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From Myth, to Struggle, to Change: The Realities of Co-Designing Digital Mental Health solution for and with Frontline Health Workers

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1. Abstract

This paper reflects on the process and complexities of co-designing a digital mental health solution named "MANSI" for frontline health workers (FLWs). The intervention was developed by The George Institute for Global Health-India (TGI) through a USAID-funded initiative. The project aimed to address the high risk of distress, burnout, and mental health challenges faced by FLWs, which are critical to achieving the Sustainable Development Goal (SDG) 3 of "healthy lives and well-being for all at all ages". The development followed a structured three-phase process that integrated insights from FLWs, iterative design reviews, and expert validation, all while maintaining anonymity and adhering to data privacy regulations. The application includes staged self-assessments, curated mental health content, and a locally validated referral helpline.

Despite challenges such as time constraints, digital literacy gaps, and stigma, the intervention engaged over 15,000 FLWs, highlighting its relevance. However, bureaucratic limitations, project management trade-offs, and sustainability concerns hindered long-term adoption. The findings demonstrate the feasibility and strength of FLW ownership, involvement, and adaptive decision-making. They also underscore the difficulties of maintaining co-creation fidelity under constraints of time, resources, and alignment. The paper concludes by advocating for sustained stakeholder alignment and involvement in creating scalable digital mental health interventions for FLWs, offering insights for future participatory models in low- and middle-income settings.

2. Key words:

Frontline Health Workers (FLWs), Mental Health and Well-being, Co-Creation Approach, Digital Mental Health Interventions, Participatory Design, Participatory Validation, Challenges in Co-Creation Approach.

3. Introduction:

A healthy workforce is key to achieving Sustainable Development Goal 3, which aims to ensure healthy lives and well-being at all ages. However, frontline health workers (FLWs) remain at progressively higher risks of distress, burnout, and mental health illnesses due to sustained and asymmetrical exposure to crises, with their interrelated causes and disruptive impacts [1,2]. The recent pandemic exposed the wide gaps and fragility in the support systems for FLWs. While compounding stressors impacted their mental well-being and productivity, they can also adversely affect healthcare effectiveness and quality of healthcare service delivery. The Coronavirus SARS-CoV-2 (COVID-19) pandemic further precipitated these risks and highlighted the need to prioritize FLWs' mental health needs as a vital public health priority [3]. FLWs had to rapidly adapt to changing environments and uncertainty, increasing workloads, redeployment, new work practices, the introduction of digital applications for work, risks of contagion, and limited resources and support [4,5]

During the pandemic, FLWs in India and worldwide reported incidents of higher levels of burnout, anxiety, depression, and other psychosocial effects [3–5]. A systematic review of 57 studies from 17 countries concluded a significant increase in the pooled prevalence of depression in healthcare workers due to COVID-19, ranging from 25% for nurses, 24% for medical doctors, and 43% for frontline professionals [6]. These emerging mental health needs of FLWs led to calls for a robust and comprehensive response [7,8]. Also, while the FLWs have been adopting a variety of coping mechanisms to deal with stressors during such crises [9,10], there is little evidence available on how robust or sustainable these mechanisms are and how they could integrate well within interventions to strengthen their response and resilience [11]. Desk-based reviews and landscape analyses of existing interventions and mechanisms that form responses to mental health issues of FLWs reveal an over-emphasis on pharmacological approaches [12–14], often missing the inter-connected social and cultural determinants of mental health and well-being [14–17].

The existing responses to address the issue of mental health illnesses among FLWs in India have been fragmented. Among the persisting reasons for intervention failure is their limited engagement during prioritising requirements, and the development and design stages, potentially resulting in low fidelity, limited uptake and increased dropout rates. Barriers identified to ownership by FLWs include lack of adherence to design, inadequate

dissemination and difficult-to-navigate designs[19–21]. This is further compounded by: systemic inequity from asymmetric participation in decision making, lack of collaborative solutioning for complex problems, leading to fragmented solutions. Few mental health professionals and even fewer FLWs have a say in prioritising, designing and development of response strategies [18]. Their absence in the decision-making significantly impairs opportunities to develop comprehensive and acceptable responses to address psycho-social needs of the FLWs. Addressing these reasons could potentially demonstrate opportunities to amplify and accelerate impact[22–25].

The consensus on telehealth for mental health care in remote areas[26–29] suggests improved access, better service quality, and lower costs [22,24]. Given the poor accessibility of mental health services across India, coupled with the stigma in seeking care, FLWs stand to benefit from tele-health interventions that provide mental health care support remotely, while adhering to safety and privacy safeguards [30]. The current literature on user-participation in telehealth designing and developing interventions is even poorer.

The current evidence also indicates, comprehensive and specialized interventions for addressing the psychosocial wellbeing of the FLWs are very important[31–33]. However, the limited evidence on leveraging participatory approaches for identifying specific requirements and then designing and deploying such interventions (especially tele-health-based interventions) highlight the importance of engaging users and relevant stakeholders throughout the process to integrate their inputs and contextual realities. Such processes could help in co-creating interventions that continue to directly respond to users' needs[25].

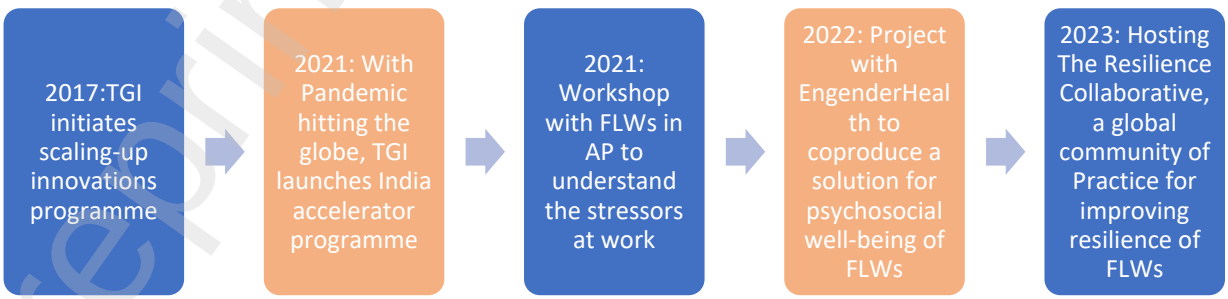

Figure 1: TGI-India Trajectory of Engagements in Digital Health, Innovations, leading to Project DISHA

