

Collective Care

Advancing menstrual health with
design and collective intelligence



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Anuprita Ranade | Graduate Student



Ashley Deal | Primary Advisor



Raelynn O'leary | Primary Advisor



Sarah Fox | Secondary Advisor

table of contents

04 - 05	Abstract
06 - 09	Introduction
10 - 25	Understanding the Problem Space
26 - 37	User Research
38 - 49	Generative Research
50 - 53	Evaluative Research
54 - 69	Design Intervention
70 - 71	Conclusion
72 - 73	Acknowledgments
74 - 77	References



abstract

The advent of smartphones and wearables has made health tracking for self-awareness commonplace. The technology available to us today allows us to track health indicators like sleep cycle, physical activity, heart rate, nutrition, etc. in great detail. For approximately 50% of the world's population, the menstrual cycle is a key indicator of general health and wellbeing. However, despite being a key health indicator, the tracking of menstrual cycles currently remains a relatively unexplored and under-researched domain. There exist many digital applications for tracking menstrual cycles. The rise in usage of these applications shows that there is a genuine need for menstrual tracking tools. However, most of these applications fail their users in many ways like lack of accuracy in predictions, wrong assumptions of the **gender identity and sexual orientation** of users, and a biased focus on fertility. These applications fail to provide relevant insights to

menstruators for their specific needs thus rendering these applications ineffective. The user experience of menstrual tracking tools merits design intervention. Menstruation has been historically stigmatized and this has resulted in limited research for developing tools and technologies in this domain. This thesis is an exploration of the shortcomings of current menstrual tracking tools and technologies and identifies opportunities for design intervention. Through the course of this project, I investigated the value of period tracking by understanding how menstruators plan their professional and social lives around their periods. I then applied my learnings to propose design principles that guide the experience design of menstrual tracking tools to enable menstruators to effectively track periods, gain self-awareness, and mitigate challenges associated with menstruation in daily life scenarios.

01 Introduction

The Problem

Impact of the problem

Research question

the problem

The menstrual cycle is a key health indicator for menstruators who comprise roughly 50% of the world's population. Historically, menstruation has been considered as taboo; talking about it is considered shameful and embarrassing. The shame and embarrassment emerges from the complex social constructs and stigmas associated with menstruators' bodies across cultures and societies of the world. This taboo is not merely societal; it has also translated into ignorance towards menstrual health in healthcare technology. Searching for "menstruation" on Pubmed from 2001 to 2020 results in 9791 research papers. This seems like an impressive amount of clinical research. However, searching for an issue that affects the male population specifically, for example, "erectile dysfunction" results in 18,079 research papers. This is double the amount of clinical research done for menstruation. Despite being a key health indicator, the lack of research for menstruation is concerning as it significantly impacts the daily lives of menstruators. It has resulted in limited resources and tools which drives menstruators to be passive acceptors of their health, hesitating to talk about their periods and seeking help when necessary. Not having the means to know oneself and find reliable sources of information limits menstruators' ability to become

decisive change seekers of their health and wellbeing.

A classic example that demonstrates the ignorance towards menstrual health is Apple's launch of an "expansive" health kit application which allowed users to track many health parameters like blood alcohol content and sodium intake. This "expansive" app left out menstrual health altogether which outraged the menstruator population. Apple eventually included menstrual cycle tracking in the next version. Fitbit, another major health tracking platform has been around since 2007. It took Fitbit 11 years to include menstrual health in their application.

In addition to Apple health and fitbit, there exist many menstrual trackers that enable menstruators to track their cycles to better understand their bodies. While these tools are widely used by menstruators across the world, research indicates that these tools fail menstruators in basic ways like:

- Lack of accuracy in predictions
- Wrongly assuming sexual identity of users
- Bias towards fertility
- Emphasis on pink, flowery and feminine form over customization options
- Inability to support diverse needs of users

the impact

Due to the historic ignorance of menstrual health, many common conditions like PCOS and endometriosis take years to be diagnosed. According to an article by PennMedicine, “5 myths about Polycystic Ovary Syndrome (PCOS)” (2018), PCOS is a common hormonal disorder that affects 5 million women in the US alone. A clinical study in women’s health conducted by Apple revealed that for 34% of the women, PCOS took two to three years to be diagnosed. This is a result of the lack of research in menstrual health. Another condition, endometriosis which affects 10% of the menstruator population, can take almost a decade to diagnose. “Apple Study Affirms That Women Do in Fact Have Cramps During Their Periods” (Victoria Song, 2018). Additionally, some phases

of a menstruator’s life, like perimenopause, are also heavily under-researched as menopause is associated with the social stigma of menstruation and the stigma of aging. The current state of menstrual health drives menstruators to hesitate to seek help when required, suffer in silence and become passive acceptors of their health and wellbeing. There is a dire need to focus on research and development of tools and technology for menstrual health to empower menstruators by increasing self-awareness and taking charge of their wellbeing. The problem with the current state of menstrual health and its impact led me to frame my research question. This research question served as the basis for my research.

research question

How can the design of menstrual tracking tools help menstruators better understand their cycles and navigate challenges around menstruation they face in their daily lives?

The user experience of menstrual tracking tools merits design intervention in order to better support the needs of menstruators and empower them by helping them understand their bodies. This research question aims to explore 3 aspects:

- **Menstrual tracking tools:** What are the capabilities of currently available period tracking tools and how do they add value to the lives of menstruators?
- **Better understanding of menstrual cycles:** How do menstruators perceive their own periods and how much awareness do they have about their own cycles?
- **Navigating challenges around menstruation:** What are the strategies used to prepare for challenges faced during different stages of the menstrual cycle and alleviate physical and emotional symptoms

Understanding the problem space

- Literature review
- Territory mapping
- Journey mapping
- Artifact review

literature review

In my literature review, I wanted to explore literature related to menstruation specifically, as well as how it is situated within the realm of reproductive and sexual health, personal informatics and how we measure aspects of our lives, and feminist approaches towards personal informatics tools.

The purpose of my literature review was to seek answers and gain clarity about some of the guiding questions that formed the basis of my research. My inquiry started with why menstruators track their periods. This led to my first guiding question:

What is the value of tracking periods?

Literature:
Daniel A. Epstein, Nicole B. Lee, Jennifer H. Kang, Elena Agapie, Jessica Schroeder, Laura R. Pina, James Fogarty, Julie A. Kientz, and Sean Munson. 2017. Examining Menstrual Tracking to Inform the Design of Personal Informatics Tools.

Levy, J., Romo-Avilés, N. "A good little tool to get to know yourself a bit better": a qualitative study on users' experiences of app-supported menstrual tracking in Europe.

Many menstruators consider a regular cycle as an indicator of good health; period tracking helps them keep a check on their overall health and know their bodies better. Through these readings,

I learned that menstruators track their periods with multiple goals in mind. Here are some goals concerning period tracking:

- **Be aware of how their body is doing:** Tracking helps menstruators make observations of unusual occurrences and find patterns in the symptoms they experience
- **Understand their body's reactions to different phases of the cycle:** Many menstruators face physical and emotional changes that typically align with their period's arrival. Tracking helps them better understand these patterns and become more aware of their bodies.
- **Be prepared:** Menstruators rely on tracking to ensure they have supplies available and make necessary alterations to certain daily life activities like work and exercise and socializing based on the timing of their period.
- **Become pregnant or avoiding pregnancy:** Tracking periods is considered a method to have pregnancy checks.
- **Inform conversations with healthcare providers:** The observations made by tracking periods are often helpful during conversations with doctors. "Healthcare providers often ask a patient when their last period was as a part of exploring their needs for more information and general attitude towards their body." (Epstein et al., p.4, 2017).

Through these readings, I also learned about the existing shortcomings of the currently available period tracking tools in comparison to other personal informatics tools. Personal informatics has gained a lot of traction over the past few years, with nearly 70% of US adults track at least one health indicator such as sleep, physical activity, and nutrition. (Epstein et al., p.1, 2017). Technology has made it easy to track these health indicators. However, due to the stigma attached to menstruation, very little attention has been given to the research and development of tools for period tracking.

As I continued to understand the existing gaps in the development of period tracking tools, I became curious about how the stigmatization of periods affects the current perception of menstrual health. This led me to my next guiding question:

How is menstrual health perceived in society, and how does it affect daily lives of menstruators?

Literature:

Amanda Lazar, Norman Makoto Su, Jeffrey Bardzell, and Shaowen Bardzell. 2019. *Parting the Red Sea: Socio-technical Systems and Lived Experiences of Menopause*.

Bobel, C., Winkler, I. T., Fahs, B., Hasson, K. A., Kissling, E. A., & Roberts, T. A. (Eds.). (2020). *The Palgrave Handbook of Critical Menstruation Studies*. Palgrave Macmillan.

The stigma and shame generated by stereotypes around menstruation have severe impacts on all aspects of women’s and girls’ human rights, including their human rights to equality, health, housing, water, sanitation, education, freedom

of religion or belief, safe and healthy working conditions, and to take part in cultural life and public life without discrimination. (United Nations 2019)

These readings introduced me to the lived experiences of menstruators and the idea that menstruation is not merely a biological phenomenon, it is a socio-cultural one. Most articles on menstruation start by pointing out that menstruation is a normal biological process. This, of course, is true. But at the same time, menstruation is so much more for many people; in fact, it is fundamental. Menstruation unites the personal and the political, the intimate and the public, and the physiological and the socio-cultural. (Bobel et al,. p.9, 2020)

Another critical aftereffect of this stigma is the lack of support at workplaces and professional lives. Numerous articles and online blogs revealed the challenges menstruators face at work because of not having space to openly voice their concerns and receive the support they need for navigating challenges faced due to menstruation in their professional lives. Some organizations are trying to tackle this wicked problem by introducing policies like period leaves.

The stigmatization which reinforces menstruation as a hush-hush subject affects the quality of available resources for menstrual wellbeing and also results in the ignorance in research and development of tools and technology catering to menstrual health.

I began to question how I can position my work as a designer to contribute to this field. My next guiding question was:

What is the role of design in improving the lives of menstruators?

Literature:

Teresa Almeida, Rob Comber, and Madeline Balaam. 2016. *HCI and Intimate Care as an Agenda for Change in Women’s Health*.

Jeffrey Bardzell, Shaowen Bardzell, Amanda Lazar, and Norman Makoto Su. 2019. *(Re-)Framing Menopause Experiences for HCI and Design*.

Designing for women’s healthcare remains an unexplored area of HCI, particularly outside information systems of maternal health (Almeida et. al, 2017). Prior research in HCI focuses primarily on maternal health and fertility; technology for women’s health as a broader subject has remained relatively unexplored despite the advancements in technological capabilities in health tracking. Through my literature review, I learned that most users of menstrual tracking tools remained unsatisfied, not only due to the bias towards maternal health and fertility but also due to many other reasons like inaccuracy in predictions, inability in keeping up with the changing goals with regards to menstrual health and a non-inclusive and strongly feminine look and feel. The current state of menstrual health tracking technology is fairly nascent and has tremendous scope for exploration through the lens of good user experience practices. Designers, engineers and researchers can do more to make menstrual tracking tools to be more inclusive and to reflect the changing needs of these women.

As I gained clarity on the role of design and HCI in menstrual tracking, I delved into the specific opportunity gaps where I could position my work in this thesis. My next guiding question was:

How can menstrual tracking be improved?

