacy, and integration of community-based support. Themes were refined through team discussion to ensure alignment with participant perspectives and contextual realities observed during the design sessions.

Ethical Considerations

This study was reviewed and determined exempt by the Arizona State University Institutional Review Board (IRB #STUDY00017441). The research was conducted in accordance with relevant institutional guidelines and regulations and in accordance with the Declaration of Helsinki. Participants were informed of the purpose of the design sessions and the voluntary nature of participation. All data were de-identified prior to synthesis for this report.

RESULTS

Overview of Design Sessions

Across the four Design Studios for Health sessions, approximately 50 women participated in facilitated co-creation activities focused on maternal healthcare experiences and digital solution design. Participants represented diverse racial, ethnic, and linguistic backgrounds and shared a range of pregnancy and postpartum experiences within the Phoenix metropolitan area. Each session followed a three-movement structure, enabling iterative exploration of maternal health challenges, desired supports, and feedback on proposed mHealth features.

Consistent with the study design, sessions were conducted in two iterative phases, with needs assessment sessions (Design Studios 1 and 3) followed by prototype feedback sessions (Design Studios 2 and 4). This structure enabled the identification of core needs and the subsequent refinement of platform features based on participant feedback across diverse population groups.

Analysis of session outputs revealed five cross-cutting thematic areas that shaped the design of the multilingual maternal health literacy mHealth platform (see Fig. 2).

Theme 1: Language Accessibility and Health Literacy Support

Participants consistently identified language discordance and low health literacy as major barriers to understanding maternal health information and navigating the healthcare system. Women described difficulty interpreting medical terminology, appointment instructions, and insurance-related information. Many emphasized the need for multilingual content that extends beyond basic translation to include culturally appropriate language, dialect sensitivity, and simplified explanations of complex concepts.

Across sessions, participants highlighted that existing translations were often inaccurate or overly formal, and did not reflect everyday language use or dialect preferences, underscoring the need for culturally and linguistically grounded communication.

Participants expressed strong preferences for:

- Audio guidance and text-to-speech options
- Visual aids such as icons, diagrams, and videos
- Plain-language explanations of healthcare processes
- Glossaries of common maternal health terms

These elements were seen as essential to ensuring accessibility for women with varying literacy levels and digital fluency.

Theme 2: Trust, Privacy, and Safe Digital Engagement

Trust emerged as a foundational requirement for the adoption of the mHealth platform. Participants highlighted concerns related to data privacy, particularly among women living in shared households or navigating sensitive social circumstances. Women emphasized the importance of:

- Minimal required personal information during onboarding
- User control over data sharing and visibility
- Confidential and discreet use of the platform
- Clear communication about how information would be used

Participants also expressed concerns about potential data misuse in vulnerable contexts, including domestic environments and immigration-related sensitivities, reinforcing the importance of transparency and user control in platform design. Participants noted that without strong privacy safeguards, many women would hesitate to engage with digital health tools, regardless of their potential benefits.

Theme 3: Integration of Human Support with Digital Tools

Across sessions, participants underscored that digital tools should complement—not replace—human connection. Women described reliance on trusted individuals such as peer mentors, community navigators, interpreters, and family members for emotional support and guidance. Desired platform features included:

- Access to peer support networks or mentor connections
- Direct links to community-based resources and services
- Opportunities for family or partner involvement
- Integration with culturally responsive providers and interpreters

Participants emphasized that technology should serve as a bridge to real people, including community health workers, doulas, and peer mentors, rather than functioning as a standalone solution. The platform should enhance navigation to trusted human support systems, reinforcing relational aspects of maternal care that technology alone cannot provide.