The above figure 1 details the journey of The George Institute for Global Health-India (TGI) in this domain. TGI India Health Accelerator Program's, Innovation Challenge to source and scale up innovations for FLWs' psycho-social support that could be accelerated and scaled within health care delivery systems in India and LMIC's. The opportunities to engage with FLW's led to further collaborations. Through an exercise commissioned by UNICEF, TGI engaged with FLWs in Andhra Pradesh to explore the range of psychosocial issues faced by them 31. This led to an opportunity to evaluate smartphone based psychosocial well-being application of Health workers, intended for nationwide roll-out, followed by an opportunity to co-create a digital application to address their psychosocial needs. The project involved engagement with FLWs across six districts in six Indian states, leading up to the design and implementation of a digital solution aimed at improving FLW mental health, adopting co-creation approach with the FLWs.

This article captures the project journey of conceptualizing and implementing the above project, where we present the proposed implementation and research plans, some of which could not be implemented. The narrative emphasizes the process activities that were successfully carried out, offering a detailed account of the project's evolution.. Drawing from these experiences, the article provides some generalizable inferences into the feasibility and value of co-creating and implementing digital psychosocial interventions with the FLWs. This study contributes to both theoretical and methodological insights for future research and application of co-creation and implementation of psychosocial interventions with and for FLWs.

4. Perspectives on current knowledge

This section synthesizes our understanding from the current literature as well as our field experiences, from the earlier projects, to explore pathways for resilience among FLWs. It then examines the current landscape of interventions, highlighting the common challenges for its adoption. We discuss the potential of mobile phone technology to bridge critical gaps in mental health support and emphasize the value of co-creation approaches in enabling context-specific responses. These discussions? form the basis for the approaches we take in our proposed work.

4.1 Understanding pathways to FLWs' resilience

FLWs often organically adopt resilience behaviours as immediate coping mechanisms, for surviving in the moment, and develop safe reliable patterns as strategies? for longer term resilience and preparedness. Most of these resilience behaviours adopted tend to have been modelled by their peers or seniors within professional or culturally relevant contexts. Over time, such peer-influenced or peer-led behaviours gain traction, reaching a critical-mass, after being filtered for reliability across contexts, teams and communities.

Additionally, many resilience practices and behaviours that laterally translate from within the community, that pertain to personal and family well-being. These culturally embedded behaviors tend to have a more robust acceptance, adoption, and ownership as compared to externally introduced interventions. This underscores the importance of community-driven pathways in fostering sustainable resilience. Agency and personal choice also emerge as important attributes of behavioural transitions, highlighting the significance of self-directed coping strategies. Beyond role modelling, social media influence serves as another key pathway - an organic, low-resistance channel for disseminating and normalizing resilience behaviours. It supports both the need for emotional relief and de-escalation while also attests to reliable change.

4.2 Interventions and implementation gaps

A range of targeted interventions have been developed to address psychosocial issues among FLWs. These include self-care manuals for FLWs[32,33], NGO-initiated interventions for specific communities[34] and digitally facilitated interventions such as the ShareCare application designed and developed by the National Institute of Mental Health and Neurosciences (NIMHANS) and UNICEF [35]. Despite their potential, the adoption and success of these interventions are hindered by several persistent challenges. These include stigma surrounding mental health care-seeking amongst the FLWs [11,27,36,37], limited capacity of care providers to respond to the unique needs of FLWs [38,39], and insufficient ability amongst FLWs to engage with self-care resources[40]. Additionally, there is limited support from the government agencies and institutions[37] and inadequate contextual adaptation of interventions to suit diverse implementation environments. An extract from the review of existing interventions is presented in Annexure 1.

4.3 Leveraging mobile phone technology

The expansion of internet access and the growing use of digital applications for work offer unique opportunities to facilitate design and the implementation of such interventions for FLWs. However, a persistent digital divide, characterized by disparities in connectivity, digital literacy, and access, continue to affect FLWs, particularly in low-and-middle-income countries (LMICs). The perceived sense of stigma around stress and mental health care seeking remains a significant barrier, both for FLWs, and health workers in general. The hesitation is amplified when interventions are delivered via mobile devices, due to concerns around confidentiality and trust.

Nonetheless, there is emerging interest in anonymised consultations and group-based digital conversations that offer greater psychological safety and peer support. Gamified interventions have also shown potential in promoting behaviour changes through engaging and non-intrusive methods. While digital illiteracy and connectivity gaps pose real challenges, appropriate/viable? solutions are yet to be systematically evaluated. To explore this further, the team conducted a review of the digital applications based on a set of relevant factors. An extract from this review is presented in Table 1. These insights, combined with experience of conducting innovation challenges with FLWs during the pandemic, inform and underline the potential for developing scalable and contextually effective digital mental health interventions [41–43].

Table 1: Extract from Review of Mental Health Applications by the team

Factors	Application - REACH	Application – HEROES Health
Basic Information	Launched by Roche Diagnostics. Users have access to counselling sessions, self-help content, and self-assessment tools on a variety of topics. REACH has been introduced in select hospitals, like Tata Memorial Centre (TMC).	Application-based initiative that provides healthcare workers and first responders to track their mental health and access crisis support. Developed in partnership with University of North Carolina (UNC).

Interface	5 windows: 1. Profile - Basic info, FAQs, about reach. 2. Assessments - for anxiety, depression, perceived stress and stress management. 3. Explore - Informative, short stories, podcasts, self-help videos, guided meditation. 4. Counselling - QR code required, only available for hospitals signed up with REACH. 5. Home - Information curated for your profile.	3 Windows: 1. Activities - Track your habits, questionnaires and activities, currently in use. 2. Reports - Summaries of weekly mental health assessments and activities. 3. Resources - Consent pdf, about the study etc.
Positive Features	Large amount of information readily available, App navigation is smooth, Disclaimers provided wherever required, clean design.	Provide feedback to your work organization (anonymously), Track your wellness with weekly surveys, Simple interface, systematic, you can view the terms of consent.
Negative Features	Lack of icons and graphics, too much text. All text is in English, only four assessments available, no emergency options. Not robust enough for the need it aims to satisfy.	Access mental health resources only specific to your organization, large amount of text, lack of visual elements, slightly impersonal interface.
Reach and Reviews	Launched for India, but only available in select hospitals. Anyone can download from app/play store, but one must select the hospital they belong to sign up. No reviews found.	Tailored for the American Market. One review - Assisted an EMT with their mental health.
Overall Opinion	Language limited to English, limited tailoring potential to FLW context. Reference to this application recommended for its resources (explore sections) but not for its interface and design.	Feature of providing anonymous feedback to the work organizations is a unique and helpful tool, may help with some system-level stressors faced by FLWs in India. The interface however needs to be more visual.

