

# **Iterative Design and Prototyping Process for a Postpartum Depression Support Tool**

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# 1 Introduction

Postpartum depression (PPD) is a highly common mental health disorder identified in new mothers, who most of the time exhibit various signs and symptoms like being sad, fatigued, and anxious. Previous studies have shown that few are designed for the use of mothers suffering from PPD, despite the great advance and availability of apps on mental health and wellness. This report documents an iterative design process of a user-centered mobile application supporting mothers with PPD. This report represents a number of stages in the iterative design cycle that involves user research, prototyping at low and high levels, and evaluations with the goal of devising a solution that effectively addresses the emotional, mental, and practical needs of mothers with PPD without sacrificing usability and accessibility.

## 2 Problem

In the interviews, the mothers with PPD described facing some of the interconnected difficulties that they face are both emotional and physical. It is this overwhelming feeling of loneliness and isolation associated with the postpartum period of the feeling of emotional disconnection and misunderstanding even when people are around. Most often, feelings of guilt worsen under conditions of isolation, since women may feel that they are unable meet either the demands from society or their expectations about becoming a "perfect" parent. The pressure to balance personal well-being with caregiving responsibilities adds to their emotional load.

Another major challenge that a mother with PPD has to deal with is sleep disturbances. The postpartum period is usually characterized by disturbed sleep due to the irregular sleep pattern of the infant, in addition to the day-to-day needs of feeding, diaper changing, and soothing. These interruptions in sleep hinder the mothers from falling into restorative sleep and make their physical and emotional conditions worse. Chronic sleep disturbances can increase frustration, sadness, and stress, setting up a self-reinforcing cycle.

In addition to physical obligations, the high tide of caregiving responsibilities places a heavy mental burden on the mother. A newborn requires constant attention, and multitasking leaves no time for the mothers even to attend to their needs or get some sort of psychological help. Normal tasks like eating up a meal or going for some small break becomes hard to handle which turns into emotional exhaustion and neglect in taking care of one's self.

Social stigma associated with mental health prevents the mother from seeking help. The mother is culturally seen as someone who must be strong, put her family's needs before her own, and thereby never show vulnerability. Most of the myths about PPD, like it is just "baby blues," make women fearful of approaching someone and being labeled "unfit mothers."

Besides these, the time that mothers can spare for traditional tools of mental health is hardly there. The unpredictable demands for caregiving hardly leave space for keeping schedules, and hardly any tool exists that prepares them for such high-stress moments as nighttime caregiving.

The available solutions on the market, though helpful for general mental health, are all a bit too generic and vague to tackle the various many-layered problems moms suffering from PPD may face. Many applications fail to provide emotional support focused on the

postpartum life of mothers, for instance, tools for nightly stress or features promoting communication with mothers like themselves. They rarely include adaptive functionality, real-time notification, or personalized guiding through relaxations concerning the state of a user's emotional and physical condition.

The following project proposes the design of a mobile application that is user-centered. The app will focus on solving the core challenges identified through user requirements, which include:

- **Mood tracking:** It allows mothers to track their feelings and go back in time to understand their mental health patterns.
- **Stress-adaptive notifications:** It offers personalized alerts, tips on relaxation, and soft reminders when the stress levels are particularly high-for example, at night.
- **Community support:** A safe space is provided for mothers to share experiences, ask for advice, and connect with peers who understand what they are going through.
- **Educational resources:** To provide them with accessible, stigmaless information on PPD and how to cope effectively.

These elements combined in this app would make it a practical, available, compassionate intervention that fits seamlessly into the daily life of a mother with PPD. The emphasis is on real-time support, personalization, and connecting with peers, placing it uniquely to meet needs that have not been met heretofore among this vulnerable population.

## 2.1 Key Findings from User Research

### 2.1.1 Core Features

- **Mood Tracking:** One of the primary feature request is to log and track their emotional states daily. It was desired by the mothers to have an interface that was simple for recording how they were feeling, supplemented by a text input for notes about what was the specific trigger or event. This will let the user visually find trends and thus better reflect on patterns, drawing correlations between their activities and changes in mood.
- **Community Support:** The research found that mothers were comforted by the knowledge that they would be reaching out to peers with similar experiences. An online support community in the app provides anonymity for the mothers to share their views and feelings without judgement. Creating questions, comments, and likes were essential in creating interaction and emotional support.
- **Stress-Adaptive Notifications:** Participants emphasized notifications would adapt to their level of stress or caregiving schedules. These include reminders of self-care when stressed or suggestions to undertake relaxation exercises at that specific time. The notifications should be personalized, taking into consideration the different challenges and schedules of mothers.
- **Access to Supportive Resources:** Easy access to proper, concise, and de-stigmatizing information concerning PPD should be noted. Resource tools on items

such as articles, videos, and guides regarding coping strategies, differentiating between PPD and "baby blues," and seeking help from a professional expert were felt by the mothers.