Literature:

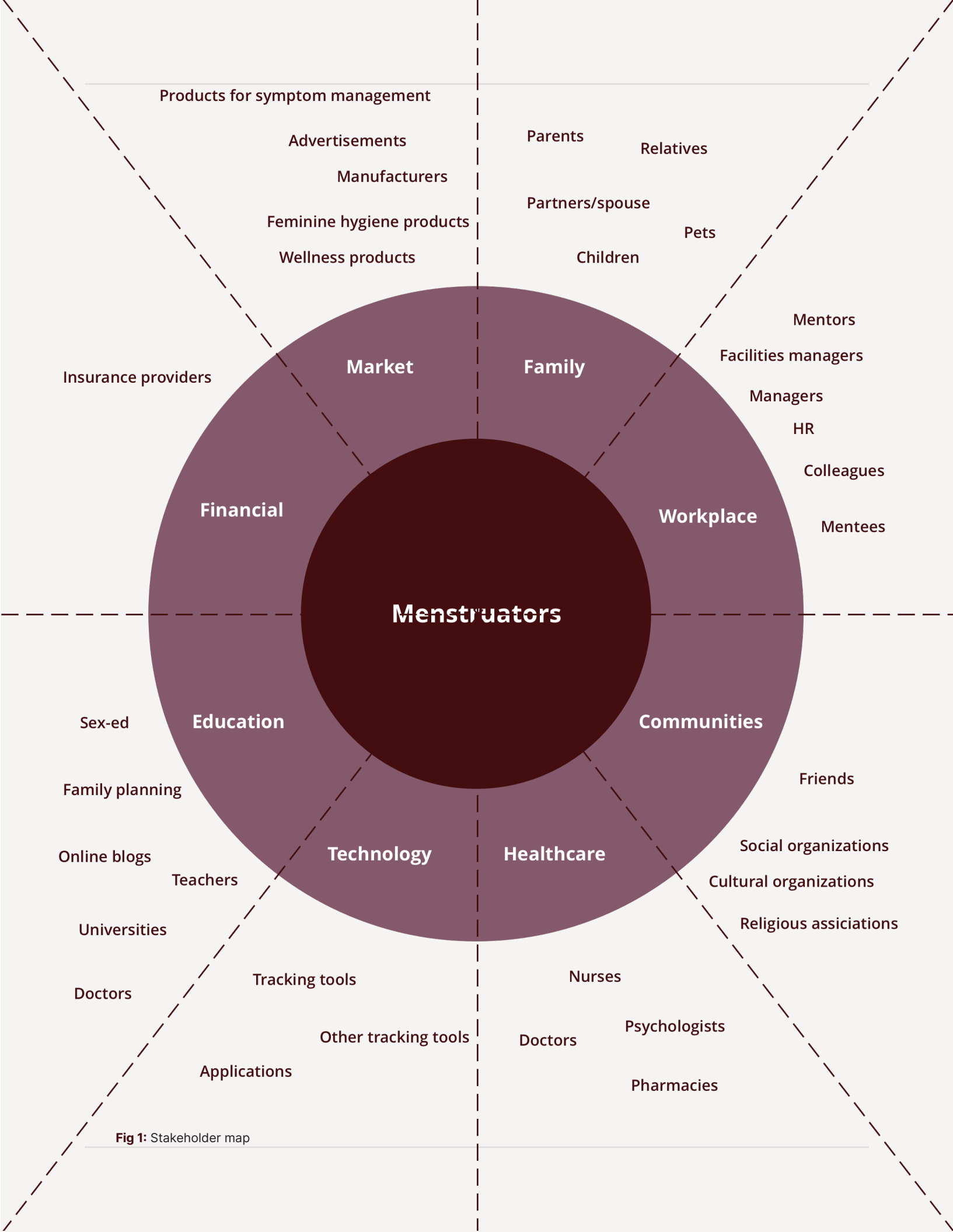
Dan Lockton, Delanie Ricketts, Shruti Aditya Chowdhury, and Chang Hee Lee. 2017. *Exploring Qualitative Displays and Interfaces*.

Kate Crawford, Jessa Lingel, and Tero Karppi. 2015. *Our metrics, ourselves: A hundred years of self-tracking from the weight scale to the wrist wearable device*.

Period tracking differs from traditional informatics practices in that it is about tracking one’s experiences with menstruation whereas personal informatics is about tracking one’s behavior. Therefore, period tracking merits a different design approach. The current approach towards menstrual tracking aligns with the act of data logging. I believe that this approach can be re-imagined by treating menstrual tracking as a journaling activity that helps people observe their bodies and reflect on the information to better understand trends and patterns. While the current data logging approach is useful in quantifying complex menstrual data to give users an easily scannable set of information, it tends to neglect the qualitative descriptions of the lived experiences of menstruators. I think that a design approach that supports menstruators in freely expressing their experiences can improve tracking. While the current data logging approach is useful in quantifying complex menstrual data to give users an easily scannable set of information, it tends to neglect the qualitative descriptions of the lived experiences of menstruators. I think that a design approach that supports menstruators in freely expressing their experiences can improve tracking.

territory mapping

Based on learnings from the literature review this phase was focused on exploring the domain of menstrual health, by understanding the influence of multiple stakeholders and institutions through territory mapping, stakeholder mapping and journey mapping. I mapped out institutions that impact menstrual health and stakeholders related to each institution. Further, I mapped the challenges faced specific to each institution.



journey mapping

My literature review gave me a clear understanding of the various goals people have with respect to menstrual tracking. I created a journey map of the life of a menstruator and mapped these goals on the journey map. I learned that people plan their lives around their periods and that these plans can be short term as well as long term. For example, short term plans can be going on a date, or going hiking. Long term plans can be planning to have a baby. Menstrual cycle tracking becomes an integral part of these short term and long term goals.

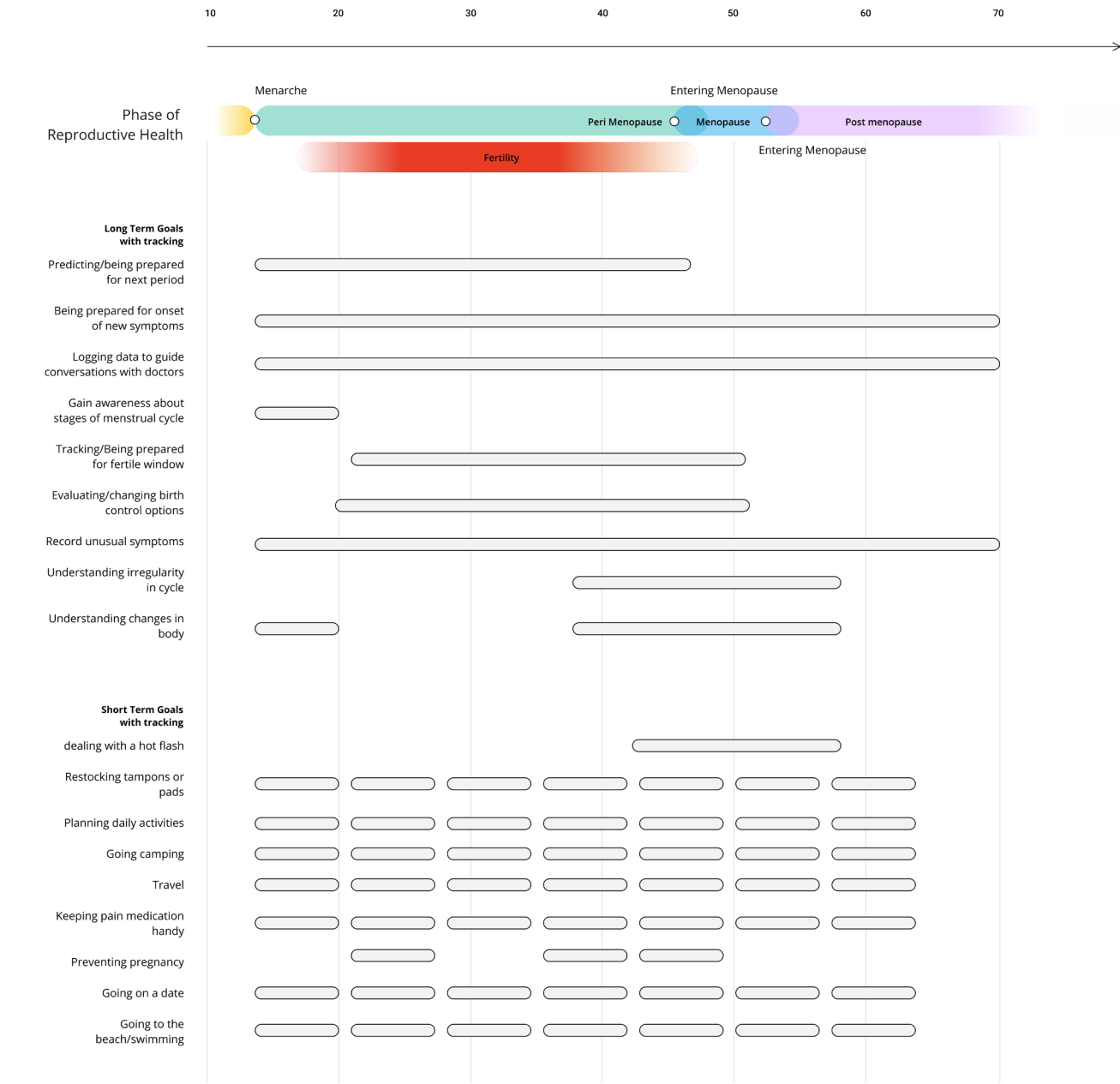
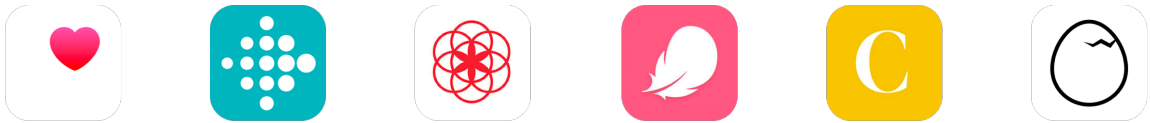


Fig 2: Journey of a menstruator

artifact review

To better understand the technology currently available for period tracking, I studied a variety of personal informatics tools ranging from health tracker and period tracker applications to personality and emotion trackers. I also reviewed works of art, campaigns, products and policies related to menstrual health.

Tracking applications



Health and fitness trackers

Menstrual trackers

Menstrual trackers

Other artifacts



Beauty in Blood



Pantone Red



Period leave policy



HooHa tampon dispenser

Fig 3: Diagram of reviewed artifacts

Apple Health

Apple health makes it easier to access all health information through a single app by consolidating data from the iPhone, Apple watch and third-party health and fitness apps. It shows you long term trends and also tiny details for a wide range of health metrics. It uses machine learning to determine what matters most to the user. Unlike most third-party apps, Apple health guarantees safe and secure handling of users’ data. When Apple health was launched in 2014, it received a lot of criticism for not including a menstrual tracker while claiming to be a “comprehensive” health app. Eventually, Apple added a menstrual tracker to its consequent versions.

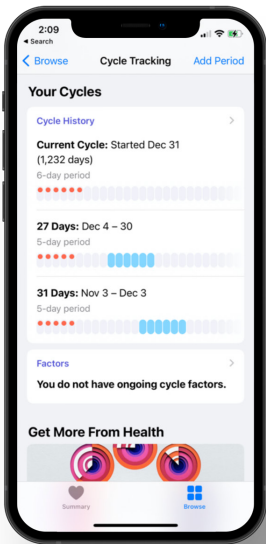


Fig 4: Apple Health (V14.5.1), Apple Inc

Fitbit

Fitbit is an activity tracker that includes a series of wearables that sync with smartphones via bluetooth. It tracks fitness metrics such as number of steps, heart rate, quality of sleep and a number of other metrics involving fitness. The product appears to increase physical activity, by encouraging its users to set fitness goals and achieve them. Fitbit has a freemium model with some features made available with a paid membership. Fitbit gives detailed insights to its users based on their physical activity, sleep and nutrition information. It offers multiple ways to visualize data and identify patterns through its interactive UI. It also includes a community feature where users can connect with their friends, form groups and participate in challenges to motivate each other to stay fit. Fitbit never had a menstrual tracker until 2018.

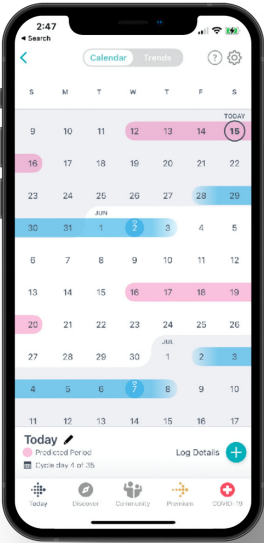


Fig 5: Fitbit (V 3.41.1), Fitbit Inc

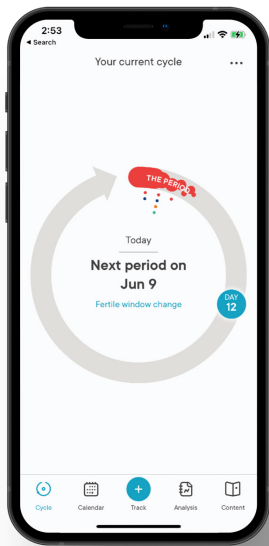


Fig 6: Clue (V 33.0), BioWink GmbH

Clue

Clue is a period and ovulation tracker. It has over 8 million users from 180 different countries. It helps menstruators track their cycles and learn more about each phase of the cycle. The goal of Clue’s founders was to take female reproductive health “out of taboo land” and start “a reproductive health revolution”. Its interface is minimal and easy to use. It provides the most important information about the menstrual cycle in a clear and concise way. The most important information is presented in big bold letters. The app provides insights based on the symptoms tracked by users. However, these are only available in the premium subscription. The premium subscription also has a repository of blogs and articles on topics related to reproductive health. It offers insights about the cycle by collecting menstrual data over time and helps users better understand their bodies. Users can track a variety of menstrual health parameters. However, there seems to be a lot of scope for improvement in the user interactions for logging data.