Theme 4: Practical Navigation and Resource Coordination

Women described the maternal healthcare system as fragmented and difficult to navigate, particularly for those unfamiliar with appointment structures, referral processes, and insurance requirements. Participants prioritized features that would support real-time navigation and coordination, including:

- Appointment reminders and checklists
- Step-by-step guidance for healthcare visits
- Transportation coordination tools
- Location-based resource directories
- Symptom tracking and medication reminders

Participants also emphasized the need for integrated resource mapping, including access to community services such as transportation, food support, housing assistance, and culturally responsive healthcare providers. These practical tools were viewed as critical to improving preparedness, reducing missed appointments, and enhancing continuity of care across the perinatal period.

Theme 5: Holistic Support Across the Perinatal Continuum

Participants emphasized the need for comprehensive support that extends beyond pregnancy to include postpartum and mental health care. Women described gaps in postpartum follow-up, emotional wellness support, and culturally sensitive guidance during transitions such as birth, recovery, and early parenting. Desired content areas included:

- Postpartum recovery and emotional wellness resources
- Mental health support and stress management tools
- Guidance on infant care and breastfeeding
- Information tailored to different stages of the perinatal journey

Participants further highlighted the importance of addressing trauma, emotional well-being, and social support needs, particularly among women navigating displacement, isolation, or limited support networks. Participants stressed that a platform focused solely on pregnancy would not fully address their needs; instead, they sought a holistic tool supporting the entire maternal journey.

Prototype Feedback and Design Implications

Feedback across sessions informed iterative refinements to the platform's conceptual design.

Participants responded positively to:

- Simple and intuitive interface design
- Customizable reminders and trackers
- Culturally relevant content
- Multilingual navigation options

However, participants also identified areas requiring further development, including:

- Improved translation accuracy and dialect options
- Greater personalization of content and notifications
- Expanded offline functionality
- Enhanced visual and audio accessibility features

Feedback from prototype sessions highlighted the importance of refining language accuracy, improving accessibility for low-literacy users, and ensuring that digital features are supported by human connection and real-world resource integration.

These insights informed the prioritization of features that balance usability, cultural responsiveness, and technological feasibility.

DISCUSSION

This report describes the development of a multilingual maternal health literacy mHealth platform through a community-based participatory co-creation process. Findings from four Design Studios for Health conducted in Phoenix, Arizona, demonstrate that women prioritize accessibility, trust, relational support, and practical navigation tools when engaging with digital maternal health interventions. The themes that emerged across sessions highlight both the promise and the limitations of existing mHealth solutions in addressing maternal health inequities, particularly in relation to usability, engagement, and contextual fit [7, 13, 17]. These findings are interpreted across three domains: centering maternal health literacy in digital design, technology as a bridge to human support, and privacy and trust as preconditions for engagement.

Centering Maternal Health Literacy in Digital Design

Participants' emphasis on plain language, audio guidance, visual tools, and simplified system explanations underscores the central role of maternal health literacy in digital engagement. Maternal health literacy extends beyond the ability to read pregnancy information; it encompasses understanding how healthcare systems function, when to seek care, how to interpret medical recommendations, and how to advocate for oneself during clinical encounters [4, 10–12]. The findings suggest that digital maternal health tools must embed health literacy principles at every layer of design, from onboarding to content delivery and navigation supports [26].

Grounding the platform in maternal health literacy principles shifts the focus from passive information delivery to active preparedness and engagement. Participants did not simply request more content; they requested content that is understandable, actionable, and culturally resonant. These findings align with recent digital maternal health research demonstrating that usability, contextual relevance, and trust are key determinants of engagement and sustained use, particularly among underserved populations [8, 13, 19, 20]

Technology as a Bridge to Human Support

Across sessions, women consistently emphasized the importance of human connection in maternal care. Digital tools were viewed as helpful only when integrated with trusted support networks, including peer mentors, community navigators, interpreters, and family members. This finding reinforces growing recognition in digital health scholarship that relational trust cannot be replaced by technology alone [9, 13, 27]. The co-creation process revealed that effective maternal mHealth platforms must operate within a hybrid model—combining digital features with pathways to human support. Features such as peer connection, resource directories, and navigation assistance were prioritized not merely as conveniences but as mechanisms to reduce isolation and strengthen continuity of care [7, 23].