### 2.1.2 Usability Needs

- **Intuitive Navigation:** Feedback on usability required a neat and simple interface. The mothers were irritated with overcomplicated designs that could further overwhelm them. Therefore, a streamlined system of navigation that prioritizes the most frequently used features was key to the requirement.
- **Focused Interactions:** Unpredictability while caregiving allows mothers a very little time to operate the app. Short focused interaction, such as quick log-ins, bite-sized pieces of educational content, ease of community features, identified as key to sustaining engagement for users.

### 2.1.3 Critical Functionality

- **Supportive Nighttime Stress:** Several mothers reported that nighttime is a stressful period for them. Obviously, sleep deprivation and relentless infant care demands contribute to higher levels of stress among this group. Relaxation techniques, guided breathing, and bedtime-suitable audio were appreciated for their potential benefits in night use.
- **Personal Settings:** Personal themes, notification preferences, and activity tracking ensure the application will adjust to every single user's needs and schedules.

## 3 Iteration 1: Low-Fidelity Prototype

### 3.1 Goal

The first iteration had the purpose of collecting initial feedback from users about the basic features and layout of the app in order to find out what needed improvement. This iteration shall provide the baseline understanding of user preferences and behaviors regarding mood tracking, community interactions, and settings.

### 3.2 Research Questions

1. How intuitive and effective is the interface when tracking the mood?
2. Does the community dashboard allow for easy navigation and meaningful interaction?
3. Are the settings intuitive and easy for the user to understand?

These questions were framed in a way that the design of the app would meet the specific needs of mothers with postpartum depression. Insights from this phase will shape the future iterations of the design by highlighting the usability gaps and prioritizing refinements.

### **3.2.1 Prototype**

- Technique: Low-fidelity sketching using MockFlow. Low-fidelity sketches had been chosen because they offer a fast and inexpensive manner of investigating several design solutions and obtaining user feedback throughout their early stages. They communicated enough detail to enable deep discussions while being flexible when changes needed to be considered.

## **3.3 Design Description**

### **1. Mood Tracking Screen:**

- The emotional states are captured by the provided emotive icons: "Happy", "Neutral", and "Sad".
- A text field allowed the user to make notes about how they were feeling, thus providing qualitative context to their mood entries.

### **2. Community Dashboard:**

- A simple layout with the basic feed where a user shared updates and interactions were either by comments or likes.
- The aim was meant to reduce feelings of loneliness and promote a sense of community.

### **3. Settings Page:**

- Contained simple toggles to turn on stress-adaptive notifications and set quiet hours.
- While functional, the toggles didn't explain what each would do or for what purpose it should be used.

### **4. Gamified Mood Tracking:**

- It was suggested to add gamification elements, like streaks or badges, to encourage users to track their mood consistently. For example, it could offer rewards for a week of daily mood logging.

## 4 Method

- **Approach:** Semi-structured interview with two participants, N=2. Semi-structured interviews allow for open-ended discussions, hence the participants can explain in detail about their feelings in the usage of this app. Qualitative approaches help in the determination of deep-seated insights into an app's usability and relevance.

### 4.1 Results

Participants appreciated the simplicity of tracking their mood but felt a need to visualize the feature in trend form using charts and graphs to analyze emotional progress. Without visual separators, the community dashboard was functional but reduced readability or usability. While toggles are easily usable on the settings page, they need some descriptive labels explaining what they do to reduce uncertainty on the user's end.

### 4.2 Reflection

The participants pointed out data visualization as an important point, and they emphasized that the absence of mood tracking trends was a huge gap; they wanted some tool that would give meaningful insights, such as weekly or monthly emotional overviews. Some suggestions for the community dashboard were to enhance readability by improving the visual hierarchy with separators or highlighting the important content. The description of such toggles in the settings should be clear to reduce ambiguities among users and make them confident enough to use the app.

This iteration set the baseline for further development since it was targeted at the very basic usability concerns, matching user expectations. This came to inform the focus in Iteration 2, where the refinements were mainly of functionality and user experience.

### 4.3 Design Prototype Visualization



Figure 1: Low-fidelity sketching

## 5 Iteration 2: Mid-Fidelity Prototype

### 5.1 Goal

This iteration aimed to refine the app's layout and features based on the feedback from the first iteration in the areas of stress-adaptive notifications, tools for night-time support, and general navigation. The primary objective was to determine how much the navigation of the application helps users access essential features, whether the notification system regarding stress adaptation fits the needs of users or not. Also, onboarding has been included for reporting its effectiveness in guiding first-time users.