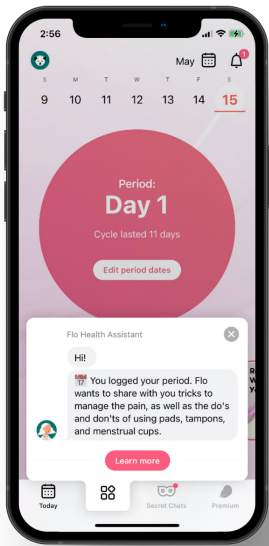


Fig 7: Flo (V 6.7), Flo Health Inc

Caria

Caria is a menopause symptom tracker. It helps menstruators have a healthier, easier menopause. Users can track and manage their symptoms, get personalized insights and connect with other menstruators on a similar journey. Caria helps users through their personalized journey and helps understand the changes caused by menopause, as well as manage their symptoms. While most trackers only have an option to log symptoms, Caria allows users to log the intensity of the symptoms. It also allows users to take notes and create their own symptom/parameter to track. Caria enables users to visualize how their symptoms change over time and even compare them with other activities that are tracked. For example, users can compare their anxiety records with CBT over time to help them figure out what’s working and what’s not.

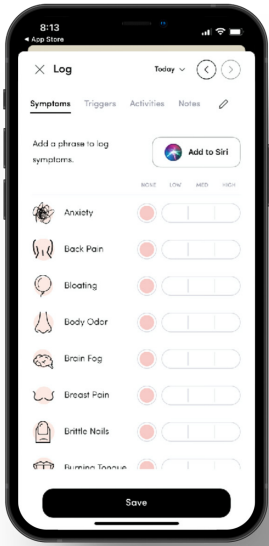


Fig 8: Caria (V 1.9.7), Chorus Health Inc

Flo

Flo is a women’s health app designed to support women at different stages of the reproductive cycle. It was co-founded by Dmitry and Yuri Gurski in 2015. Flo launched a question and answer service within the app. It claims to make accurate predictions of menstruation. The app takes the user through a series of questions with valuable information integrated in the answer choices to help with better predictions. The insights section has blogs and articles related to reproductive health. The experience of using the app is designed differently based on the goal. For example, the tracking experience is entirely different compared to the getting pregnant experience. Flo also has a unique conversation based experience which helps menstruators find answers to their questions.

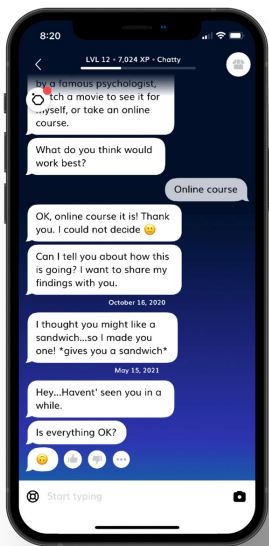


Fig 9: Replika (V 9.5.2), Luka Inc

Pantone Red

Pantone Color Institute collaborated with INTIMINA to create Period, an energizing and dynamic warm red shade encouraging period positivity. This color emboldens menstruators and makes them feel proud of who they are. The vice president of the Pantone Color Institute described the color as a confident red that encourages positive conversations around menstruation. This is a great initiative to spread period positivity and a step in the direction of eradicating stigma around menstruation.

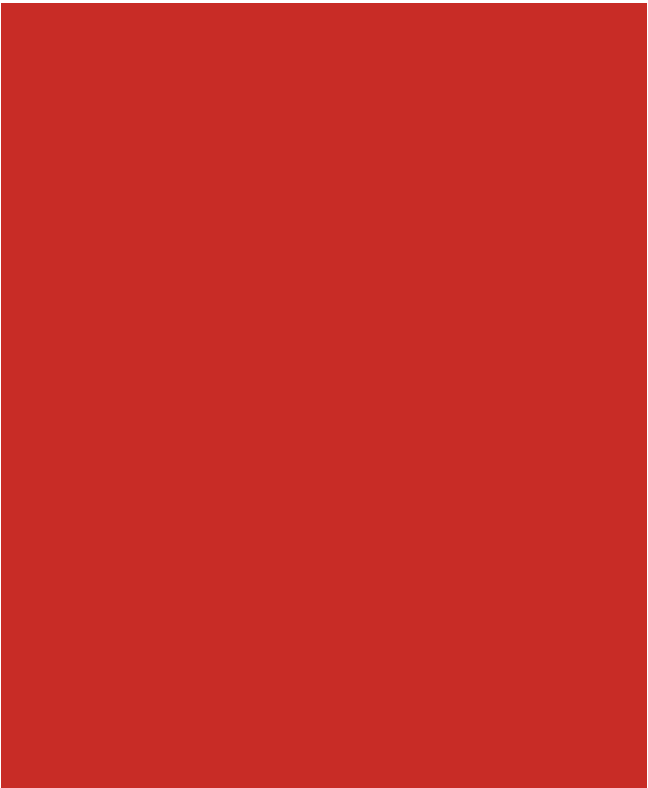


Fig 11: Pantone Red, Pantone LLC

Replika

Replika is an AI companion with conversation based interactions. It offers helpful conversations by letting users express and witness themselves freely. It is geared towards providing a safe space where people can share their feelings, thoughts, experiences etc. It was created by Eugenia Kuyda with the idea to create a personal AI that would help people express and witness themselves by offering a helpful conversation. The conversation based interaction allows fluent communication and can potentially be used by menstruators to describe their symptoms and emotions. The AI sometimes doesn't provide relevant answers or feedback but it does get smarter over time.



Fig 12: Beauty in Blood, Jen Lewis

Beauty in blood

Beauty in Blood is a conceptual feminist art project by Jen Lewis. It is a series of images created using the flow of menstrual blood. It tries to portray menstruation as a beautiful process rather than a scary, stigmatized one. The project challenges the long standing cultural taboo of menstrual cycles by offering the viewer a different perspective of menstrual blood. The artist, in her statement claims that this work quashes taboo around menstruation, reclaims feminine power and puts this subject on the pedestal it so rightly deserves. She challenges the notion that menstruation is “gross”, “vulgar” or “unrefined”.

Period leave policy

The period leave policy is a system that allows menstruators to take the day off if they are unable to attend work due to menstruation. This policy has advantages and disadvantages based on how it is implemented and how people of an organization react to it. It has the potential to destigmatize menstruation and help those who have menstrual cycle related illnesses like dysmenorrhea. However, there have also been instances where menstruators have faced discrimination and disadvantage at workplaces for making use of the period leave.



Fig 13: Period leave policy



Fig 14: Hooha, hooha.ishere

Hooha

Hooha is a smart tampon dispenser that you can text for a free tampon. Most tampon dispensers we see today are broken, complicated to use and need quarters to dispense. No one carries quarters. Hooha makes it very convenient for menstruators to have access to tampons. It is fairly easy to install as its physical form doesn't vary much when compared to the general tampon dispensers we see everywhere. It's definitely a great product for public bathrooms, workplaces, hospitals, etc. It could also have a variation which dispenses sanitary pads.

03

User research

- Interviews
- Diary study
- Synthesis of findings
- Insights

user interviews

This goal of exploratory research was to probe deeper into various aspects of menstrual tracking and how they affect the lives of menstruators. My literature review and territory mapping exercises helped me lay the groundwork for the research activities I conducted in the exploratory research phase. I conducted interviews with 12 participants to understand these things. Through these interviews and diary study, I wanted to learn more about the following things about menstruators:

1. Awareness about one’s own menstrual cycle
2. Methods of period tracking
3. Perceived value of period tracking
4. Impact of periods on social and professional lives
5. Strategies to navigate symptoms
6. Planning daily activities around periods

Reproductive Stage

Menarche

Fertility

Perimenopause

Menopause

Lifestyle

Family planning

Measures taken for
menstrual wellbeing

Planning based on known
conditions like PCOS

Work/school/home

Challenges at work/school

Methods to face challenges

Support from family/friends

Healthcare

Getting regular health check-
ups for menstrual health

Comfort level in talking about
problems with clinicians

Self-awareness

Awareness about own cycle

Ability to care for self

Tracking methods

Tools used for tracking

Needs for effective tracking

Taking charge

Methods to manage
severe symptoms

Dealing with emotional
wellbeing

Dealing with irregularities

Stigma

Talking about menstruation
with non-menstruators

Getting support at work and
school

Planning goals

Impact of menstruation on
planning daily life activities

Impact of menstruation on
planning long term goals

interview guide

Awareness about menstrual cycle:

- 1. Are your periods fairly regular
- 2. When was your last period
- 3. How long is your cycle?

Methods of period tracking:

- 1. How do you remember when your period is going to start?
- 2. How do you track your period?
- 3. What is the most important thing about your period that you need to keep track of?
- 4. Do you use a digital application? Can you tell me about your experience using the application?

Impact of periods on social and professional lives:

- 1. Do you talk about your periods with people at your workplace?
- 2. How much of your period experience do you share with your family and/or friends?
- 3. Can you describe an embarrassing situation you faced at work/school due to your period?

Strategies to navigate symptoms:

- 1. What measures do you take specifically for your menstrual well being?
- 2. What are some stress management strategies?
- 3. How do you manage your symptoms when they're severe?

Planning activities around periods:

- 1. Can you think of specific things you plan around your period? If yes, can you describe what you plan and how you think about it?
- 2. What do you do when you get your period when you travel?

After interviewing 12 participants, I created an affinity map of all their responses. This helped me identify prominent themes.

affinity mapping of interview responses



Fig 15: Affinity mapping of interview responses

diary study

The goal of my diary study was to observe the reactions, thoughts and emotions of menstruators during their periods. I also wanted to learn about the methods they used to predict the period dates and to manage symptoms. I designed the diary study in a way that I would send them a questionnaire on their anticipated start period date and have them answer the questionnaire every day until the last day of their period. Each diary entry would start with the question “Did your period start today”. Based on their response, they would go through a series of questions.

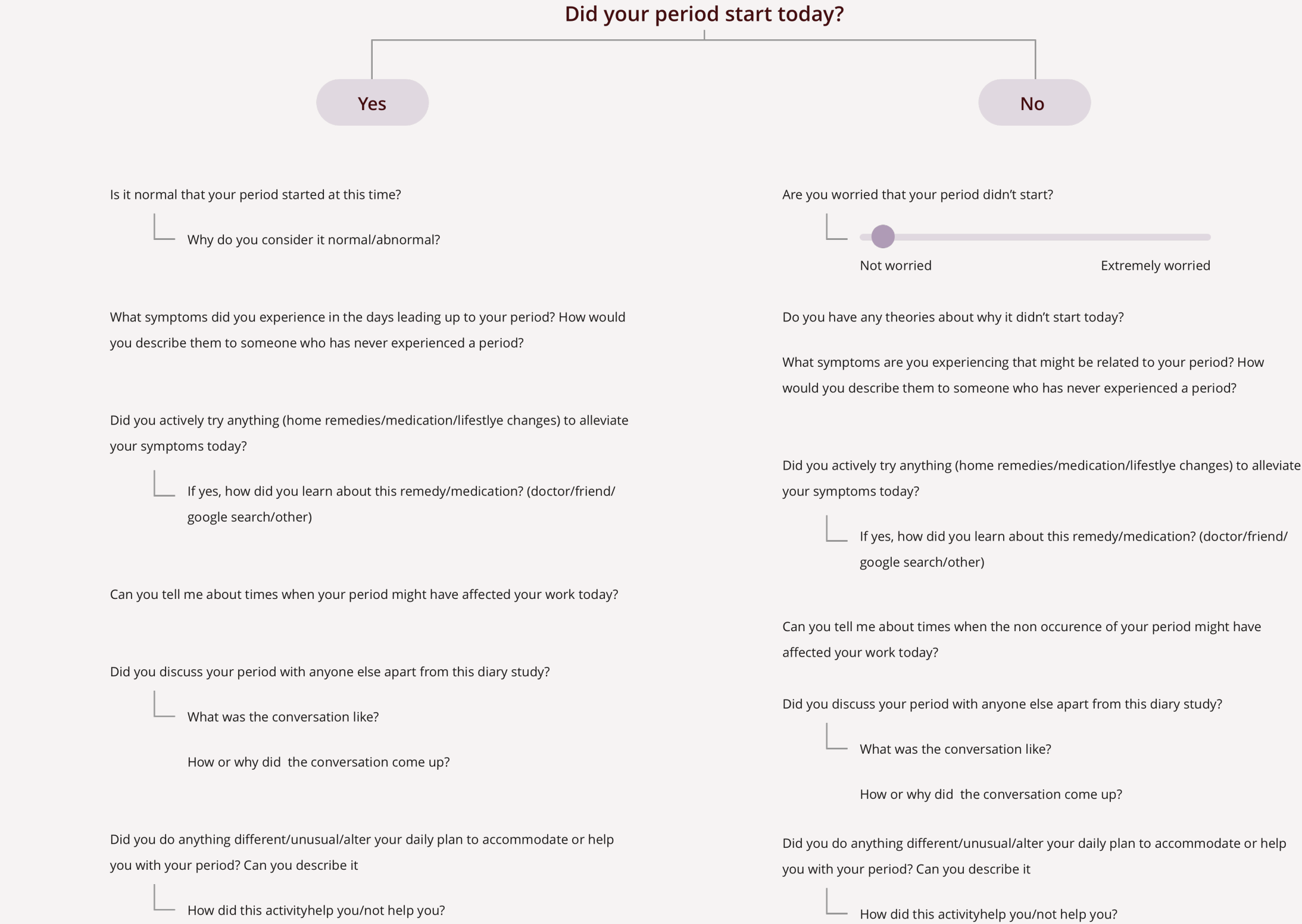


Fig 16: Diary study protocol

affinity mapping of diary study responses



Fig 17: Affinity mapping of diary study responses

overview of findings

The synthesis of all my research through techniques like affinity mapping led to some key learnings:

- 1. Menstruators feel helpless and frustrated about not having the agency for managing their symptoms and planning their lives around their periods. This stems from the lack of reliable resources for gaining self awareness about their own cycles.
- 2. Menstrual tracking becomes valuable when there are lifestyle changes or irregularities in the cycle. Menstruators seek help from tracking tools when there is irregularity in their cycle. However, most trackers fail to provide support during periods of uncertainty.
- 3. The motivation to track is low among many menstruators as tracking tools don't provide any valuable information in return. It feels like a one way exchange in information and the information received seems meaningless.
- 4. Most menstruators face challenges in their professional lives.

insights

I was able to generate insights which then helped me with my design principles.