Privacy and Trust as Preconditions for Engagement

Trust and privacy concerns emerged as non-negotiable elements for adoption. Participants articulated clear boundaries around data sharing and emphasized the need for user control, especially in situations involving shared devices or sensitive health information. These findings suggest that privacy safeguards should not be treated as backend technical considerations but as visible, user-centered design features [8, 17]. For linguistically diverse and underserved populations, trust in digital health tools is closely tied to transparency, cultural sensitivity, and control [13]. Without these components, even well-designed educational features may fail to achieve meaningful engagement.

Implications for Community-Based Digital Health Development

This brief report contributes to the growing body of literature supporting participatory design in digital health innovation [22–24]. The structured Design Studios for Health framework enabled systematic engagement of diverse women while maintaining clarity of purpose and iterative refinement. Rather than developing a platform based solely on clinical assumptions, the co-creation process surfaced contextual realities that might otherwise remain invisible, including nuanced language preferences, concerns about stigma, and practical barriers to care coordination.

The findings suggest that community-based participatory approaches are particularly valuable in maternal health contexts, where lived experience, relational dynamics, and system navigation complexities intersect [21, 22]. Design processes that center these lived realities are more likely to produce interventions that are not only usable but trusted and sustained.

STRENGTHS AND LIMITATIONS

Strengths

This report draws on four structured Design Studios for Health conducted with 50 women representing diverse racial, ethnic, and linguistic communities in Phoenix, Arizona. The iterative three-movement framework enabled progressive refinement of priorities while maintaining consistency across sessions. The community-based participatory approach facilitated direct engagement with end users and ensured that platform design decisions were informed by lived experience rather than solely by clinical or technical assumptions. The diversity of participants across sessions strengthened the relevance of findings to multilingual and culturally diverse populations. The structured facilitation process also enhanced methodological clarity and reproducibility of the co-creation model.

Limitations

This report synthesizes facilitator notes, structured session digests, and visual artifacts rather than verbatim transcripts. Findings, therefore, reflect collective thematic priorities rather than in-depth

qualitative narrative analysis. Further analysis incorporating full Design Studio transcripts may provide deeper exploration of individual meaning-making processes and contextual nuance. Participants were recruited within a single metropolitan area, which may limit generalizability to other geographic contexts. However, the participatory design framework and identified thematic priorities may be transferable to similar urban settings serving culturally and linguistically diverse populations.

CONCLUSION

Designing digital maternal health interventions that are accessible, trusted, and culturally responsive requires more than technological innovation; it requires structured engagement with the women the tools are intended to serve. Findings from this study demonstrate that multilingual accessibility, maternal health literacy support, privacy safeguards, and integration of human connection are foundational to digital engagement through four Design Studios for Health conducted using a community-based participatory framework.

This report highlights the value of co-creation in developing maternal mHealth platforms that move beyond information dissemination toward meaningful preparedness, navigation support, and relational continuity. Centering maternal health literacy and community voice can help align digital interventions with the realities of women's lived experiences and contribute to advancing equitable maternal healthcare delivery. Future analyses incorporating more detailed session data may further deepen understanding of participant perspectives and inform subsequent phases of development.

Abbreviations

MHL	
Maternal Health Literacy	
mHealth	
Mobile Health	
DSH	
Design Studios for Health	
CBPR	
Community-Based Participatory Research	

Declarations

Ethics approval and consent to participate

This study was reviewed and determined exempt by the Arizona State University Institutional Review Board (IRB #STUDY00017441). The research was conducted in accordance with relevant institutional guidelines and regulations and in accordance with the Declaration of Helsinki.

Participants provided informed consent to participate in the design sessions prior to engagement.

Consent for publication

Not applicable.

Availability of data and materials

The datasets generated and/or analyzed during the current study are not publicly available due to the nature of participatory design sessions and the inclusion of potentially identifiable information but are available from the corresponding author on reasonable request.