#### 5.1.1 Research Question

- Is the navigation intuitive in this application to ensure users can access critical features such as mood tracking and night-time tools?
- Are the stress adaptive notifications related to user needs?
- Does personalization increase the ease of use and personal value of the dashboard?
- Is the onboarding flow capable of taking first-time users through the features of the application?

#### 5.1.2 Prototype

**Technique:** Mockflow mid-fidelity wireframes. Mid-fidelity wireframes showed a balanced amount of detail which was flexible to iterate over changes, yet with enough detail to conduct meaningful user interactions with the design.

## 5.2 Design

### 1. Streamlined Dashboard:

- Unified navigation with clear, intuitive icons for core features such as mood tracking, community support, nighttime tools, and settings.
- The redesign focused on reducing cognitive load while making the core functionalities accessible.

### 2. Improved Mood Tracking:

- Added graphical elements to represent the emotional trends over time.
- Users could change the view of daily, weekly, and monthly insights into mood and triggers.

### 3. Nighttime Tools:

- Added direct shortcuts to the home screen for things such as guided breathing exercises, calm audio, and various relaxation techniques personalized in high-stress caregiving scenarios.

### 4. Settings Page:

- Interacting toggles let users activate and tune the frequency of their stress-adaptive notifications.
- Added clearer descriptions of what each toggle does, based on the areas of confusion found in the previous prototype.

### 5. Emotion-Specific Suggestions:

- The integrated mood tracking feature now uses AI-powered prompts for personalization. Such examples of added personalization include adding relaxation tips for sad moods and celebrations for happy moods.

### 6. Onboarding Flow:

- An interactive walkthrough was done that would lead the first-time user through how to use the app—essentially, how to navigate through it by showing the key features of the app.

## 5.3 Evaluation Method

The evaluation, heuristics, and cognitive walkthroughs were with two participants. The heuristic analysis was performed based on established usability principles and found that strengths lay in intuitive navigation, while there were areas lacking proper visual feedback for toggles, with very little explanatory text to guide the operation of nighttime tools. A scenario-based walkthrough was carried out on the usability of real-life situations that might include multitasking while logging mood, hence the application should support time-sensitive and practical caregiving scenarios.

## 5.4 Results

The heuristic evaluation showed strengths, including a very minimalistic design that reduced cognitive overload; intuitive navigation, where the most important features such as mood tracking and night-time tools were easy to find. The participants noted that toggles were missing visual feedback and there was a lack of explanatory text in the night-time tools. The cognitive walkthrough confirmed that users could reach major features without help, and the night-time tools generally were well-received. Participant suggestions included adding contextual hints, for example, during high-stress periods, to help improve responsiveness and usability.

## 5.5 Reflection

Participants stressed the incorporation of immediate mechanisms for feedback-animations or a confirmation message for toggles. Dynamic promotions of nighttime tools should be done regarding user behavior, promoting better accessibility in high-stress periods. Customizable dashboards will be able to prioritize key features to the user. Mood tracking increased with visuals highlighting any major changes in feelings and emotions.

This iteration refined the design and usability of the app. The next iteration, building on the insights and feedback from this iteration, would test a high-fidelity prototype with advanced features and a polished user experience.