- 1. Contextual and meaningful insights require regular tracking: Patterns in the menstrual cycle become evident only when there's enough data about the cycle. Without sufficient data, insights seem irrelevant.
- 2. Regular tracking requires motivation: Even if it takes less than a minute to track, most menstruators don't feel motivated to do it because the trackers fail to communicate the value of tracking. The complicated UX of most apps poses challenges in generating motivation.
- 3. So what do i do with all this information?Most trackers fail to convert insights into actionable tasks that can improve menstrual health
- 4. Tracking is valuable when there are

irregularities in the cycle: Menstruators seek methods of sense-making when they don't understand what's happening in their cycles.

- 5. Predictions are inaccurate because the body is not a clock: The body's complex system can't be simplified using algorithms to predict future events accurately.
- 6. Communicating uncertainty in predictions can increase trust: Most trackers predict the next period date as if it were true. When this doesn't happen, it leads to lack of trust. If trackers communicated that their predictions are inaccurate by acknowledging the uncertainty it can lead to increase in trust.
- 7. Every menstruator's experience is complex and unique: Trackers convert these complex physical and emotional experiences into simplified statistics that don't effectively describe the lived experiences of menstruators.

design principles

The insights led me to develop a clear understanding of the value of menstrual tracking and how it can be enhanced. The value of tracking can be enhanced by focusing on 3 main categories: sense-making, generating trust and motivation to track.

Sense making:

Enable menstruators to identify patterns

Provide relevant and actionable insights

Motivation to track:

Acknowledge complexity in the menstrual cycle

Support for unique needs and goals of menstruators

Generating trust:

Communicate uncertainty in predictions

Offer support during periods of irregularity

design principles

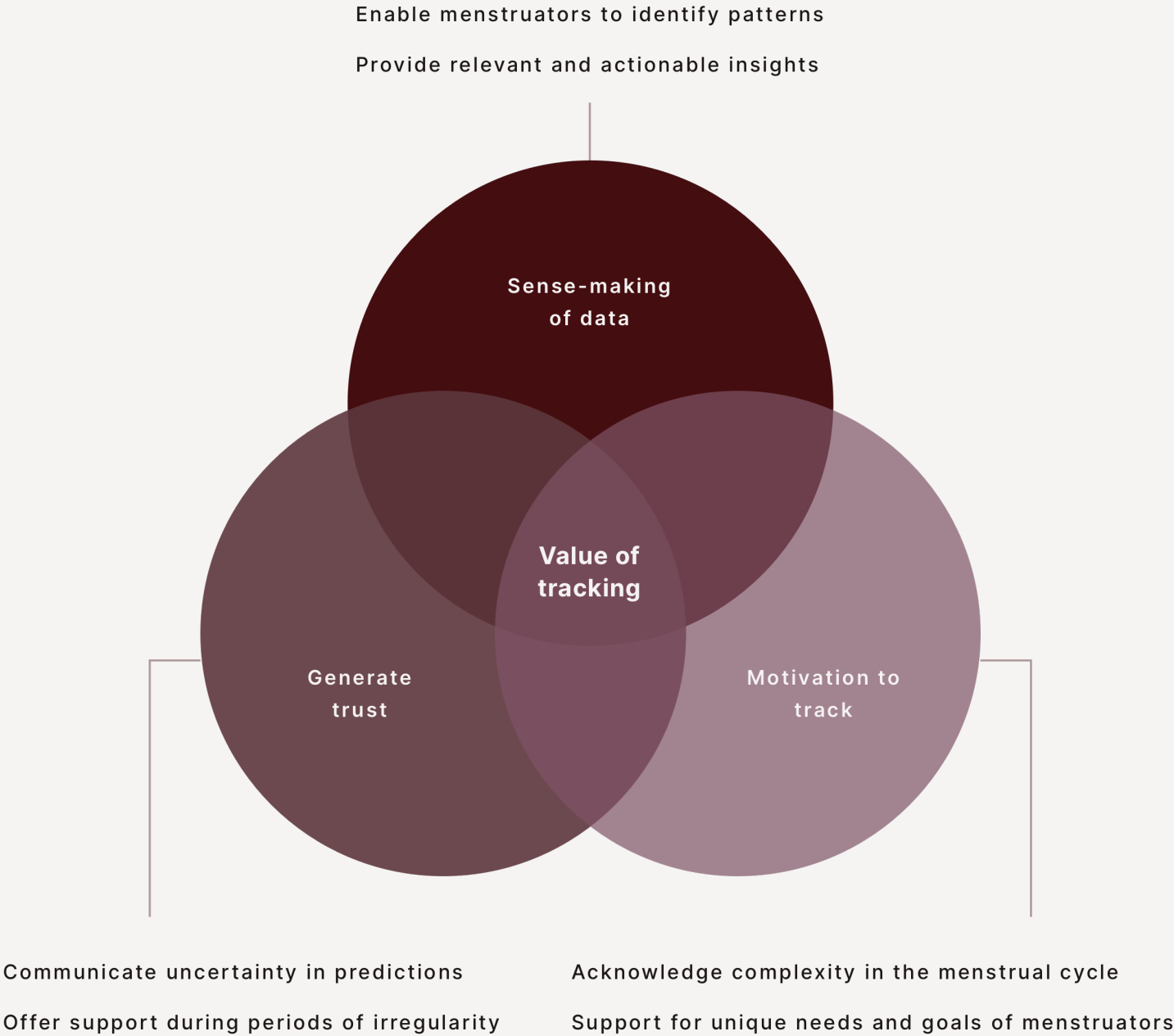


Fig 18: Design principles

concept storyboards

The design principles formed the basis of the conceptualization phase. The goal here was to use each design principle to generate ideas that enhance the value of menstrual tracking. These concepts ranged from features within digital applications, services based on menstrual tracking and physical devices for tracking.

I created 7 concepts and represented them in the form of storyboards. I also created lo-fi prototypes to explain the functionality of the concept.

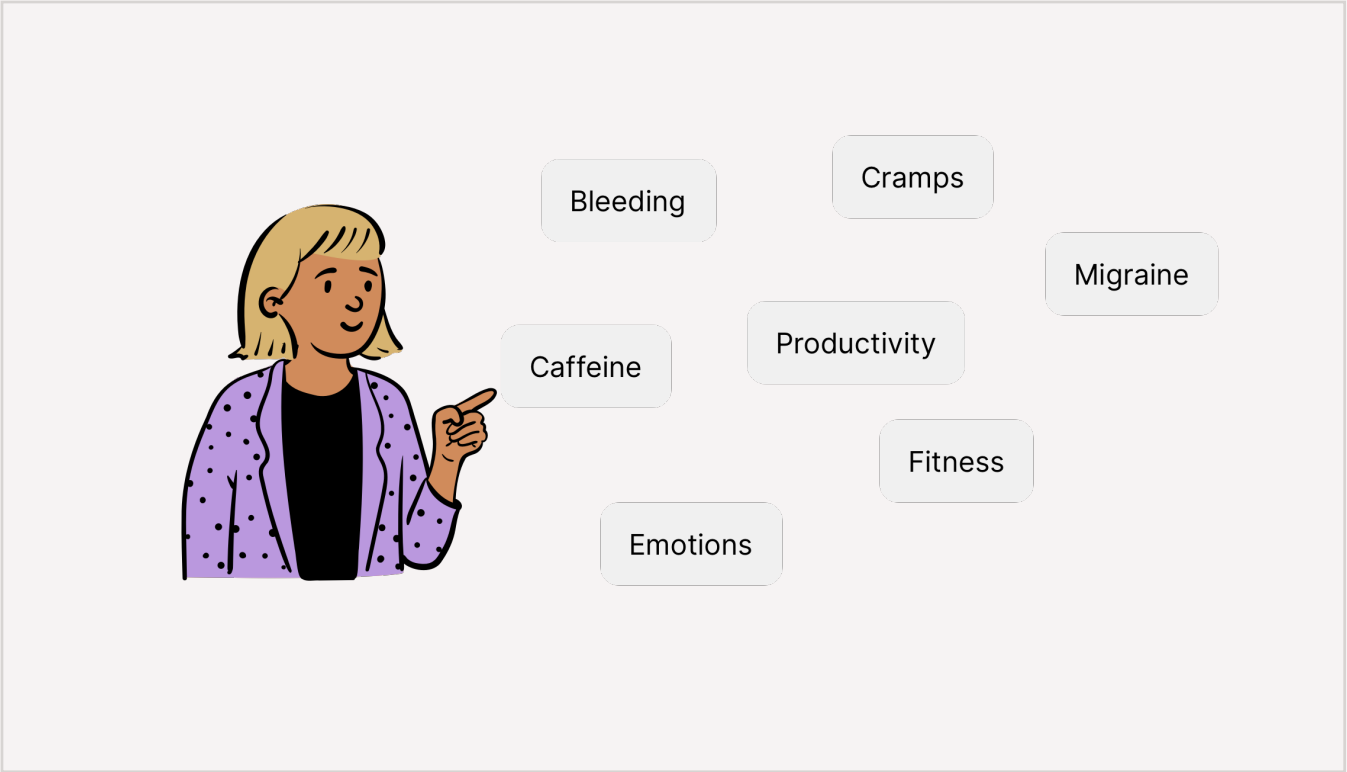


Fig 19: DIY tracker concept

01 diy tracker

Your period, your rules. Define what parameters you want to track and how you want to track them.

Design Principles:

- Acknowledge complexity of menstrual cycle
- Communicate uncertainty in predictions