Competing interests

The author declares no competing interests.

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Authors' contributions

E.A.A. conceptualized the study, designed the research, conducted the Design Studios for Health sessions, performed data synthesis and analysis, prepared all figures, and wrote the manuscript.

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References

1. Fleszar LG, Bryant AS, Johnson CO, Blacker BF, Aravkin A, Baumann M, Dwyer-Lindgren L, Kelly YO, Maass K, Zheng P, Roth GA. Trends in State-Level Maternal Mortality by Racial and Ethnic Group in the United States. *JAMA*. 2023;330(1):52–61. 10.1001/jama.2023.9043.
2. Hoyert DL. Maternal mortality rates in the United States, 2023. *NCHS Health E Stats* [Internet]. 2025.
3. Davidson KW, Terry MB, Braveman P, Reis PJ, Timmermans S, Epling JW. Jr. Maternal Mortality: A National Institutes of Health Pathways to Prevention Panel Report. *Obstet Gynecol*. 2024;143(3).
4. Putri AP, Lu YY. Maternal Health Literacy in Pregnant Women: A Concept Analysis. *Matern Child Health J*. 2024;28(8):1272–82. 10.1007/s10995-024-03945-z.
5. Crear-Perry J, Correa-de-Araujo R, Lewis Johnson T, McLemore MR, Neilson E, Wallace M. Social and Structural Determinants of Health Inequities in Maternal Health. *J Women's Health*. 2021;30(2):230–5. 10.1089/jwh.2020.8882.

6. Lazarevic N, Pizzuti C, Rosic G, Boehm C, Williams K, Caillaud C. A mixed-methods study exploring women's perceptions and recommendations for a pregnancy app with monitoring tools. *npj Digit Med*. 2023;6(1):50. 10.1038/s41746-023-00792-0.
7. Ameyaw EK, Amoah PA, Ezezika O. Effectiveness of mHealth Apps for Maternal Health Care Delivery: Systematic Review of Systematic Reviews. *J Med Internet Res*. 2024;26:e49510. 10.2196/49510.
8. Girmay M. Digital Health Divide: Opportunities for Reducing Health Disparities and Promoting Equitable Care for Maternal and Child Health Populations. *Int J MCH AIDS*. 2024;13:e026. 10.25259/ijma_41_2024. Epub 20241220.
9. Hollimon LA, Taylor KV, Fiegenbaum R, Carrasco M, Garchitorena Gomez L, Chung D, Seixas AA. Redefining and solving the digital divide and exclusion to improve healthcare: going beyond access to include availability, adequacy, acceptability, and affordability. *Front Digit Health*. 2025;7–2025. 10.3389/fdgth.2025.1508686.
10. Meldgaard M, Gamborg M, Terkildsen Maindal H. Health literacy levels among women in the prenatal period: A systematic review. *Sex Reproductive Healthc*. 2022;34:100796. <https://doi.org/10.1016/j.srhc.2022.100796>.
11. Kim J, Heazell AE, Whittaker M, Stacey T, Watson K. Impact of health literacy on pregnancy outcomes in socioeconomically disadvantaged and ethnic minority populations: A scoping review. *Int J Gynecol Obstet*. 2025;168(1):69–81. <https://doi.org/10.1002/ijgo.15852>.
12. Stafford JD, Goggins ER, Lathrop E, Haddad LB. Health Literacy and Associated Outcomes in the Postpartum Period at Grady Memorial Hospital. *Matern Child Health J*. 2021;25(4):599–605. 10.1007/s10995-020-03030-1.
13. Hernandez-Green N, Davis MV, Farinu O, Hernandez-Spalding K, Lewis K, Beshara MS, Francis S, Baker LJ, Byrd S, Parker A, Chandler R. Using mHealth to reduce disparities in Black maternal health: Perspectives from Black rural postpartum mothers. *Women's Health*. 2024;20:17455057241239769. 10.1177/17455057241239769.
14. Asadollahi F, Zagami SE, Eslami S, Roudsari RL. Barriers and facilitators for mHealth utilization in pregnancy care: a qualitative analysis of pregnant women and stakeholder's perspectives. *BMC Pregnancy Childb*. 2025;25(1):141. 10.1186/s12884-025-07244-5.
15. Raab R, Geyer K, Zagar S, Hauner H. App-Supported Lifestyle Interventions in Pregnancy to Manage Gestational Weight Gain and Prevent Gestational Diabetes: Scoping Review. *J Med Internet Res*. 2023;25:e48853. 10.2196/48853.
16. Sakamoto JL, Carandang RR, Kharel M, Shibamura A, Yarotskaya E, Basargina M, Jimba M. Effects of mHealth on the psychosocial health of pregnant women and mothers: a systematic review. *BMJ Open*. 2022;12(2):e056807. 10.1136/bmjopen-2021-056807.
17. Deniz-Garcia A, Fabelo H, Rodriguez-Almeida AJ, Zamora-Zamorano G, Castro-Fernandez M, Alberiche Ruano MDP, Solvoll T, Granja C, Schopf TR, Callico GM, Soguero-Ruiz C, Wägner AM,