## 5.6 Design Prototype Visualization

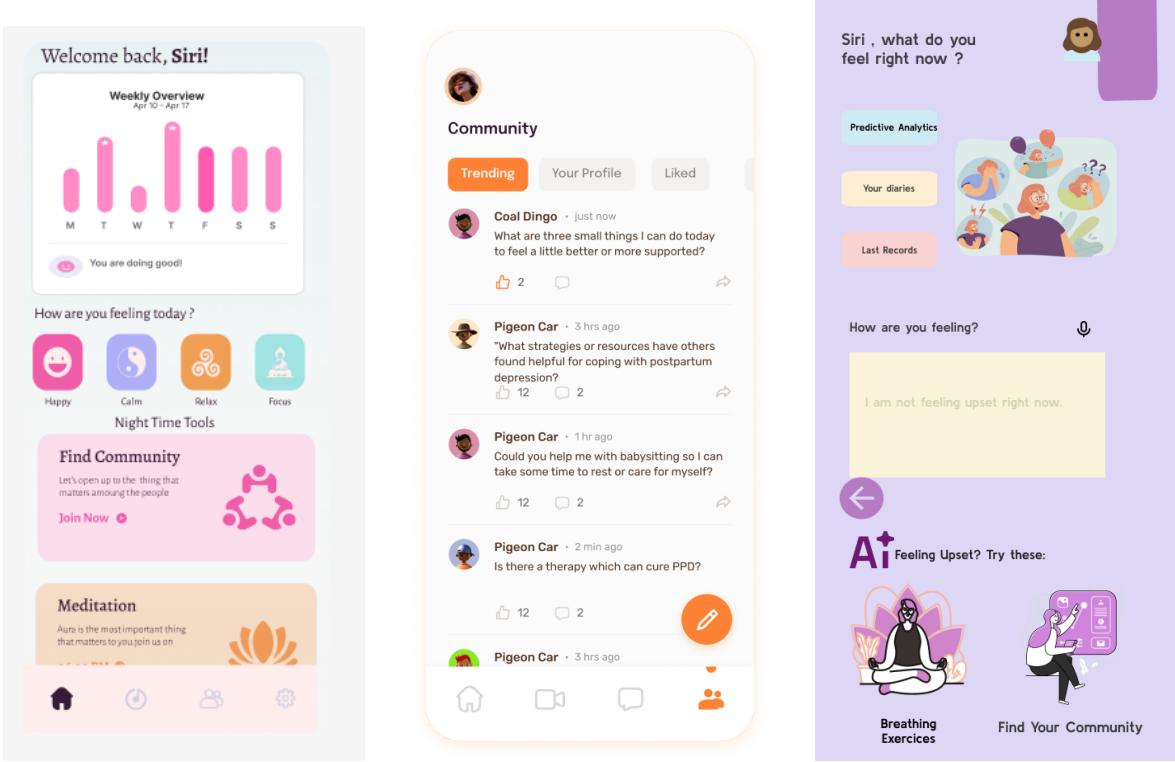


Figure 2: Mid-Fidelity Prototype

## 6 Iteration 3: High-Fidelity Prototype

### 6.1 Goal

This high-fidelity prototype iteration is a test for overall usability, functionality, and user satisfaction. Testing in this stage assesses the contribution that the app makes to high-stress instances in the lives of mothers, such as nighttime caregiving, and whether the app can meet the emotional and practical needs linked with PPD. Emphasis was directed at refining interactive features and visual design with the purpose of maintaining an intuitive, calming, and supportive application throughout.

### 6.2 Research Questions

- Does the app handle high-stress scenarios effectively from a user experience perspective?
- Are users satisfied with the general design and functionality?
- Does the integration of wearing devices improve the efficiency and effectiveness of the app in reacting to stress-related signals?
- How well do predictive analytics improve user insights coming from mood tracking?

- Does the speech-to-text functionality make it more accessible and easier to track moods?

### 6.3 Prototype

**Technique:** High-fidelity interactive prototype created using Figma. This prototype had to be of high fidelity to simulate an almost final product with near-realistic visuals and interactions. This was an important test of the app's usability and functionality under near-real conditions of use.

- **Visual Design:** The soothing pastel colors used in the interface, such as soft blue and peach, allowed for a very ethereal atmosphere, fitting for the emotional needs of mothers with PPD.
- **Interactive Mood Tracking:**
  - Allowed setting of customizable emotion labels and dynamic graphs that reflected emotional trends for daily, weekly, and monthly periods.
  - Integrate predictive analytics for the personalized mood trend.
  - The integrated mood tracking feature now uses AI-powered prompts for personalization. Such examples of added personalization include adding relaxation tips for sad moods and celebrations for happy moods.
- **Night Time Tools:**
  - Dynamic nighttime tools were made according to user activity or stress levels.
  - Enhancement in mood tracking with detailed trends and patterns.
- **Community Dashboard:** Included peer-to-peer messaging and anonymous posting for a supportive, nonjudgmental atmosphere in the community.
- **Adaptive Notifications:** Provided personalized, real-time reminders for relaxation, self-care, or spending time in the community. Notifications dynamically adjusted according to user behavior and fluctuating stress levels.
- **Integration with Wearables:** Explored integrations with wearable devices, such as smartwatches, which could track one's stress based on heart rate and then provide relevant notifications.
- **Speech-to-Text Mood Tracking:** The addition of voice input allowed reducing the user's typing effort; therefore, this will make tracking one's mood easier, especially for multitasking users.

### 6.4 Evaluation Method

Heuristic evaluation and semi-structured interviews, these two techniques were employed. The two participants underwent a heuristic evaluation in order to bring forth some major usability issues, related to navigation, feedback, and visual hierarchy, in locating design flaws of their prototype affecting user interaction. The semi-structured interview yielded qualitative responses regarding user satisfaction and functionality in the way that participants shared perceived strengths and areas of improvement.

## 6.5 Results

The heuristic evaluation showed intuitive navigation, with adaptive notifications well received, though participants pointed to a minor issue in identifying the active section in a navigation bar, suggesting dynamic pointers. During the interviews, speech-to-text was commented on for the added accessibility this afforded, especially while multitasking. Similarly, integration with wearables is of value, given real-time stress indicators are possible and proactively notify from physiological data. The predictive analytics were valuable in helping a user anticipate periods of emotional upset and proactive adaptation of coping strategies.