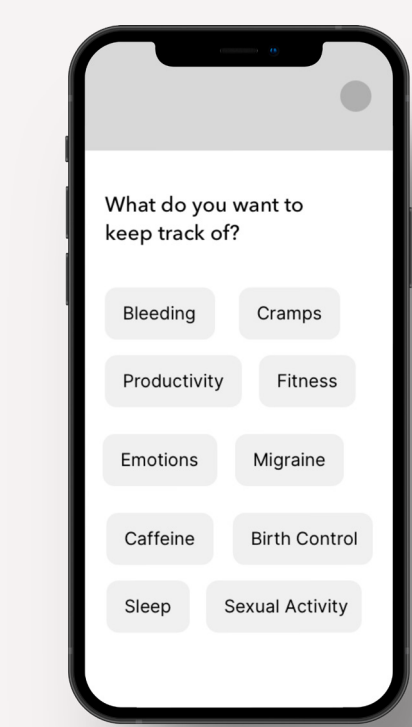


Fig 20: DIY tracker prototype

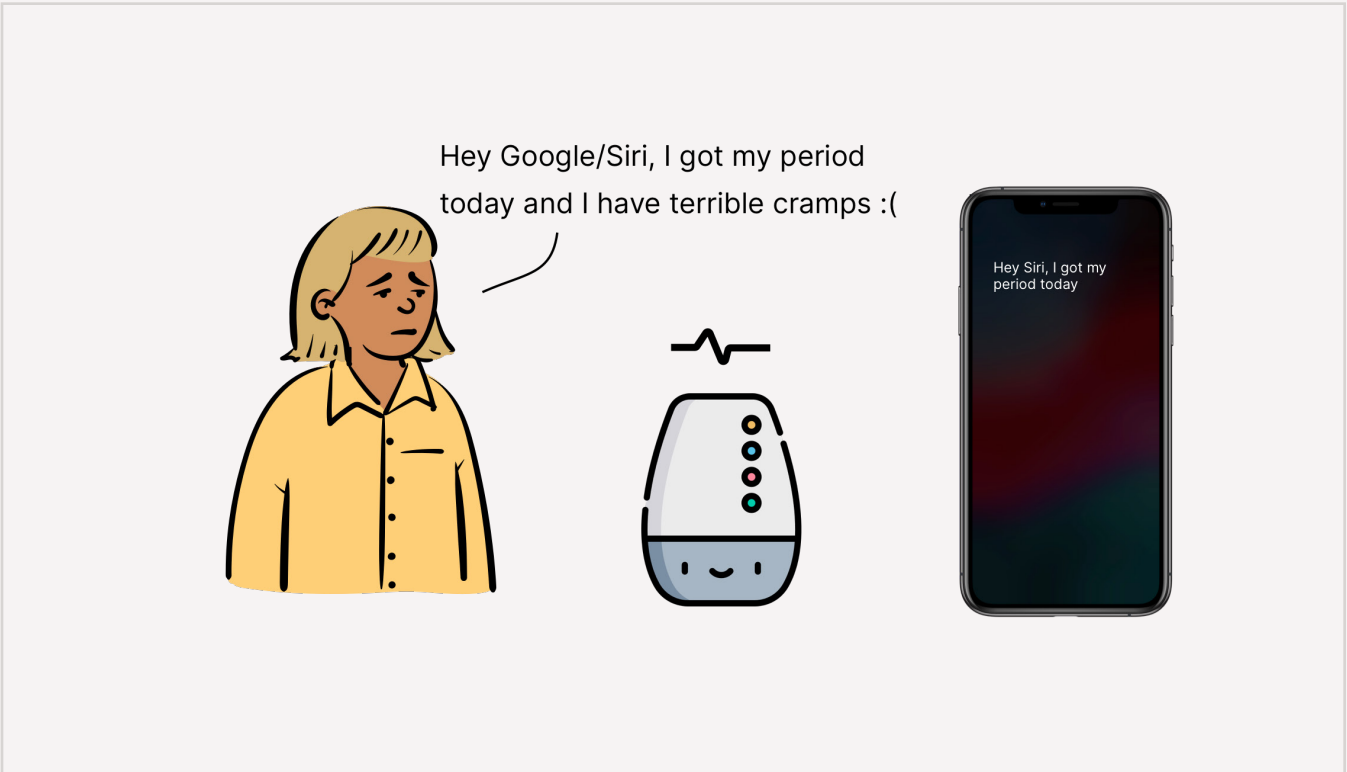


Fig 21: Period talk concept

02 period talk

An AI assistant that listens to your period symptoms, identifies patterns in your cycle based on your descriptions, and offers support through suggestions

Design Principles:

- Support unique needs of menstruators
- Acknowledge complexity of menstrual cycle
- Easy and flexible data logging

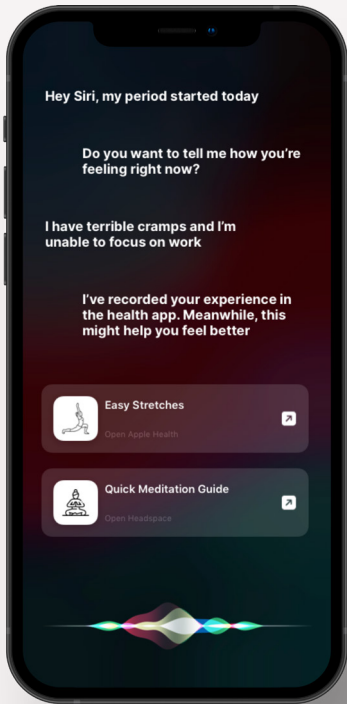


Fig 22: Period talk prototype

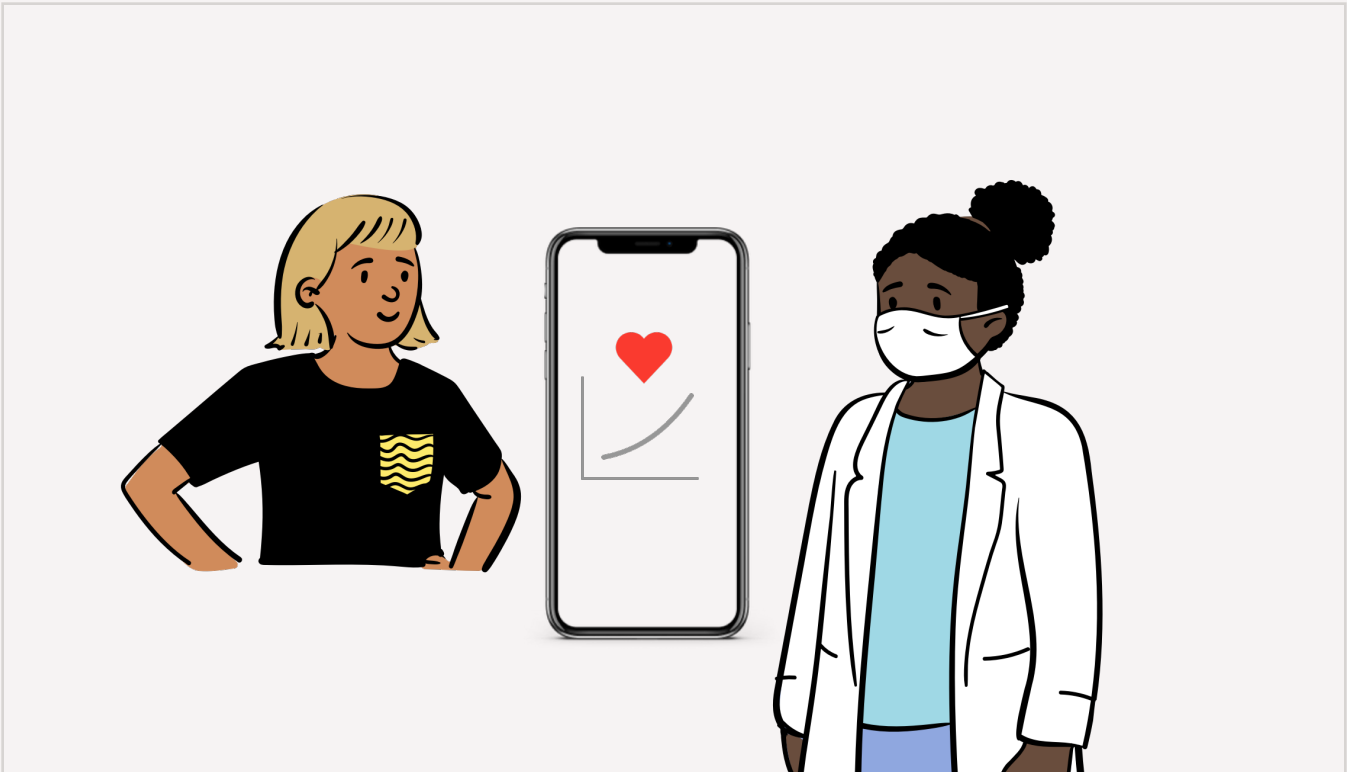


Fig 23: Expert help concept

03 expert help

An AI assistant that listens to your period symptoms, identifies patterns in your cycle based on your descriptions, and offers support through suggestions

Design Principles:

- Support unique needs of menstruators
- Acknowledge complexity of menstrual cycle
- Easy and flexible data logging

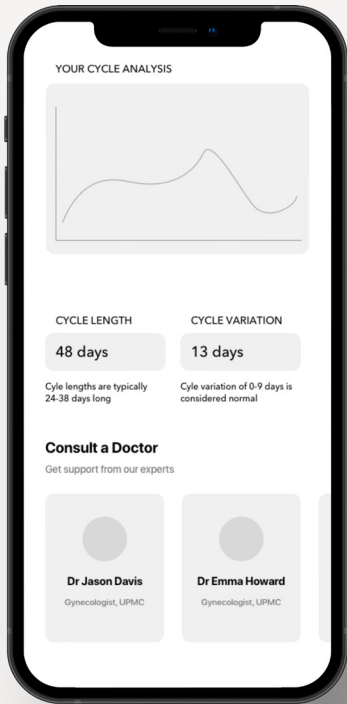


Fig 24: Expert help prototype

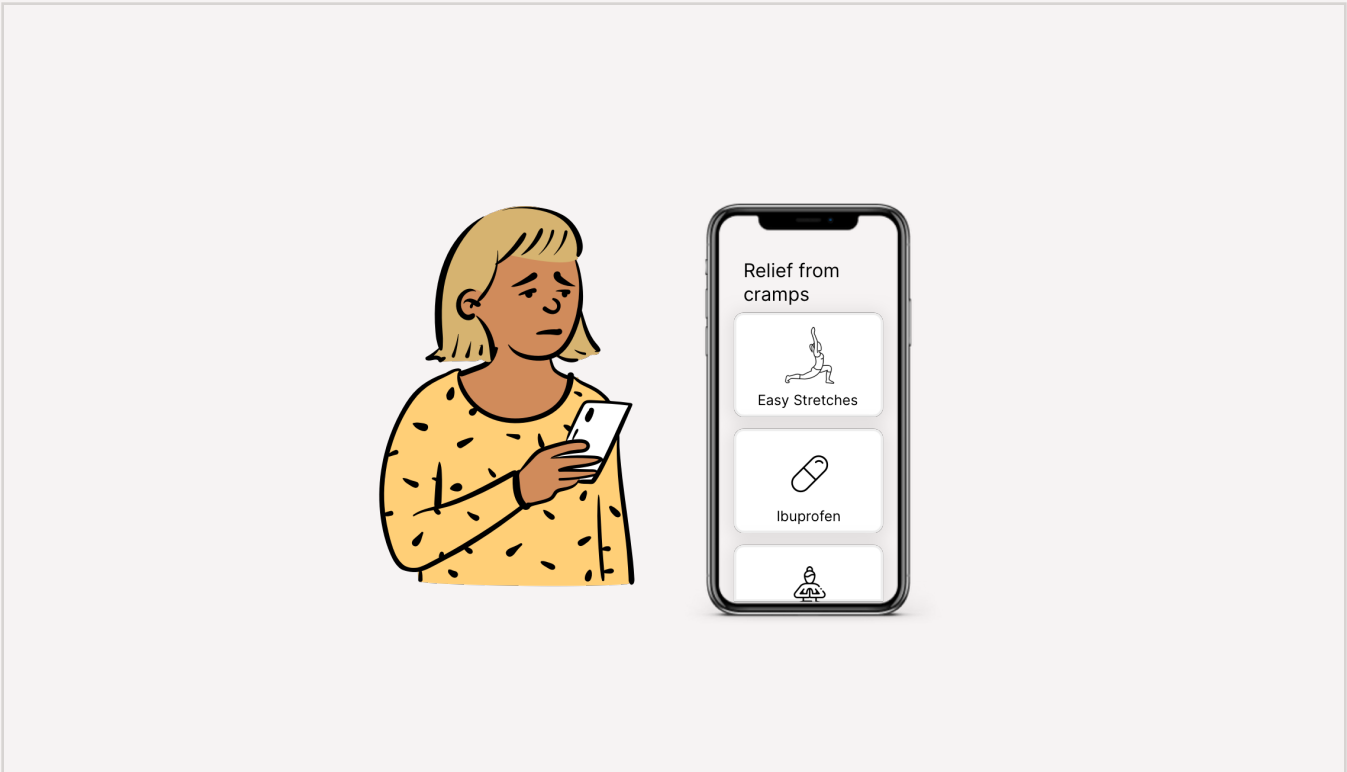


Fig 25: Actionable tasks concept

04 actionable tasks

An application that lets you log your symptoms and gives you easy tips and methods that you can follow to manage your symptoms better

Design Principles:

- Support unique needs of menstruators
- Provide relevant and actionable insights