4.4 Why Co-creation approach for addressing psychosocial needs of FLWs

There are significant gaps in research regarding the top-down approach used to scale these interventions among community-level health workers, often with minimal or no contextual adaptations, thus limiting their relevance and effectiveness. To address these gaps, it is essential to adopt iterative and inclusive approaches across all stages of design and implementation. In this context, collaborative knowledge generation through participatory or co-creation activities has become an increasingly popular strategy for aligning public health research with real-world implementation of projects and interventions [44,45]. Emerging anecdotal evidence also suggests the promises of co-creation approaches in developing scalable and effective interventions that resonate with the lived realities of FLWs [41–43].

4.5 Exploring and enabling contextualization of responses using co-creation approaches

Our desk review highlighted critical gaps in existing interventions, reinforcing the need for approaches that grounded in the experiences of actual stakeholders. Co-creation emerged as

a promising strategy to address these gaps and facilitate meaningful contextualization of psychosocial needs within the intervention. The co-creation approach adopted in the study is guided by three core principles. First, prioritizing human-centred framing, focused on lived experiences; second, an emphasis on the process of engagement with participants; and finally, bringing in an integrated systems thinking that allows for local adaptations within broader intervention frameworks [44]. Through this research we to demonstrate the feasibility and value of co-creating a digital mental health application along with the FLWs, ensuring that the intervention is both contextually relevant and practically scalable.

5 Aims and objectives:

We had the opportunity to design and develop a digital solution to improve psychosocial well-being of FLWs, through smartphone-based interventions, using appropriate co-creation approaches. This project was funded by USAID under its *MOMENTUM Safe Surgery in Family Planning and Obstetrics Project*, implemented by EngenderHealth India.

This paper is aimed at describing the phases of design and implementation of the project and outputs from these phases. Additionally, it aims to analyse the outputs and challenges faced in adopting such co-production modalities for designing and developing solutions for improving psychosocial well-being of FLWs.

5.1 Original Project phases, aims and Objectives

For this we believe it is important to understand the original aims and objectives and phases of the project was designed for the following outcomes:

1) Co-create, develop, pilot and deploy a telehealth-based intervention package, aimed at enhancing the psychosocial well-being of FLWs.

2) Conduct implementation research to: Identify enablers and barriers for implementation, Evaluate the potential impact through pre-and post-assessment, and using realist evaluation methodology to identify and describe mechanisms influencing the uptake of the intervention.

To achieve the intended outcomes, the project was structured into three distinct phases:

Phase 1 (March-July 2022): Initiated with desktop research and a series of co-creation-based workshops with the FLWs, to identify their psychosocial needs. These inputs were triangulated with literature review, stakeholders' consultations, and expert reviews to inform the intervention design.

Phase 2 (August 2022-February 2023): Focused on defining the application's value proposition and features through participatory? panels. Iterative development of the application was guided by continuous feedback and inputs from FLWs. The application was named 'MANSI'.

Phase 3 (Scheduled for March-July 2023): Envisioned as the pilot testing and implementation phase, including a research component to identify enablers and barriers and conduct a realist evaluation. However, this phase was not undertaken.

The approval for the research protocol for this originally proposed study was obtained from The George Institute Ethics Committee, for Project No. 06/2022 titled: Digital health Innovations for psychosocial Support to frontline Healthcare workers during COVID-19 pandemic-Accelerated response (DISHA).

This project was funded by USAID under the Emergency response program, for 18 months from March 2022 to July 2023. The developed solution was intended for rolled out across 25 districts in six states, targeting three key cadres of FLWs, namely Accredited Social Health activists (ASHAs), Auxiliary Nurse Midwives (ANMs), and Anganwadi Workers (AWWs).

6 Process Description

In this section, we present the key findings and insights derived from the study.

We begin by outlining the processes adopted across the three phases, detailing the roles played by different stakeholders (presented in Table 2), methods of engagement and key outputs. Additionally, we provide a temporal mapping of stakeholder involvement in Annexure 5, highlighting their evolving roles and engagement throughout the project lifecycle.

Table 2 - The key stakeholders and the roles they played in this project are listed in the table below

TGI	Responsible for the co-creation approach, convening stakeholders to define needs as well as identify and interpret behaviour, derive insights, design and coordinating the development of the application and managing the iterations: All the research components in independent capacity.
Funding agency (Sub-granting agency)	Provide grants for the implementation of the project, connecting with the other field teams, agreement on features, oversight and approvals.

Scientific Advisory Group (SAG)	A group of six experts who guided the entire research and implementation process
Implementing Agencies (field teams)	Supported by funding agency, they played key role including primary liaison with street level bureaucracy, for approvals, coordinating with FLWs for exercises and deployment of solution
FLWs	Identified by field teams, guiding the design, validating the translations, testing and adopting the solution and provide active feedback through the implementing agencies.
Developer	Agency contracted for developing the application
District Health Administration	Responsible to provide necessary permissions for roll-out and allowing access to FLWs.

6.1 Detailed Description of Phases

6.1.1 Phase 1: Co-creating the process and intervention package with the FLWs and other relevant stakeholders

The community-based participatory workshops contributed to two major inputs relevant to this project, workshop insights provided recommendations for stakeholders, including policymakers to: respond to the FLW psychosocial needs, and understanding to co-conceptualise the co-creation and implementation process [46,47].

As part of the preparatory phase, a series of participatory workshops were co-designed to create safe space for the FLWs to share the spectrum of their stressors and psychosocial needs, shaped by their multifaceted roles at home, at work and as community leaders. The workshops also captured the coping mechanisms they adopted and assessed their awareness and utilization of any existing interventions or mental health services. A comprehensive three-hour workshop plan, consisting of six structured sessions, was developed to sensitively capture their lived experiences, perspectives, emotions, and specific psychosocial needs [45]. A variety of participatory tools, such as community case studies, focused group discussions (FGDs), storytelling, thought showers and guided visualizations were employed to facilitate meaningful engagement.