## 6.6 Reflection

Predictive analytics significantly raises the value of the app in providing actionable emotional insights to support preparedness and proactive stress management. The voice input features that improve usability and reduce efforts during high-stress caregiving moments were the highlights of the paper. The integration was also very engaging with wearables, and participants went on to provide features such as daily stress reports and personalized reminders. Navigation feedback suggested that dynamic indicators would help with clarity, allowing users to always know where they are and go directly to where they want. Finally, onboarding improvements were recommended with interactive tutorials and frequently asked questions in order to increase first-time user comprehension.

This is the iteration that finalized the iterative design process in which the app is polished, user-centered, and truly caters to both the emotional and practical needs of mothers with PPD.

**The next pages contain high-fidelity design visualization.**

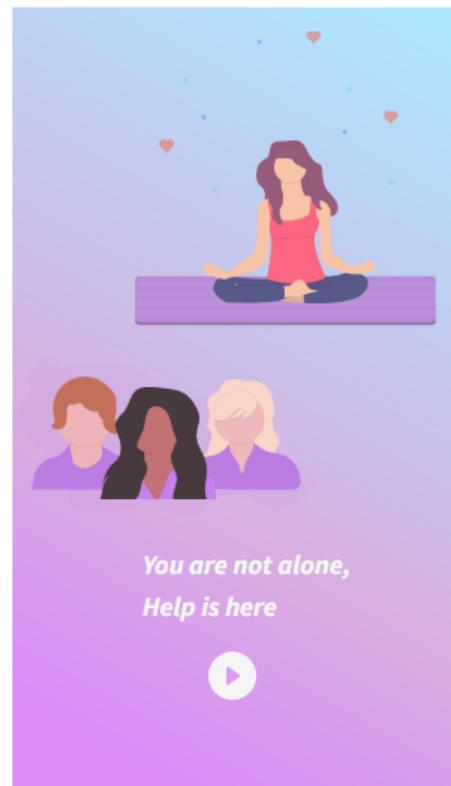
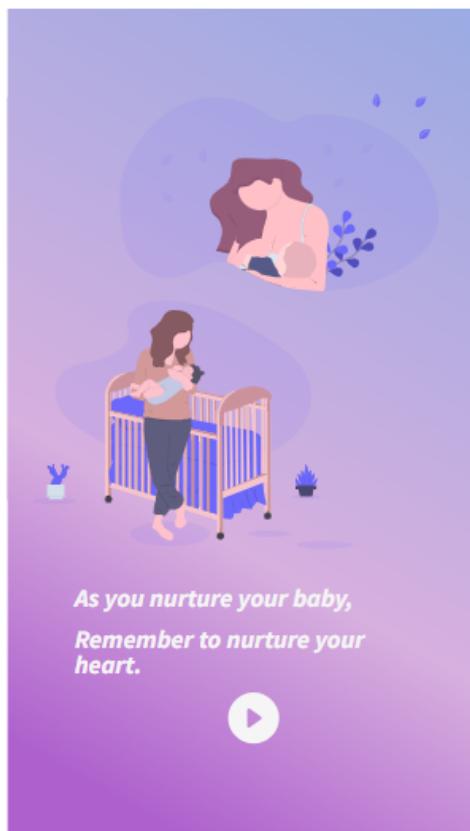
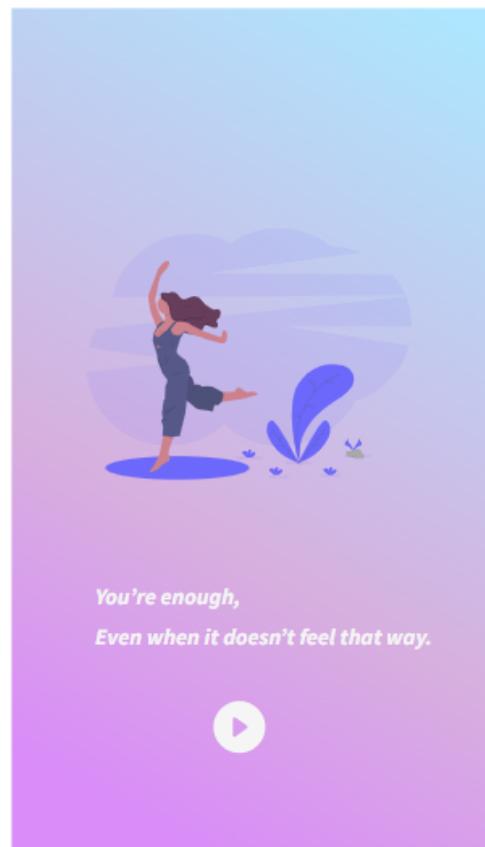
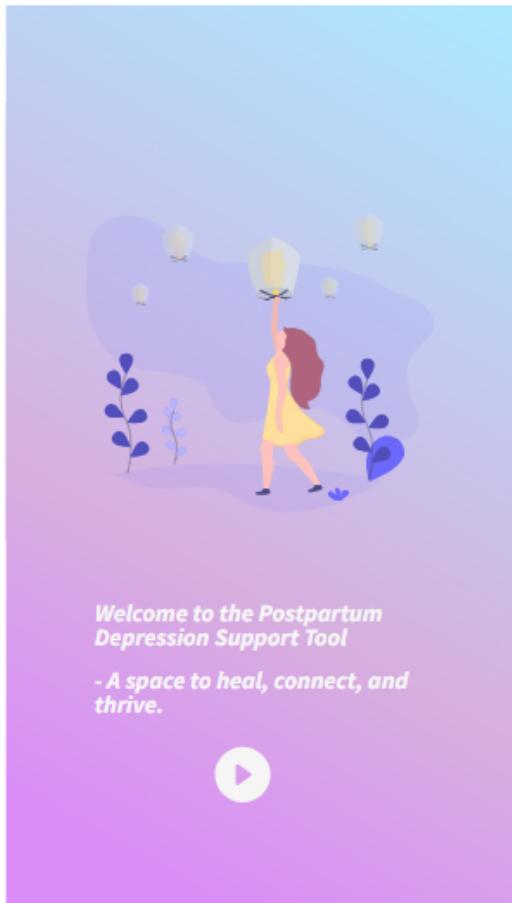