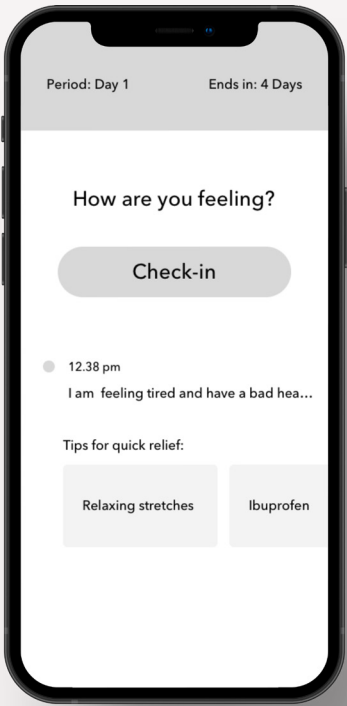


Fig 26: Actionable tasks prototype

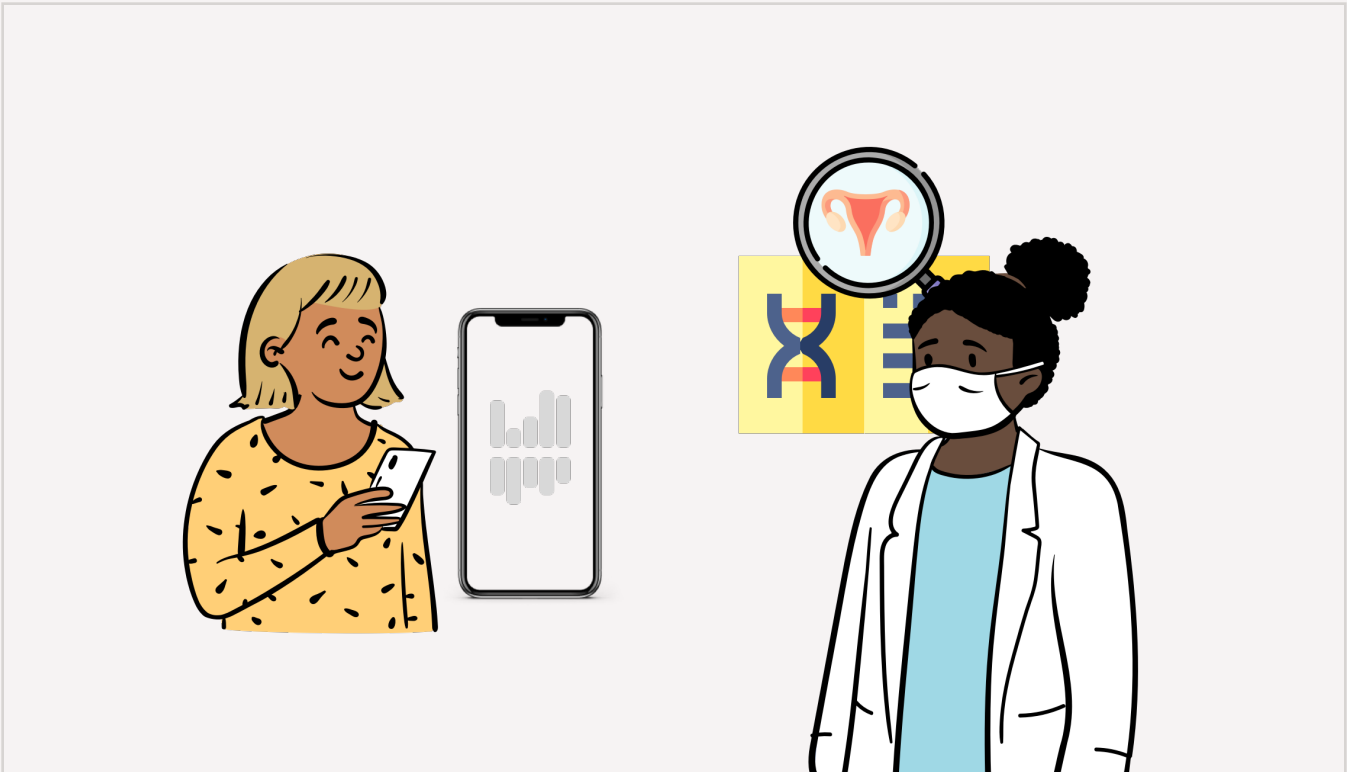


Fig 27: Greater good concept

05 greater good

Help women’s health research efforts by describing your symptoms and providing your input about your experiences

Design Principles:

- Enable menstruators to identify patterns



Fig 28: Greater good prototype

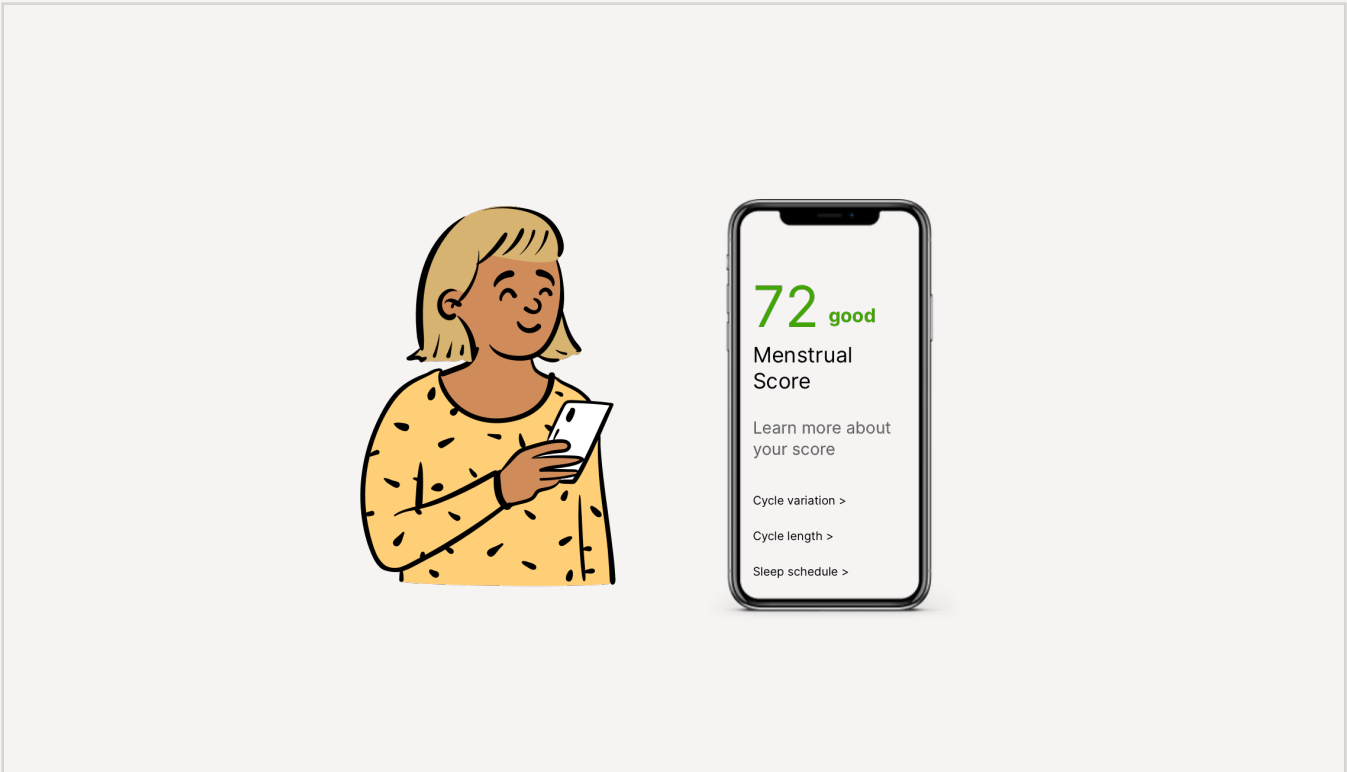


Fig 29: Wellness score concept

06 wellness score

Get a menstrual wellness score based on your tracking along with an explanation of how the score is calculated. Also get insights on how you can improve your menstrual score

Design Principles:

- Provide relevant and actionable insights
- Enable menstruators to identify patterns

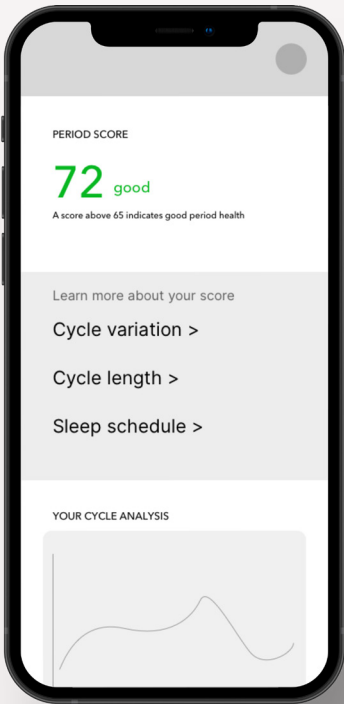


Fig 30: Wellness score prototype

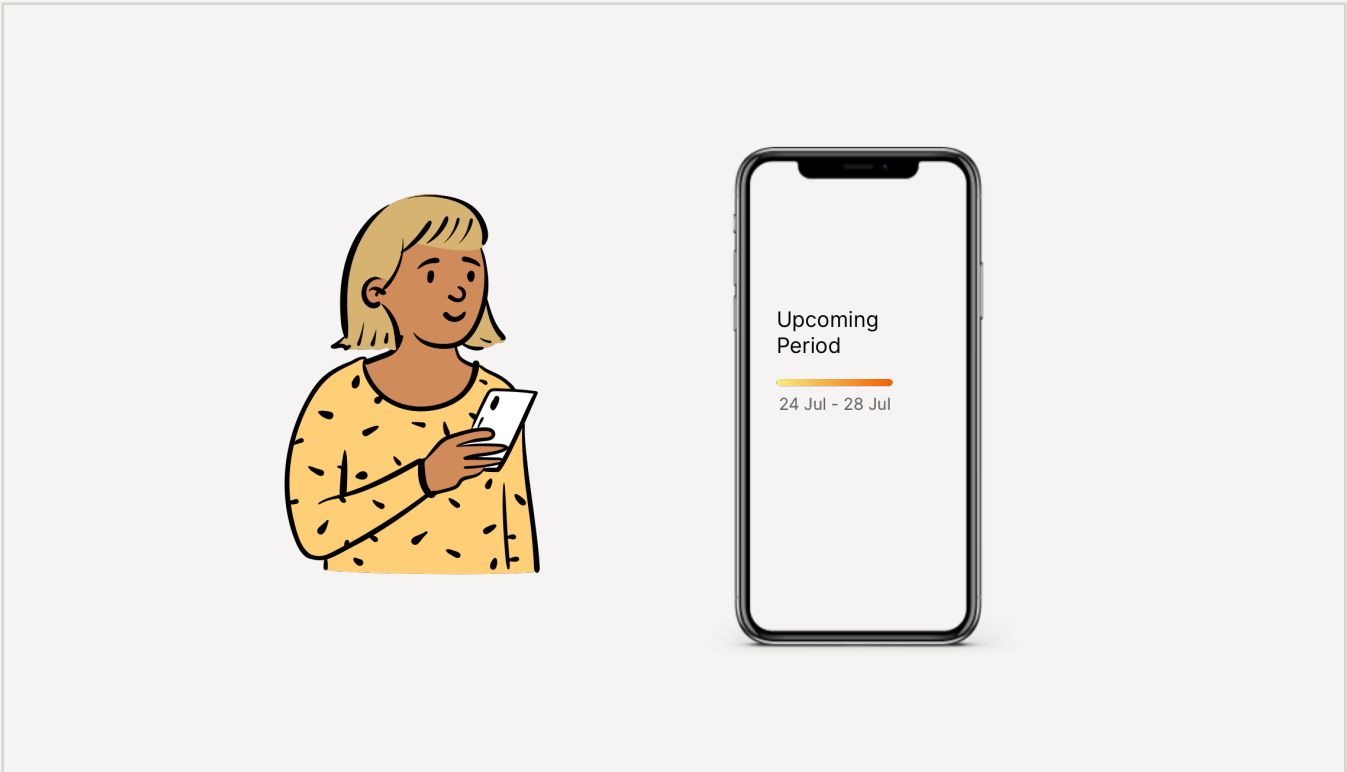


Fig 31: Period forecast concept

07 period forecast

Instead of getting an exact date, get a probability and a date range of your period start date or your fertile window and plan your daily activities around the forecast

Design Principles:

- Acknowledge complexity of menstrual cycle
- Communicate uncertainty in predictions

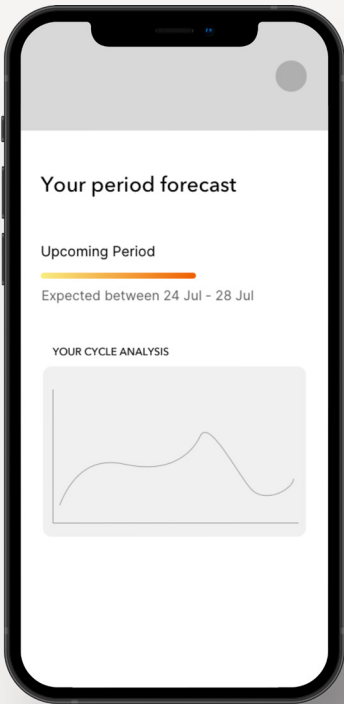


Fig 32: Period forecast prototype

05

Evaluative research

- Concept speed dating
- Synthesis of findings
- Reflections on the research phase

concept speed dating

I conducted concept speed dating sessions with 7 participants where I walked them through each concept and its corresponding lo-fi wireframe prototype. I used a semantic differential rating scale to guide my speed dating session and understand their reactions to each concept. I also

captured qualitative feedback by noting down their comments for each concept.

Differential semantic rating scale: I used this to understand whether the concepts were informative, made users feel supported, motivated and empowered.