The detailed workshop plan is provided in Annexure 2, which served as a guiding framework for the co-creation workshops conducted with the three target FLW groups.

The districts (administrative sub-units of states) were selected through a comparative evaluation of the socio-demographic characteristics, including: population size and tribal population representation, urban - rural distribution, proximity to state capital (to represent access to tertiary level mental healthcare services) and total number of sub-centres (to

represent infrastructure at community levels). One district from each of the six participating states was selected by the funding and implementing agencies after conducting feasibility assessments. The necessary permissions from the district health administrators for conducting these exercises, were obtained by implementing agencies from four of the six districts. One district denied access and another faced disruption due to ASHA workers protests. The districts included in the study were referenced as, East Singbhum (ES), Indore (I), Tumkur (T), Kamrup Metro (KM). Keeping in mind representativeness, diversity, and inclusion, additional cadres such as ASHA supervisors, AWW helpers, and Community Health Officers also participated in the workshops in some of the districts. During the co-creation workshop visits, other key stakeholders including District Mental Health Program (DMHP) team members, Chief District Medical Officers, National Health Mission (NHM)– District level coordinators in respective districts, were also interviewed to understand the contextual realities, potential challenges, and service providers' as well as implementers' perspectives. The final workshop included design professionals and senior community mental health for the inputs, to help shape the intervention design robustly.

Detailed session plans (provided in Annexure 2) were used to encourage/facilitate? active participation and systematically gather data relevant to the intervention design. The session plans were divided into four sections, each aimed at informing to specific design elements:

1. Identify the stressors perceived to impact FLW's mental health.
2. Identify the coping mechanisms and activities that contributed to their resilience and well-being.
3. Catalogue interventions that they felt impacted their well-being and mental health positively?
4. Assess key features of the ShareCare application for its strengths, gaps, and relevance to the FLW's psychosocial needs.

A total of 140 participants took part in these workshops, which were conducted separately for ASHAs, AWWs and ANMs in bilingual settings to ensure inclusivity and psychological safety. Each workshop lasted between three to four hours depending on the richness of the discussions and included a 20-minute tea break. To contextualize participants' responses, socio-economic data were collected either at the beginning or end of the workshops, as time permitted. The research team was accompanied by district officials and at least one local mental health professional or counsellor, who assisted with translation, contextual

interpretation and provided psychological support, when needed, due to sensitive nature of the discussions. The data was collected using sticky notes to add their opinions and interpretations on the flipcharts, along with individual worksheets filled by the team based on participants' responses as illustrated in the Figure 2.

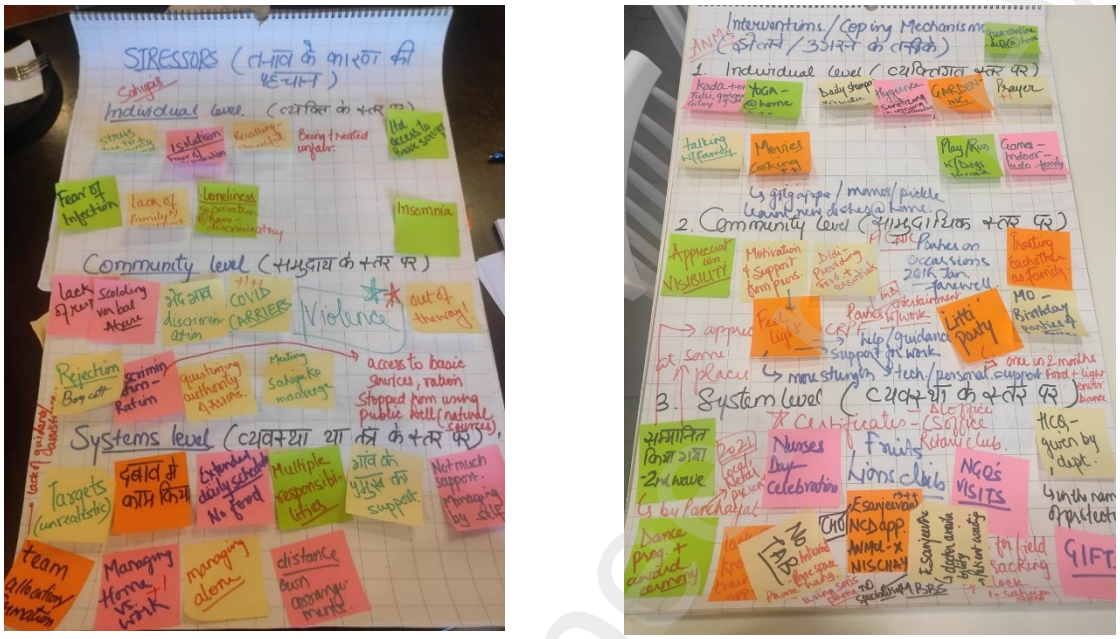

Figure 2: Snapshot of inputs received during one of the co-creation workshops

The discussions were summarized at the individual, community and system levels for identifying stressors and the respective coping mechanisms that FLWs employed. The rich qualitative data that emerged from these co-creation workshops was analysed using inductive thematic analysis, allowing for emergence of grounded insights directly from participants' narratives. Additionally, FLW's knowledge on any existing mental health interventions and available mental health services was documented. An early assessment of the ShareCare application was also conducted to capture early experiences and feedback on different components of the application, what worked for them, what did not and why, along with suggestions for improvement. Inputs gathered through these processes, guided in critically analysing the context of the FLWs and assisting in designing the intervention package that specifically addresses psychosocial needs of FLWs.

The synthesized findings are presented in the three tables below:

Table 3 summarizes stressors identified and coping mechanisms adopted, compiled across all participating districts.

Table 4 highlights interventions perceived to support their mental health and outlines desired components in digital applications such as ShareCare. Suggestions included access to a list of trusted doctors to seek care from, entertaining and informative videos, visual or interactive Question and answer formats and self-assessment tools.