Figure 3: High-Fidelity Prototype (Page 1)

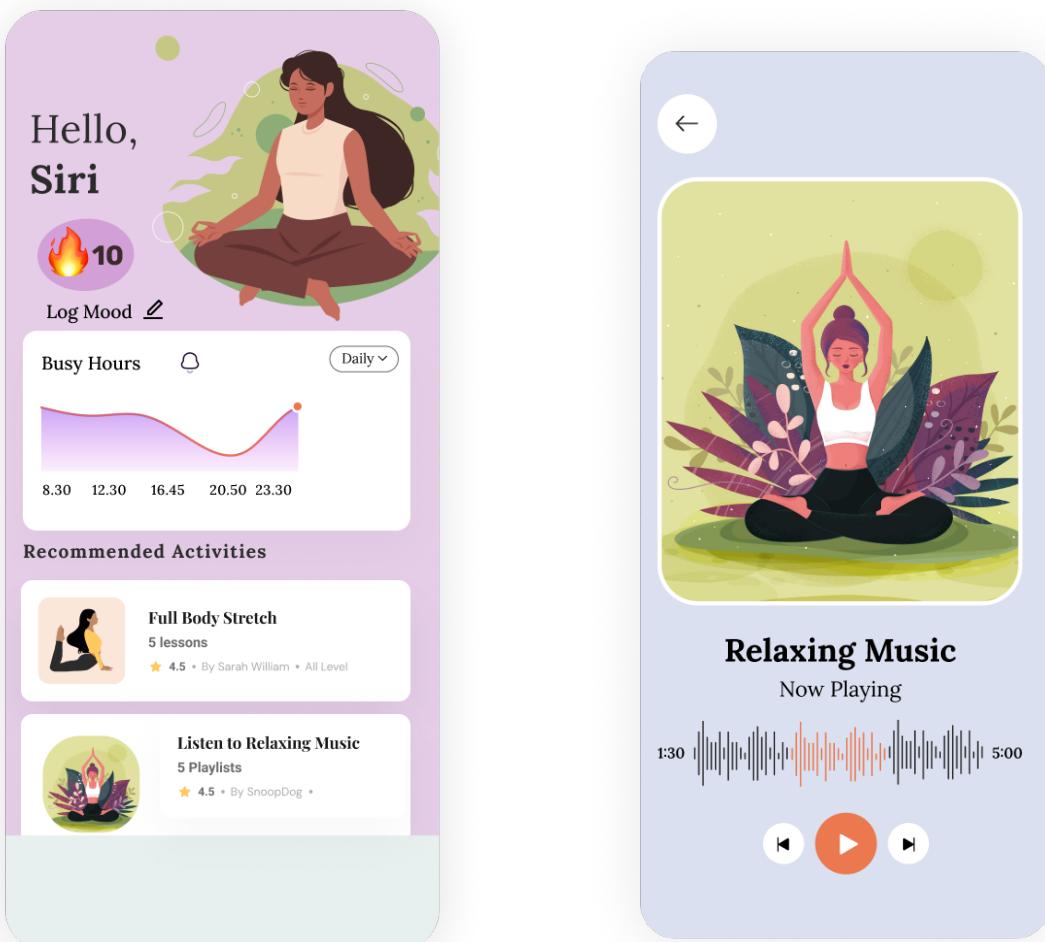


Figure 4: High-Fidelity Prototype (Page 2)