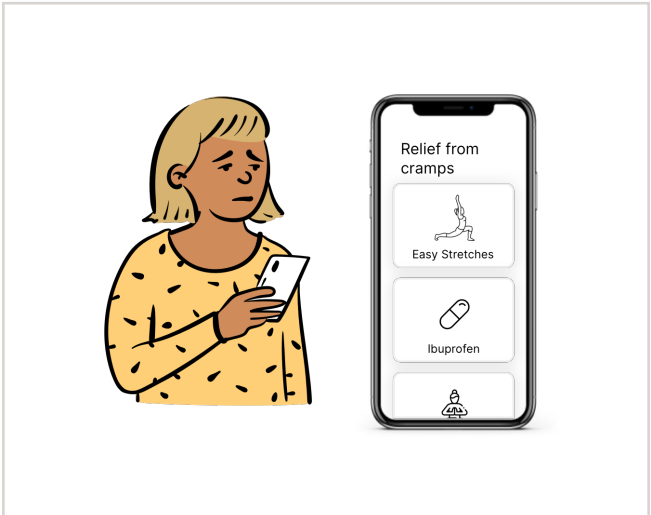


Fig 33: Concept storyboard

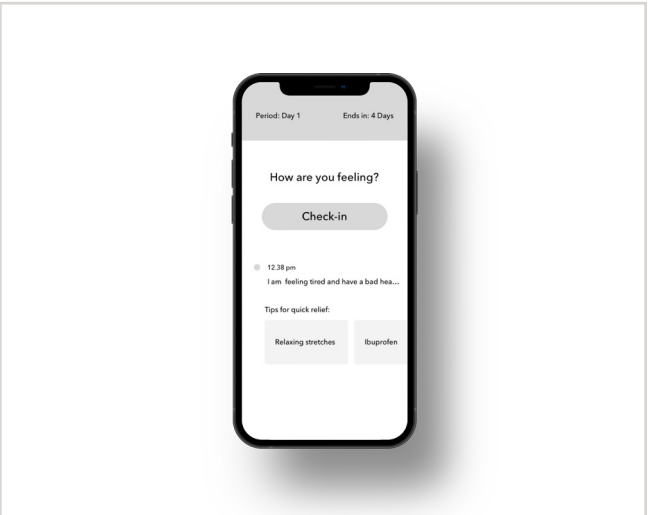


Fig 34: Concept prototype

Based on the scenario, how would you feel while using the tool?

Motivated ☐ ☐ ☐ ☐ ☐ ☐ ☐ Not motivated

Would you describe the use of the tool

Informative ☐ ☐ ☐ ☐ ☐ ☐ ☐ Not informative

Useful ☐ ☐ ☐ ☐ ☐ ☐ ☐ Not useful

Empowering ☐ ☐ ☐ ☐ ☐ ☐ ☐ Not empowering

Fig 35: Semantic differential rating scale

synthesis of findings

I conducted a rose-bud-thorn synthesis to identify the strengths, weaknesses and opportunities of each concept and then ranked them. This helped me identify the most successful and least successful concepts. Additionally, this also helped me understand the factors leading to their success/failure.

The concept that stood out to be the most successful one was “Greater Good”.

reflections on the research phase

Throughout the exploratory phase my aim was to gain a deeper understanding of the current state of menstrual tracking apps, identify their shortcomings by understanding the needs of menstruators. The problems with current tracking tools I identified led me to think that tracking can be improved by offering effective data visualizations that help users identify patterns. Through my concept speed dating and my learnings from the expert interview, I realized that the root cause of poor data visualizations

was the lack of data itself. Menstrual health is highly under researched and in order to provide relevant information to users of menstrual tracker applications, it is necessary to have sufficient data. The concept “Greater Good” was the most successful one because all participants of the concept speed dating were able to appreciate the effort to crowd source menstrual health data to advance research. They also felt a sense of empowerment to participate in an effort that would help menstruators

Concept	 Rose	 Bud	 Thorn	Rank
Period Talk	The conversational interaction feels natural	Could use coversation and touch interaction, focus on tips to improve lifestyle	Apprehension about conversational interaction to talk about periods.	5
Expert Help	Easily connecting to a doctor is a great option, motivation to collect data for informing conversation with doctor	Requires in-person interacton with doctor, could turn into a service	Will cost a lot, wouldn't use an app to find a doctor	2
Actionable Tasks	-	Detecting keywords from description is a great feature to have	Many apps already do this, not informative, information already available in many places, doesn't motivated, doesn't support emotioanl needs	6
Wellness Score	Useful for knowing how to improve general lifestyle, helpful for understand what is working and what is not	Will feel supported if app suggests tips for improving the score, forecasting PMS instead of the period itself could be helpful	Score can be judgmental, can make people feel panic if score is low	3
Greater Good	Community angle makes tracking fun, could help getting over taboo, should be a part of every tracking app, would feel empowered to contribute to research	Would be informative if results of clinical research were shared with users	-	1
Period Forecast	Seeing a range instead of a spedific date as prediction feels more supportive, gives less anxiety	Wouldn't care about range vs specific date	Not very helpful as it doesn't matter	4

06

Design intervention

Selected concept - Greater Good

Defining the features

Concept validation

Refining the concept

Reflection

selected concept - greater good

This concept was appreciated by all participants as the idea of contributing to research made them feel empowered. It also ranked high on motivation to use regularly as well as feeling supported. Most participants also felt that this tool would prove to be highly informative as it would help them compare their menstrual health with others, creating a sense of community.

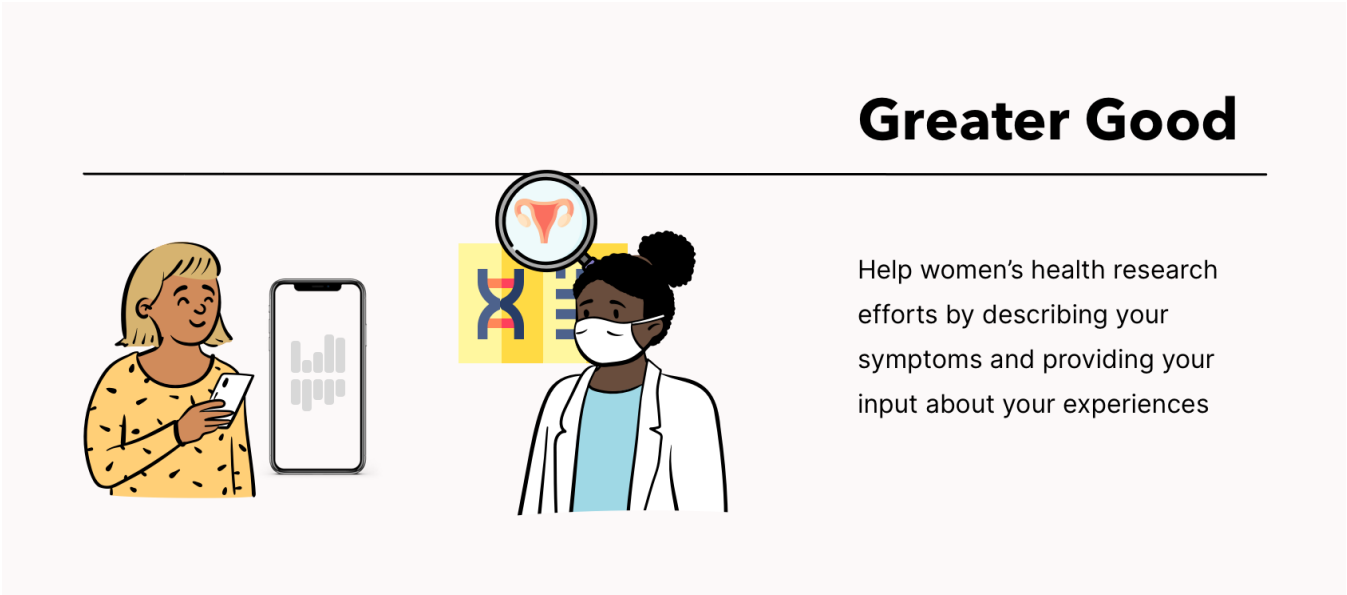


Fig 36: Selected concept - Greater good

Quote from a participant

“It is wild that there is so less information about the menstrual cycle and I would feel empowered by contributing to research for women’s health.”

I began detailing this concept by creating a value flow diagram to understand how various stakeholders can benefit from collecting menstrual health data. This value flow diagram demonstrates how the use of menstrual health data creates value for the following stakeholders:

Users

Users of this tool participate in the crowd sourcing of data by logging information related to their menstrual cycles. In return, this tool provides them useful information about their body and reproductive health.

Research institutes

Healthcare research institutes use this data to study the link between general wellbeing, health conditions and the menstrual cycles. This helps them with research and development of new treatment methods.

Doctors and clinicians

Clinicians can use this data to better understand their patients by comparing their condition with the general trends observed in the data.

Tech companies

Tech companies like Apple and Fitbit can leverage this data to improve the experience of their health apps.



Fig 37: Value flow diagram

defining the features

What is Greater Good?

Greater Good is a concept that leverages collective intelligence of menstruators to advance menstrual health research by linking users of menstrual tracking applications directly to clinical research institutions. This research can have a great impact on the level of understanding menstruators have about their own bodies.

How does it work?

Greater Good creates a direct channel between menstruators and researchers to enable menstruators to share their period tracking data with researchers.

What will menstruators get out of it?

The outcome of research will help menstruators better understand their menstrual health. They will also get a sense that they are being heard and that daily life problems are being addressed. It will also give them a feeling of empowerment as they are collectively contributing to a greater good.

This value flow diagram helped me envision Greater Good as a service which can be integrated into existing menstrual tracking applications. The focus here was on ease of data collection. Using existing tracking applications would reduce the effort required to migrate users to a new tracking application. The service is built on 3 main features:

- 1. **Tracking:** Leveraging existing tracking applications; Greater Good works as a service which can be plugged into existing tracking applications.
- 2. **Community:** Connecting menstruators with a larger community and driving a sense of empowerment by enabling them to be a part of something significant
- 3. **Research:** Creating a direct link between menstruators and clinical research that not only enables menstruators to contribute to research but also visualize the impact of their contribution.

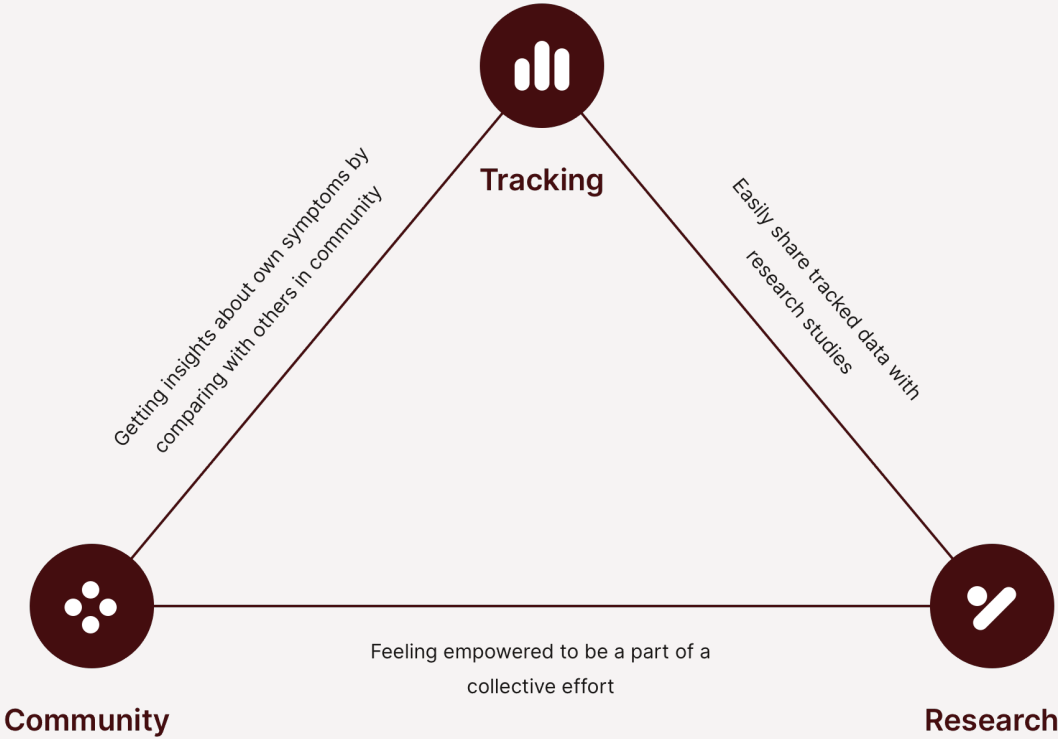
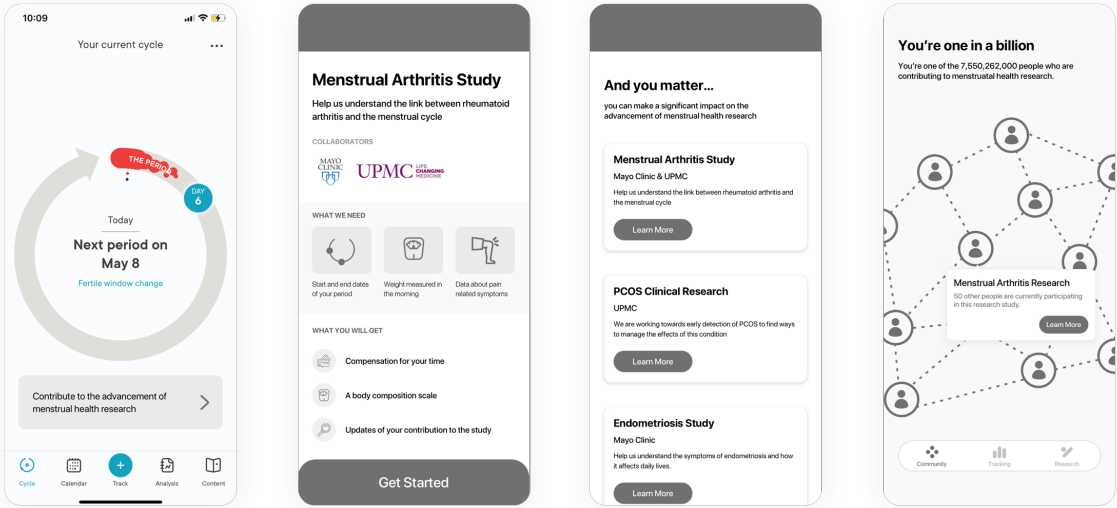