Table 5 provides insights into current practices around seeking mental health care among FLWs. Each table uses district notations to indicate the source of data: East Singbhum – ES, Indore – I, Tumkur – T, Kamrup Metro – KM.

Table 3- Identified stressors and coping mechanisms at the Individual, Community and Systems level.

Stressors Identified	**Coping Mechanisms**
Individual Level	
• Fear of infection and contagion to friends and family • Isolating from family was difficult. • Experiencing physical manifestation of stressors (body aches, exhaustion, palpitation, chest pain, sleeplessness, constant headache, anxiety, gastritis, trembling hands, irritation, fear, and anger in [T] • Managing multiple responsibilities – work vs household, with mixed responses on family support [Extreme family support reported by ASHAs in I] • Sense of Guilt – unable to do enough because of being poorly resourced [ES, T] • Can't afford to take any more stress [KM]	• Spending time with family, video/audio calls with friends and family members • Engaging in recreational activities like gardening, singing, music, YouTube videos and WhatsApp messages [T] • Maintaining hygiene & home remedies [ES, I] • Faith-based activities like praying, belief in God, [ES, KM], meditation, yoga, watching mythological series on TV/YouTube • Strong belief that nothing could happen to us, [ES, I] • Journaling [T]
Community Level	
• Stigma & Discrimination by community members for FLWs and their family (barred entry, barricading, vacate house if on COVID duty) • Referred to as COVID Carriers, strong backlash, with threats of violence and death against the FLWs ["*Sahiya ko pakad ke maarenge*"] [Translation – Will beat up the health worker]- ES; Tribal lines- KM] • No support, felt neglected and left alone, when we/family members got sick [*"we serve others, there is no one to serve us"*- 40 yr old CHW from KM] • Community questioned the authority and competency of FLWs [ES, T] • Returning migrants needed significant support - expected FLWs to do their personal outdoor chores	• Audio/Video phone calls with their peers to seek support, share problems, exchange recipes, jokes, home remedies etc. [Team Yoga in KM] • Informal chats and fun elements to lighten the environment during the cluster/team meetings. • Felicitation and recognition of CHWs for their contributions - sometimes conducted by Panchayat Heads, Ward Counsellors. • Going for picnic as small groups [ES] • De-escalation initiative: "I love you Campaign" [KM]
Systems Level	
• Limited supply of PPE kits and medical supplies, had to pay for/arrange on their own [discrimination in providing PPE kits- I]	• Provision of basic medical kit to the FLWs • Department of AYUSH to distribute 'Kaada' as

• Inaccessible transport during lockdown- overpay the fare, fines to Police because of lack of their support. • Reduced/no access to basic needs- food, toilets, water during the field work [no acknowledgement of sacrifices made – KM] • Extended working hours in extreme working conditions, unclear instructions, excessive reporting, continuous pressure to achieve unrealistic targets with limited support, resources and even leaves. [rule of picking up call within four rings – ES] • Delayed payments and incentives [discrimination in incentives provided - ES] • Made to work despite health issues/injuries/ death in the family [ES, I] • Ad-hoc/late evening trainings and meetings at 10/11pm without any provision for travel and food after a hectic day of work [T, I] • Escalation of issues faced to seniors, but not worked [a 47-yr old female – ES]	immunity boosters [I] • Support from seniors and doctors during field visits/conflicts [ES, KM] • Organizing in teams to divide work [I, KM] • Training/awareness sessions on Mental health issues helped identify patients in the community [I, KM, T] • Innovated a solution for setting up quarantine centres on their own, using banana leaf [KM] • Government made vaccination mandatory for school admission, access to ration from depots- helped reduce vaccination hesitancy [KM]

Table 4: Awareness of FLWs on available mental health activities and interventions

Individual level:
- Yoga classes on TV or YouTube
- Self-care – focus only on positive things and do things that make us happy like dancing, singing [KM]

Community level:
- Recognition at the community level by NGOs, Panchayats at community meetings – COVID WARRIORS
- Yoga Application [ES], Team Yoga [T]
- 'Buddy system' to talk about their issues openly - potential [T, I]
- Group trips/activities for recreational purposes [ES, I]

Systems level:
- Indicative access to eSanjeevani OPD (through CHOs) Provision of Equipment and Prophylactics
- Trainings on technical component of COVID-related care
- DMHP team to conduct awareness sessions on mental health for FLWs, schoolteachers, and children [I, KM, T - TMHP]
- Group organized activities by officials [birthday parties- Indore, litti party- ES]
- Revised workload within team – to facilitate better planning [KM]

Awareness on DIGITAL APPLICATIONS:
- Awareness on Sharecare application is NIL across the districts.
- Explicit fear of digital application for tracking and monitoring [T]
- Potential hesitancy in using the digital applications by FLWs, particularly the ones experiencing signs of mental health issues (who did not seek services before) [ES], compounded by the overwhelming stigma, fear, and lack of adequate awareness on mental health.

Table 5: Mental Health Services/Linkages through the District Mental Health Program (DMHP)

- DMHP team – functional in all the four districts (under-staffed in Indore to well- staffed and functioning at the Taluka level in Tumkur).
- Awareness workshops conducted for different cadres of FLWs to identify signs and symptoms of mental health illnesses/disorders amongst the community and refer them to DMHP OPD.
- Community level campaigns and weekly visits (on specific days) to PHCs/CHCs for OPD services and follow-ups.
- **eSanjeevani OPD** is indicatively functional in most districts (through CHOs) for providing general OPD

services, however, in Tumkur, mental health services are also provided through eSanjeevani OPD.

- Integration of mental health services related information in 104 [ES]

The workshops reaffirmed the need for a comprehensive intervention package tailored to the psychosocial realities of FLWs. Participants emphasized the importance of: a) timely access to relevant knowledge and information, b) locally-validated self-help exercises and activities, c) community awareness about the psychosocial challenges faced by FLWs, d) mechanisms for community recognition and appreciation of their contributions, and e) systemic level improvements in working conditions and institutional support. In terms of digital intervention features, FLWs expressed that their exposure to social-media could be leveraged as a learning and engagement tool?. One of the vital features the FLWs identified was anonymity within the application environment, which they viewed as essential for open and stigma-free engagement. Additionally, FLWs highlighted the need for mental health services to be accessible in neighbouring districts instead of their own, owing to the social stigma associated with seeking mental health services within their immediate communities.