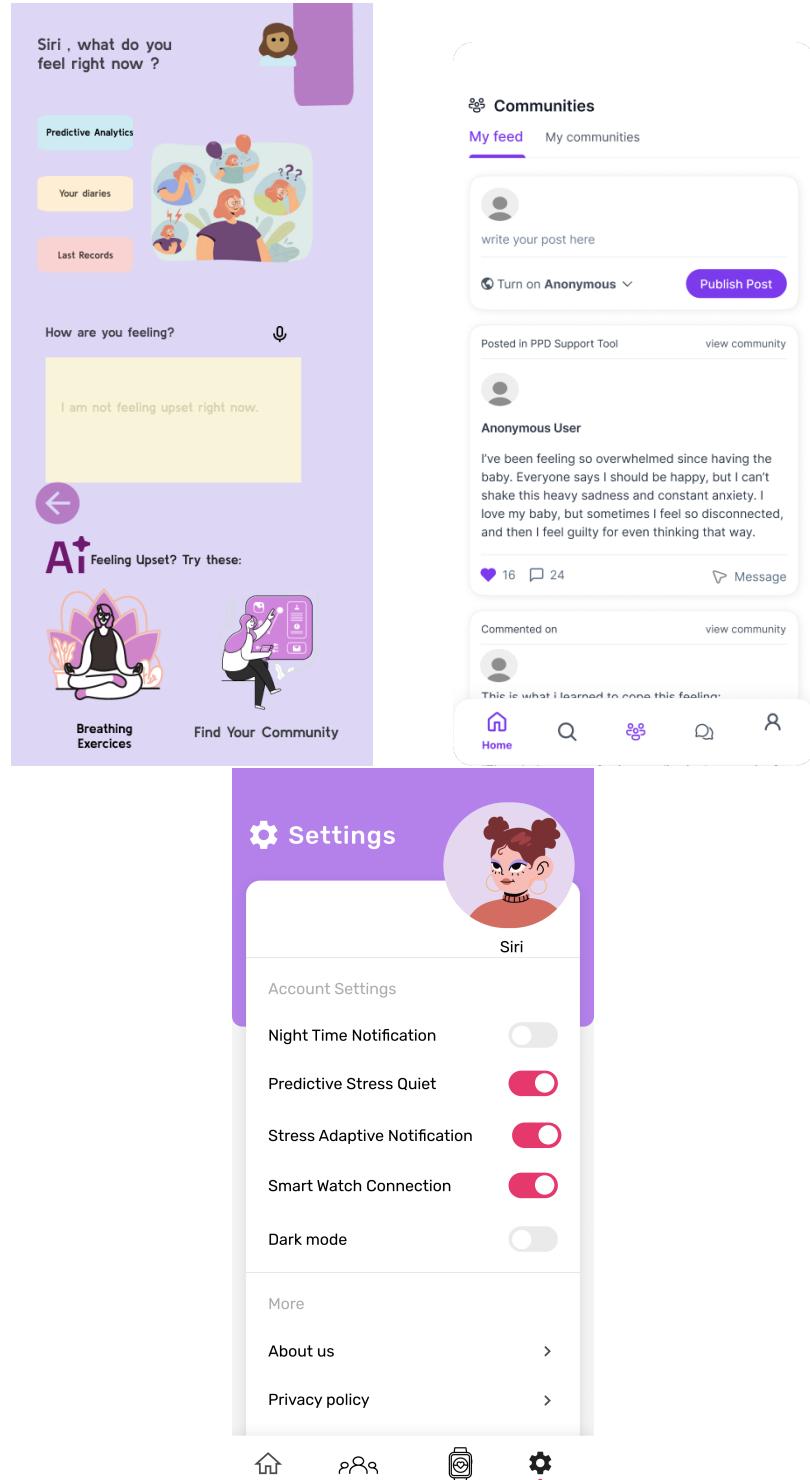


Figure 5: High-Fidelity Prototype (Page 3)



Figure 6: High-Fidelity Prototype (Page 4)

## 7 Discussion

Iterative designs underlined the importance of user-centered development. The iterative design process started with low-fidelity prototypes that were capable of quickly exploring ideas. Semi-structured interviews conducted during the first iteration outlined the gaps which informed the next iteration. Mid-fidelity prototypes provided refinement in layout and usability. Heuristic evaluations and cognitive walkthroughs brought into light issues relating to navigation clarity and the inclusion of better feedback mechanisms.

The design desirably handles the very core of PPD by offering ways to regulate one's emotions, be in company, and manage stress. Some features, like mood tracking-visualized trends, community support, and adaptive notifications according to stress, responded to key needs of users. Moreover, the night tool and wearable integrations enhance the usability of the system during moments of high caregiving stress, making the app practical and user-oriented. I would improve the design further by creating a FAQ section and step by step tutorial for the first time users. Also, showing them how their data is used to predict the level of their stress would gain trust. Implementation of a filtering system or an algorithm of relevance for the posts in the community feed would be a further development in the usability of the app.