- Quality. Usability, and Effectiveness of mHealth Apps and the Role of Artificial Intelligence: Current Scenario and Challenges. *J Med Internet Res*. 2023;25:e44030. 10.2196/44030. Epub 20230504.
18. Mazaheri H, Mohammad Reza, Moghbeli F, Langarizadeh M, Fatemi Aghda SA. Mobile health apps for pregnant women usability and quality rating scales: a systematic review. *BMC Pregnancy Childb*. 2024;24(1):34. 10.1186/s12884-023-06206-z.
 19. Babu S, Park N, Woodland G, Garcia N, Page W, Page R. Maternal health applications: Qualitative findings of user needs. *Digit HEALTH*. 2024;10:20552076241285422. 10.1177/20552076241285422.
 20. Jaeger KM, Nissen M, Leutheuser H, Danzberger N, Titzmann A, Pontones CA, Goossens C, Ziegler P, Uhrig S, Haerberle L, Bleher H, Kast K, Kornhuber J, Schoeffski O, Braun M, Fasching PA, Beckmann MW, Eskofier BM, Huebner H. Adherence to digital pregnancy care – lessons learned from the SMART start feasibility study. *npj Digit Med*. 2025;8(1):561. 10.1038/s41746-025-01966-8.
 21. Vangeepuram N, Fei K, Goytia C, Madden D, Corbie-Smith G, Horowitz CR. Community-Based Participatory Research: Insights, Challenges, and Successes From the Perspectives of Frontline Recruiters and Investigators. *J Participatory Res Methods*. 2023;4(2). doi: <https://jprm.scholasticahq.com/article/77399-community-based-participatory-research-insights-challenges-and-successes-from-the-perspectives-of-frontline-recruiters-and-investigators>
 22. Vargas C, Whelan J, Brimblecombe J, Allender S. Co-creation, co-design, co-production for public health - a perspective on definition and distinctions. *Public Health Res Pract*. 2022;32(2). Epub 20220615. 10.17061/phrp3222211
 23. Jackson DN, Sehgal N, Baur C. Benefits of mHealth co-design for African American and Hispanic adults: multi-method participatory research for a health information app. *JMIR Formative Res*. 2022;6(3):e26764.
 24. Murugesu L, Fransen MP, Timmermans DRM, Pieterse AH, Smets EMA, Damman OC. Co-creation of a health literate-sensitive training and conversation aid to support shared decision-making in maternity care. *PEC Innov*. 2024;4:100278. <https://doi.org/10.1016/j.pecinn.2024.100278>.
 25. Khatib M, Shah R, Azugbene E, Buman MP. Rethinking participation: design studios for health as a scalable co-design framework for health equity. *Front Public Health*. 2025;13:1681798.
 26. Emerson MR, Buckland S, Lawlor MA, Dinkel D, Johnson DJ, Mickles MS, Fok L, Watanabe-Galloway S. Addressing and evaluating health literacy in mHealth: a scoping review. *Mhealth*. 2022;8:33. 10.21037/mhealth-22-11. Epub 20221030.
 27. Greenhalgh T, Wherton J, Papoutsis C, Lynch J, Hughes G, A'Court C, Hinder S, Fahy N, Procter R, Shaw S. Beyond Adoption: A New Framework for Theorizing and Evaluating Nonadoption, Abandonment, and Challenges to the Scale-Up, Spread, and Sustainability of Health and Care Technologies. *J Med Internet Res*. 2017;19(11):e367. 10.2196/jmir.8775. Epub 20171101.