6.2 Phase 2: Defining Values, Features, and Iterative Development of the Mobile Application

Building on the insights gathered from FLWs and other stakeholders during Phase 1, the development team created the initial application wireframes - simple two-dimensional outline of the application screens, , to begin the iterative design process.

The overall findings from the workshops not only validated the needs of FLWs, at individual, community, and system levels but also guided the application's design process. It underwent iterative reviews both internally and with the Scientific Advisory Group (SAG)[1] to ensure its alignment with the context-specific needs of the FLWs and pertinent principles of 'Do no

[1] Scientific Advisory Group was formulated with senior and technical experts in the area of psychosocial support and/or the FLWs to seek guidance and direction over the course of this project.

harm', accessibility, inclusion (in terms of language, gender, and stigma), privacy, confidentiality, and security of FLW's data. The first set of proposed features for developing the prototype was formally ratified by the SAG (refer to Figure 3).

Levels	Potential interventions	*Digital Component*
Individual	*CBT*	
	Breathing Exercises	Videos / Animation - Mood monitor *(mechanism to evaluate themselves)*
	Relaxation Exercises	
	Journalling / Prompts	Blend
	Culturally appropriate Yoga / Meditation trainings	Videos? / Animation?
	Selfcare	
	Organising work - Daily diary	Physical printed document
	Setting-up Routines (Integrate this with Daily Diary)	
	Knowledge gaps	
	Address knowledge gaps at individual level	Digital repository for all FAQs + info sources / 1-1 conversations, interactive/animation to plain text
	Address stigma around seeking help/services	SAG Support
Community	**Larger Community**	
	IEC package for addressing stigma against FLWs	May not be part of the digital application - Regional
	FLW Community	
	Buddy system 1 hr/month Discuss personal issues in group	Non-digital component / Digital facilitation
	Address entertainment component as a group activity	Suggested activitvities, not prescriptive
System	**Advocacy w/ the state Establishment to:**	Advocacy intervention
	Streamline Work allocation - Break allocation	
	Setting up targets as team exercise	
	Timely payments of Incentivies	
	Address the issue	
	Adequate resources (PPE / Meds)	
	Ensure access to basic provision and services: water, food, toilets, safe places for breaks during fieldwork	
Services	**Actual Service mapping**	
	Telehealth	
	Esanjeevani - mapping	
	Mapped list of service providers specific to the location	Part of digital application
	Regional Preferences to be taken into consideration	

Figure 3: First data set features finalised for prototype development

This recommended feature set was presented as initial wireframes to the funding and implementation agencies for inputs and finalization. Over three rounds of discussions, the design was refined, considering resource constraints, the emergency nature of the funding, project timelines and the feasibility of expediting roll-out. Following this process, three key intervention features were selected for developing and deploying of the mobile phone application. The funding and implementation agencies finalised the application name MANSI, chosen from a shortlisted set of names suggested by stakeholders. The application was aimed to provide compatible? access to any Android iOS device running version V9.0 and above.

The workflow finalised for the application includes three modules. First, **staged self-assessment:** This commences with a mood monitor, followed by a preliminary assessment to identify the reasons for the specific mood selected by the FLW. Based on FLW's responses, the application guides the user to appropriate self-assessments for specific common mental health illnesses such as depression, stress, anxiety, and insomnia. The second module involves

a **Content Management System,** that hosts curated content to improve FLW's knowledge and awareness on the common mental health disorders and includes self-care materials tailored to their contexts and needs. Finally, the third module includes **a locally contextualized referral helpline**, which provides verified helplines and referral facilities offering multiple levels of care, including care for emergency situations. These resources were curated and verified by the field implementation and the TGI teams.

Table 6: Analysis of potential features for the proposed digital solution

Potential interventions	Digital Component
Individual Level	
CBT	
Breathing Exercises	Videos / Animation - Mood monitor(mechanism to evaluate themselves)
Relaxation Exercises	
Journalling / Prompts	Blend
Culturally appropriate Yoga / Meditation trainings	Videos? / Animation?
Selfcare	
Organising work - Daily diary	Hybrid mode
Setting-up Routines (Integrate this with Daily Diary)	
Knowledge gaps	
Address knowledge gaps at individual level	Digital repository for all FAQs + info sources / 1-1 conversations, interactive/animation to plain text
Address stigma around seeking help/services	SAG Support
Community Level	
Larger Community	
IEC package for addressing stigma against FLWs	May not be part of the digital application - Regional
FLW Community	
Buddy system 1 hr/month Discuss personal issues in group	Hybrid mode
Address entertainment component as a group activity	Suggested activities, not prescriptive
System Level	
Advocacy with the state Establishment to:	**Advocacy intervention**
Streamline Work allocation - Break allocation	
Setting up targets as team exercise	
Timely payments of Incentives	
Address issues	
Adequate resources (PPE / Meds)	
Ensure access to basic provision and services: water, food, toilets, safe places for breaks during field work	
Actual Service mapping	
Telehealth	
ESanjeevani - mapping	
Mapped list of service providers specific to the location	Part of digital application

Careful considerations were made for the application design to ensure anonymised access of the application to the FLWs, responding to the stigma associated with seeking mental health care. In line with the principle of protecting user's right to privacy, the application was designed to collect no personally identifiable information that could be decrypted or traced back to the individual users in any manner. To operationalize this, an informed consent form was integrated at the beginning of the application. The form clearly outlined the rationale behind the developing of this application, the process applied for co-creating this intervention with the FLWs, nature and purpose of non-identifiable data collection and an assurance that the collected data would be used used solely for identifying potential population level trends and patterns, not individual behaviours.

The technical workflow of the application, including the scoring tools and logic guiding users towards appropriate actions and care options, based on their scores- was validated by a panel of thirteen mental health professionals from a premier institution in India. The panel included psychiatrists, psychiatric social work professionals, psychologists, psychiatrists from DMHP from the districts in Karnataka. The application was designed carefully to uphold user anonymity and data confidentiality, ensuring that FLWs could engage with the platform without any fear of exposure or judgement. The application workflow is provided in Figure 4 and selected screenshots of the MANSI application are presented in Annexure 3.