## 8 Conclusion

Summary points and future research directions.

This project demonstrates the power of the iterative design process as the user-informed design is to creating an effective solution. The design is strong; future work will go toward building out functionality associated with the AR-based relaxation tools and running more extensive evaluations. Innovation meets empathy in ways that could very well make this app a game-changer in supporting mothers experiencing PPD.

Unlike existing solutions, it focuses on making things customizable and inclusive. Features such as predictive analytics, voice-based mood tracking, and integration with wearables provide proactive support, which has been a major leap forward in the realm of mental health support tools that usually work reactively.

High-fidelity prototyping offered a very extensive testbed for aesthetics and high-level features. Some key points from this session of feedback included contextual prompts, wearable integrations, and proactive notifications. Limitations involved small participant pools and restricted resources, allowing for shallow levels of evaluation. Future studies should aim to extend the test to more diverse demographics and integrate quantitative usability metrics into the designs.

## 9 Acknowledgement

ChatGPT was utilized to review and refine the language and grammar in this report, ensuring improved readability and coherence.

**The following pages present the collected data.**

## 10 Collected Data

Feature	Positive Feedback	Suggested Improvements	Methods Used
Mood Tracking	Simple to use; added visual trends appreciated; predictive analytics well-received	Add more customization options; provide explanations for graphs	Semi-Structured Interview, Focus Group, Cognitive Walkthrough
Community Dashboard	Anonymity and interaction features liked; better engagement through posts and comments	Improve layout and readability; introduce filtering options	Focus Group, Heuristic Evaluation
Settings Page	Descriptive labels reduced confusion; toggles were easy to find and operate	Add visual feedback (e.g., animations or confirmation) for toggles	Heuristic Evaluation, Focus Group
Nighttime Tools	Easy access to tools; guided exercises effective; proactive prompts well-received	Include more variety in relaxation exercises; offer detailed explanations for tools	Cognitive Walkthrough, Semi-Structured Interview

Table 1: Feedback Summary Table for Iterative Design Process

### 10.1 Iteration 1: Feedback Data (Pseudonymized Responses)

#### 10.1.1 Mood Tracking Interface:

- **Participant 1:** The mood tracking feature is simple and easy to use but I want to see my weekly or even monthly mood chart.
- **Participant 2:** I like how straightforward it is to log my mood, but I want more options also some patterns or trends.

#### 10.1.2 Community Dashboard:

- **Participant 1:** The feed is functional, but it's hard to distinguish between different posts and comments.
- **Participant 2:** The layout needs some improvements.

#### 10.1.3 Settings Page:

- **Participant 1:** The toggles are easy to use, but I wasn't sure what each one does.
- **Participant 2:** I would like some more options.

## 10.2 Iteration 2: Data Collected (Pseudonymized Format)

### 10.2.1 Navigation

- **Participant 1:** A better visual indicator of where I am in the app would help.
- **Participant 2:** I found the navigation straightforward.

### 10.2.2 Stress-Adaptive Notifications:

- **Participant 1:** It looks good but I didn't know exactly how they were personalized.
- **Participant 2:** I liked the stress-adaptive notifications, but I would prefer to control their notifications.

### 10.2.3 Mood Tracking:

- **Participant 1:** I like the writing feature and also the AI suggestions.
- **Participant 2:** The history of mood, the voice to text feature are good, as I don't have much time. This tool will be handy.

## 10.3 Iteration 3: Data Collected (Pseudonymized Format)

### 10.3.1 High-Stress Scenario Handling:

- **Participant 1:** The app was really helpful during stressful moments, especially the nighttime tools. It's great to have immediate access to calming audio and breathing exercises.
- **Participant 2:** I liked how the app offered suggestions based on the time of day. It felt like it knew when I needed extra support, which made me feel less overwhelmed.

### 10.3.2 Predictive Analytics and Mood Tracking:

- **Participant 1:** It helped me recognize patterns in my mood and prepare for challenging days.
- **Participant 2:** Seeing the graphs made it easier to understand my emotional state over time.

## 10.4 Speech-to-Text Functionality:

- **Participant 1:** The voice input was a game-changer. I could log my mood hands-free while taking care of my child.
- **Participant 2:** I found the speech-to-text feature very useful, especially when I didn't have time to type. It made mood logging much easier.

#### **10.4.1 Integration with Wearables:**

- **Participant 1:** Integration with my smartwatch worked well. Getting stress notifications based on my heart rate felt very personalized.
- **Participant 2:** I liked the wearable integration.