Figures

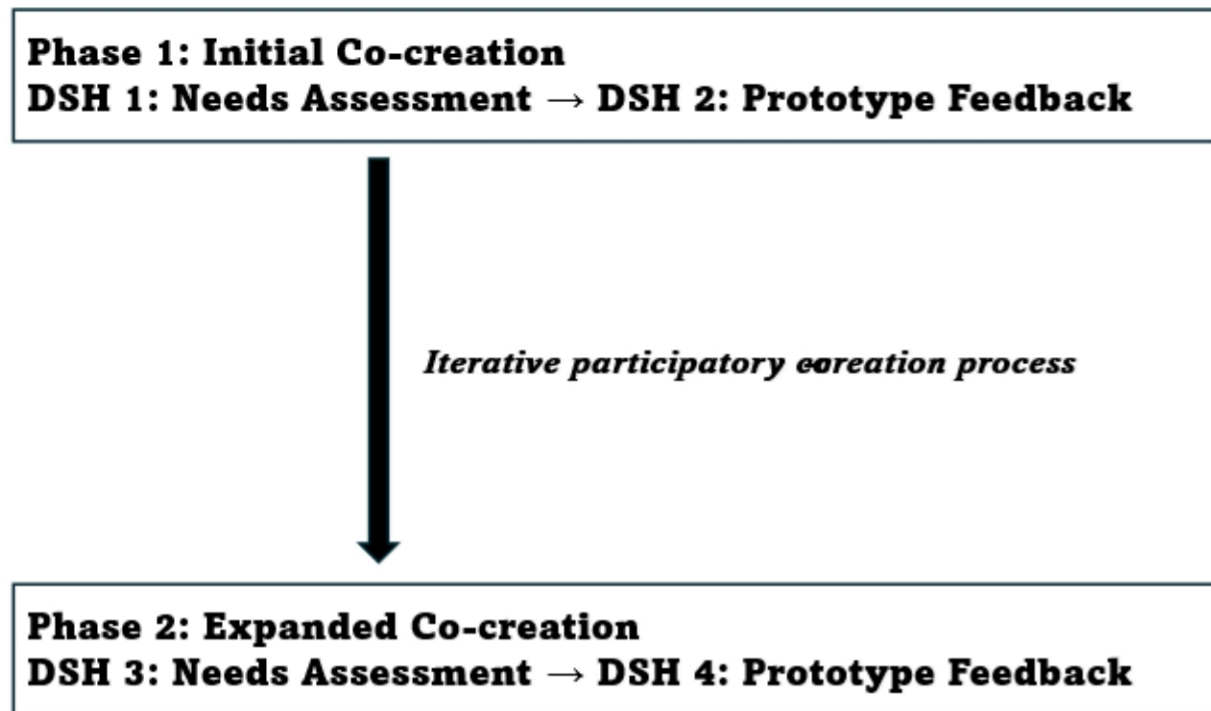


Figure 1

Participatory design studio sessions: iterative co-creation process



Figure 2

Co-created themes from participatory design sessions informing maternal mHealth platform development