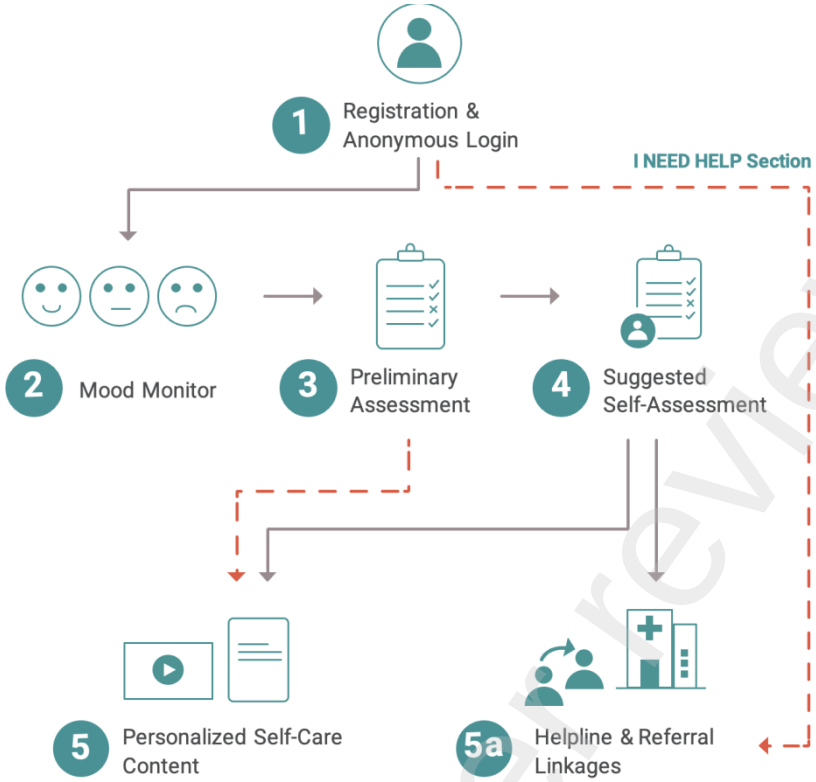

Figure 4: Workflow of the MANSI Application

The MANSI application prototype was jointly reviewed by TGI and funding agency, along with the implementation teams, and subsequently underwent multiple iterations. Upon reaching consensus on the final version, the I application was translated into four local languages: Assamese, Hindi, Kannada, and Odiya. All the contents of the application was professionally translated, followed by a rigorous validation of the translation by FLWs from each of the states. This validation process was facilitated by the implementation agencies, to ensure linguistic accuracy, cultural appropriateness and user comprehension.

6.3 Phase 3: Process and Product Feasibility Testing, Learning and Implementation of the Intervention.

While the MANSI prototype was undergoing iterations, the detailed plans for testing, implementation, and rollout were designed, along with the resources required for the roll-out. These included training manuals and presentations, audio-visual content, flyers for dissemination. However, with changes in data privacy and safeguards legislation in the country at that point of time, the original plan of data ownership – initially assigned to TGI- had to transferred to the funding agency [48].

To ensure responsiveness to user needs and uphold the spirit of co-creation, TGI and the funding agency agreed to conduct the pilot testing of MANSI application in a phased manner. The initial plan was to launch the prototype in two districts, capture early feedback from FLWs, and iterate the design before further scaling-up. The pilot testing aimed to assess the application's usability, accessibility and acceptability, focusing on its design, workflow and practical utility.

The implementation modalities were planned through multiple channels. First through integrating within existing training or dissemination programs for each of the three FLW cadres, with a dedicated 15-30 minutes module on MANSI application to the agenda. Second, through Training of Trainers (ToTs), a group of district-level trainers from EngenderHealth Teams were to be trained, who would then support FLWs in using the application and accessing mental health support. Third, through dedicated training sessions organized by DMHP teams, for ASHAs, AWWs and ANMs and lastly, incorporate a 15-20 minutes module on MANSI application within all other EngenderHealth training components for FLWs.

However, owing to time and budget constraints, the emergency response nature of the grant, and delays in Phase 2, the pilot testing could not be completed as planned. Despite these limitations, the funding agency proceeded to deploy the application across 25 districts, using the deployment resources provided. According to 2023 Annual Report of EngenderHealth, over 15,000 FLWs used the MANSI application [49]. However, the application is not available for use anymore.

7 Reflections from co-developing and implementing a sensitive project

The co-creation approach was central to the whole project cycle. In this section, we reflect on the key factors that had major influence on engagement and commitment to this approach. These reflections highlight a range of circumstances and constraints that can potentially inform future implementation and research efforts, particularly in navigating challenges to realign the project trajectories to uphold the co-creation principles.

7.1 Initial Design Inputs and Contextual Integration

The need to address the mental health and well-being of the FLWs emerged as a critical

priority during the COVID-19 crisis and was subsequently included within the emergency response program by USAID. This component was embedded within the original program, targeted at improving Maternal and Child Health, thus allowing access to the existing cohorts of FLWs for inputs into the design in this new component of the program. A set of six districts of the twenty-five districts under the original program, were identified by the research team based on diverse socio-demographic contexts (see Annexure 4), for inputs on the design features. Ultimately, four districts were selected based on feasibility and availability within a narrow three-week window. The co-creation workshops were envisioned as a foundational step for gathering inputs and fostering deeper stakeholder engagement. (see Annexure 2). Though these workshops were developed and conducted by a small team of experts with experience in qualitative research in mental health, an earlier exercise at Andhra Pradesh [47] served as a reference. To accommodate contextual adaptations, a five-day gap was planned between the first and second workshops. However, the subsequent sessions were all completed within a span of five days, which limited opportunities for reflections and iterative refinement for the next session. The design team that joined the last workshop, confirmed the alignment of the sessions for meaningful design inputs and supported in identifying pathways for extracting actionable insights. However, there was a significant? Misalignment emerged between the initial plan to repurpose the existing 'ShareCare' application, and the FLW's aspirations expressed during the workshops related to such an application. Their feedback revealed the need for a more tailored and responsive digital solution, leading to the decision to abandon the modification of 'ShareCare' and instead develop a new digital application from scratch. This shift required substantial time and effort, resulting in project scope and timeline extensions. Despite these challenges, the co-creation process remained a guiding principle, ensuring the final intervention was rooted in the lived experiences and expressed psychosocial needs of FLWs.

7.2 Translation from design to development

The cocreation approach required the MANSI application prototype to be developed iteratively and then validated with FLWs. However, the time-intensive nature of the process, particularly the need for continuous engagement with FLWs was not fully accommodated within the project timeline. This posed a significant challenge to maintaining the integrity of

the co-creation model throughout the intervention development.

Beyond the key stakeholders from the workshops, the development of MANSI application demanded intensive collaborations across multiple teams, including: the research team, members of SAG, application development team, design professionals, and wide range of mental health professionals. Throughout the development phase, inputs from the co-creation workshops served as the central reference point for all major decisions, ensuring that the participatory ethos remained embedded in the process wherever possible.

The subsequent iterations of the application also had to account for evolving requirements including funding agency directives, and changes in laws pertaining to privacy and data security. For instance, it was intended to collect the FLW's contact information and have the project and application development team register the FLWs for authenticity and validate the users on the application. However, after numerous deliberations on the viability of obtaining the FLW's contact information throughout these six project states, and the potential consequences on user's privacy and confidentiality, the idea was ultimately abandoned. The experts and members of SAG were consulted at different stages to solicit their timely inputs and guidance, as well as to keep them informed of the developments in the process.

Table 7 – Observations of what worked and what did not over the course of this project, and reflections on reasons.

What Worked	
Co-creation as a Frame of Reference	The co-creation process as envisioned, proposed and then executed via workshop inputs were validated by SAG and on-ground design team to guide all major decisions for consistent alignment. Eg: Subsequent App Iterations, Privacy regulations
Strategic Shift to FLW's Preference	Prompt decision to abandon repurposing existing application in favour of the FLW's aspiration for a co-designed functional and effective intervention
Collaborative Stakeholder Process	The mapping and facilitated engagement across stakeholders supported the process design, alignment as well as the ongoing adaptation as well as ownership and uptake
Participatory Content Validation	The Field Implementation teams and FLW's participation in translation, resource linkages and validation served as an indicator for participation and agency.
Implementation	While the later project timeframes restricted user's participation in

Capability	rigorous feedback, a condensed user-testing was implemented instead during deployment and capacity building sessions.
What Did Not Work	
Outcome Orientation	The goal shifts and disruptions called for agile and complex, project and community management expertise. Pressure to demonstrate activity progress coupled with fragmented approaches, implied timeline and scope trade-offs straining the engagement quality and rigour.
Project Management Choices	ShareCare repurposing stage consumed > 65% project duration, constraining new development, pilots, outcome evaluation as planned.
Research Processes Cut Short	Procedural delays and limitations implied that the envisioned research components could not be carried out, without application data for drawing insights.
Commitment to Co-creation	These processes are relatively unfamiliar and complex and are coupled with cultural and power dynamics. The goal shift to new FLW preferred app development provided an opportune test for commitment to co-creation
Culture, Bias and Stigma	Underreporting and preference for Peer Support indicate direction of reinforced hesitation and care seeking
Digital Divide, Trust Deficits	Lingering asymmetrical access to technology, devices, and trust in data privacy

7.3 Deployment considerations

Since Phases 1 and 2 and ShareCare repurposing process, consumed about two-thirds of the total project duration, it left little time for conducting feasibility testing, piloting, roll-out and potential outcome evaluation as planned.

Such a decision could potentially restrict users' participation across all six states, preventing their first impressions and feedback being collected through a rigorous user testing work plan designed for the purpose. To compensate for this, a condensed user-testing form was prepared, for implementation teams to collect early user feedback, during deployment and capacity building sessions with the FLWs.

During this period, The Digital Personal Data Protection Bill was tabled in the Indian parliament. This meant that ownership of data was to rest with the funding agency resulting in no data made available for drawing insights on use of application or for evaluation.

The project was handed over to the implementation agency in May 2023, for deployment

with existing resources and networks developed within the project implementation districts. In this period, the engagement of the research team at TGI was significantly reduced. Recognizing the valuable learnings from this project, and huge potential to refine and strengthen this intervention package, the research team is actively seeking additional funding to continue advancing this critical piece of work.

8 Conclusions

The emergency nature of the 18-month grant, combined with existing time and budget constraints, significantly limited the scope and potential impact of this intensive project. Implementing a co-creation based participatory approach across six states was an ambitious undertaking. While the research team made every effort to uphold the principles of co-creation, the scale and complexity of the task posed considerable challenges.. Several key limitations emerged. Firstly, the research components as envisaged could not be fully executed due to unanticipated delays and extended procedural iterations, some of which may have been avoided with more streamlined planning and coordination. Secondly,, the project states? were subjectively selected based on political and bureaucratic factors by the funding agency, so some of the context-specific and culturally sensitive results from this project implementation may not be generalizable to other states or even nationally. Thirdly, the FLWs were recruited to this study by public health officials from a few selected blocks, which may have introduced selection bias. Consequently, the co-creation workshop participants may not fully represent the district or state-level FLWs. However, such constraints are commonly observed in LMIC settings, and the participatory process developed and followed remains broadly applicable in similar contexts. Fourthly, while the TGI Research teams found the FLWs to be largely forthcoming and unhesitant in voicing their opinions and even solutions, it is possible that stigma around mental health limited their willingness to fully disclose their experiences and symptoms. This underscore the the need for additional time and research resources to build trust and reduce this response bias in future research.

Lastly, the digital health interventions are prone to technological challenges owing to the existing digital divide, cultural and regional limitations, and concerns around data privacy. These factors may hinder adoption and sustained use of such tools. To address this, digital

interventions must be complemented with robust offline components, which are often under-utilized.

9 Recommendations

The lessons gleaned from this project and study will meaningfully add to the knowledge on co-creating and implementing such an intervention package focused on the personally sensitive issue of the psychosocial wellbeing of FLWs. Critical as they are for the implementation of any public health policy or program, augmenting their welfare requires joining with them in identifying the enablers and barriers for implementing potential interventions. Furthermore, mechanisms that can potentially influence intervention adoption among the target beneficiaries themselves are paramount. The findings from this study can inform policy decisions required for potential system level changes and interventions aimed at long-term changes and improving the overall wellbeing of the FLWs including psychosocial aspects.

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11. Conflicts of Interest:

None declared

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