Fig 38: Features of concept - Greater good



- Introduce the service through existing tracking applications
- Learn about the details of a clinical research study
- Discover relevant clinical research studies
- Connect with a community to see the collective efforts

Fig 39: Initial UI for concept - Greater good

concept validation

I conducted two expert interviews to validate the concept and identify areas of improvement and change. I had insightful conversations and informed the final design of this thesis

Dr. Mehret Birru Talabi

MD, PhD - Rheumatology

Through my conversation with Dr Talabi, I learned more about the motivation for menstruators to participate in clinical research. I also better understood clinicians’ needs for conducting research. Following are the learnings from my conversation with Dr. Talabi:

1. There is a higher chance for menstruators with specific conditions to participate in clinical research when it is introduced to them by their doctor.
2. They are more likely to trust the study when it is introduced to them by credible sources like doctors.
3. Additionally, these research studies benefit clinicians as they are able to use the research to better diagnose their patients.
4. A tracking tool dedicated to research would prove to be more valuable than integrating this service with existing tracking applications.
5. Research for specific conditions like PCOD, endometriosis, perimenopause could lead to valuable outcomes for helping menstruators with those conditions

Kaylyn Frazier

UX Manager at Verily Life Sciences - Project Baseline

My conversation with Kaylyn was focused on clinical research protocols. I was able to understand how project baseline by Verily facilitates clinical research by forming partnerships with research institutes. I also learned about various methods of recruiting participants for research. Following is a summary of my learnings from Kaylyn:

1. People participate in clinical research out of altruism
2. The language used in clinical research tools plays a crucial role to tap into the people’s altruism
3. Privacy is a big concern for most people and it is crucial to make information like the IRB easily accessible and understandable.
4. Sharing updates of the research study makes participants feel valued.

refining the concept

Based on my learnings from the expert interviews, I decided to pivot the focus to creating a research tool for menstrual health instead of leveraging existing tracking applications. This would be introduced to menstruators with specific conditions by their doctors. The research study would be focused on collecting specific data to identify links between the condition and other health indicators.

redefining the features

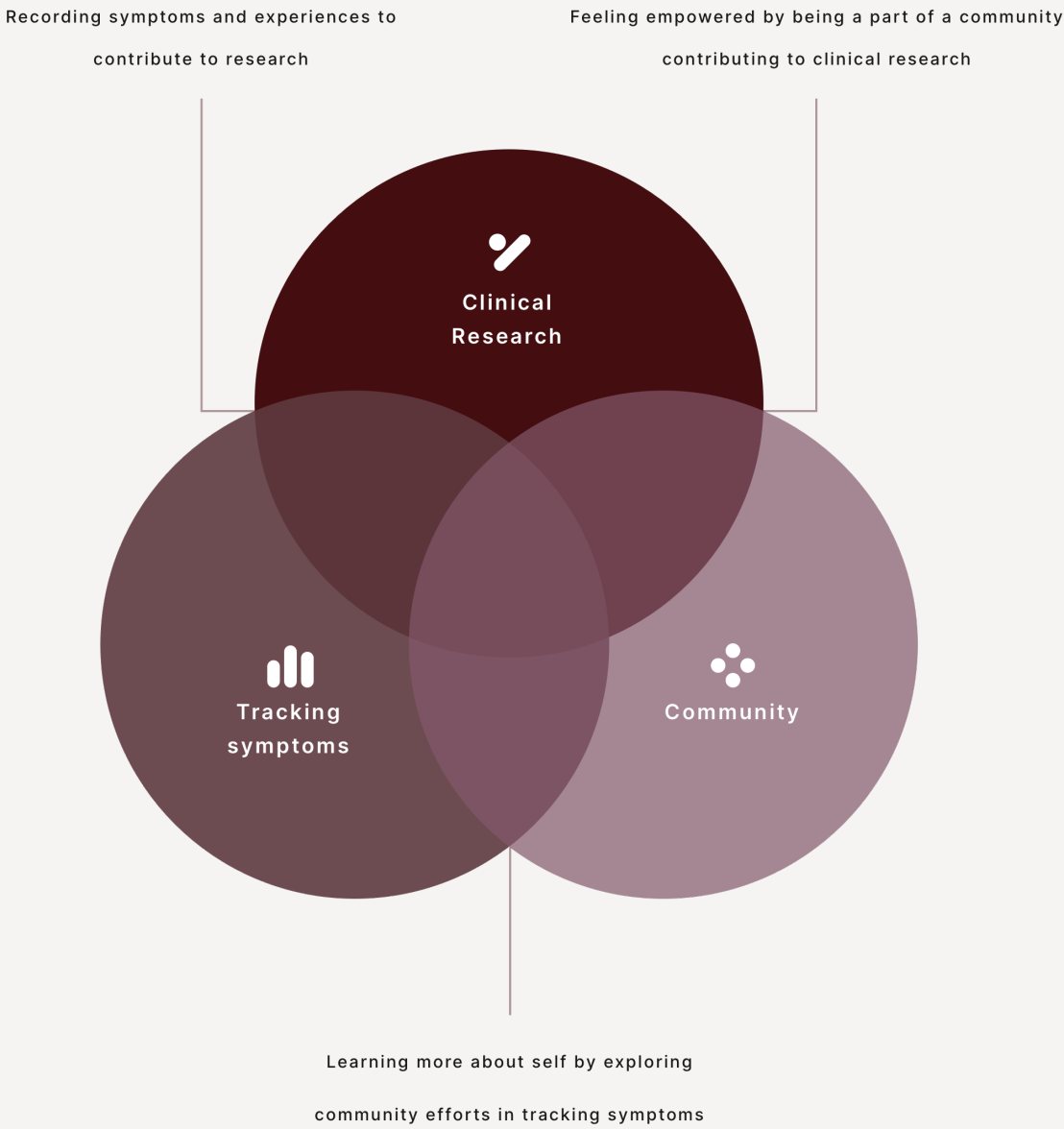


Fig 40: Redefined features

user journey

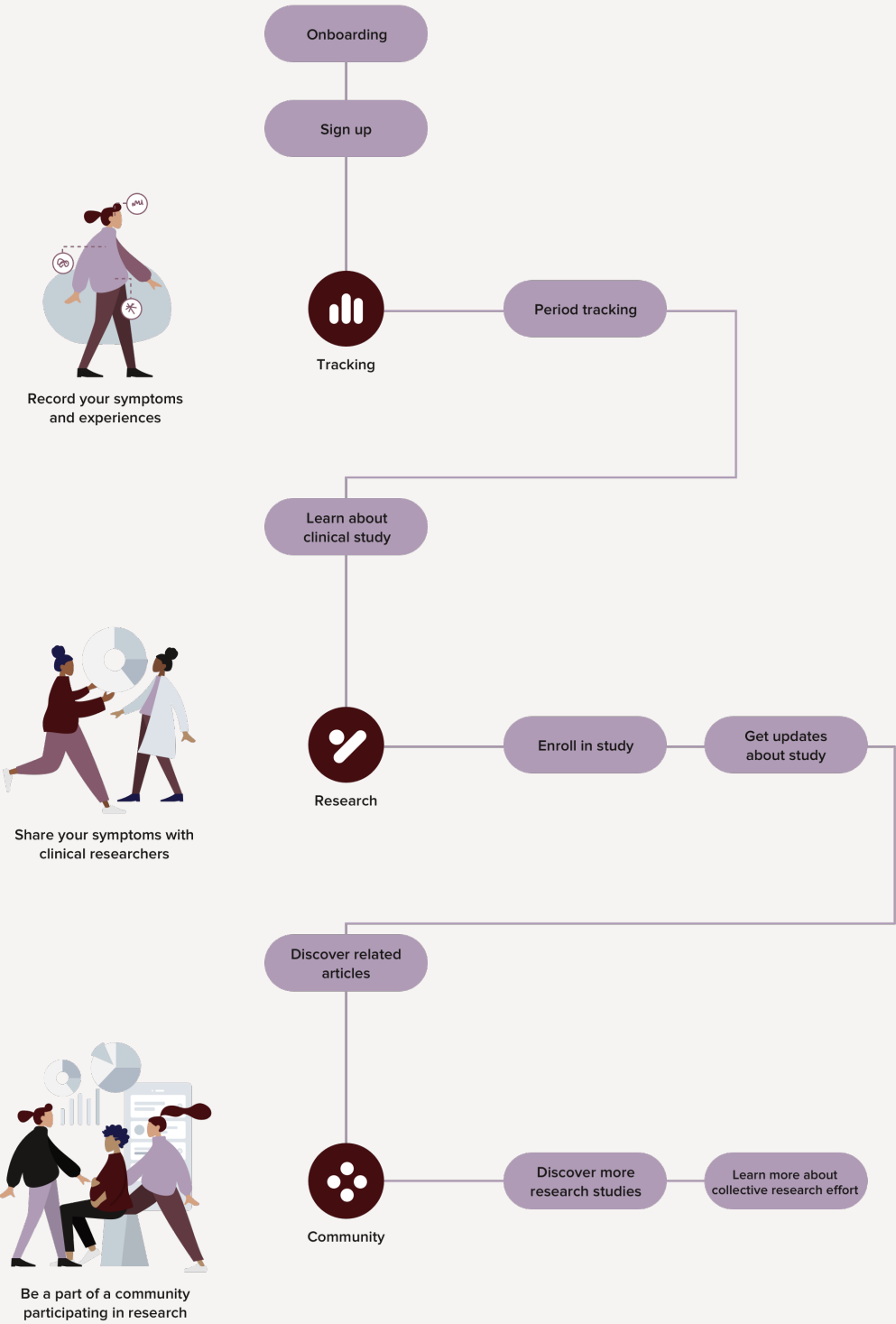


Fig 41: User journey



Fig 42: Onboarding

onboarding

The first three screens of the app introduce users to the core features of Collective Care:

- 1. Tracking periods
- 2. Sharing tracked information with clinical research studies
- 3. Becoming a part of a community to collectively advance menstrual health research

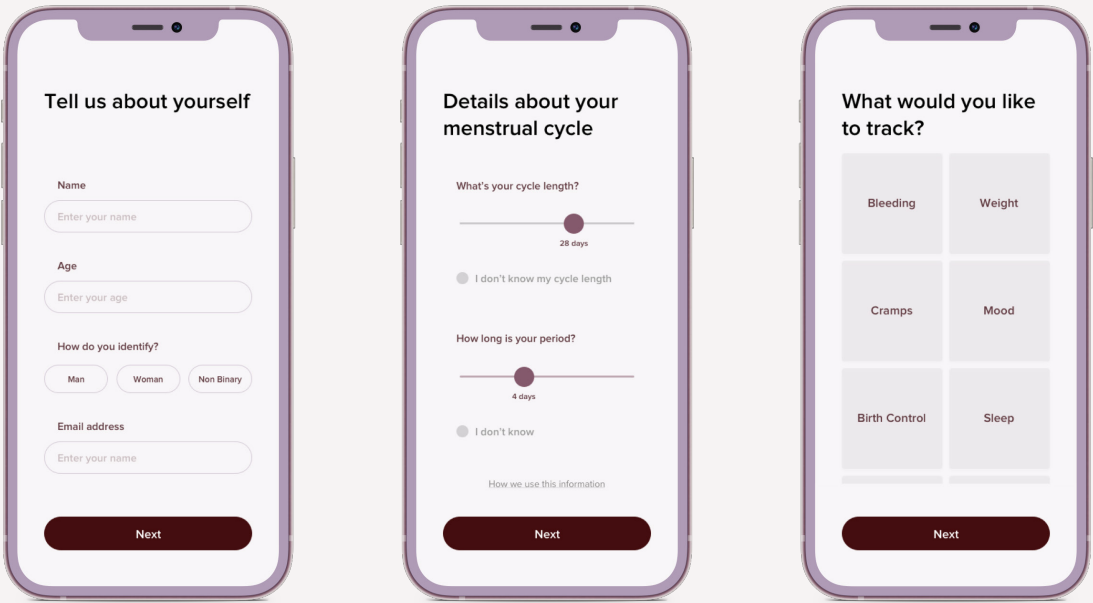


Fig 43: Sign up

sign up

While signing up, users are asked to enter details about their menstrual cycle and are also provided with information about how these details will be used for clinical research.

Additionally users are also prompted to select symptoms they want to track. These symptoms are recommended by clinicians for specific studies.

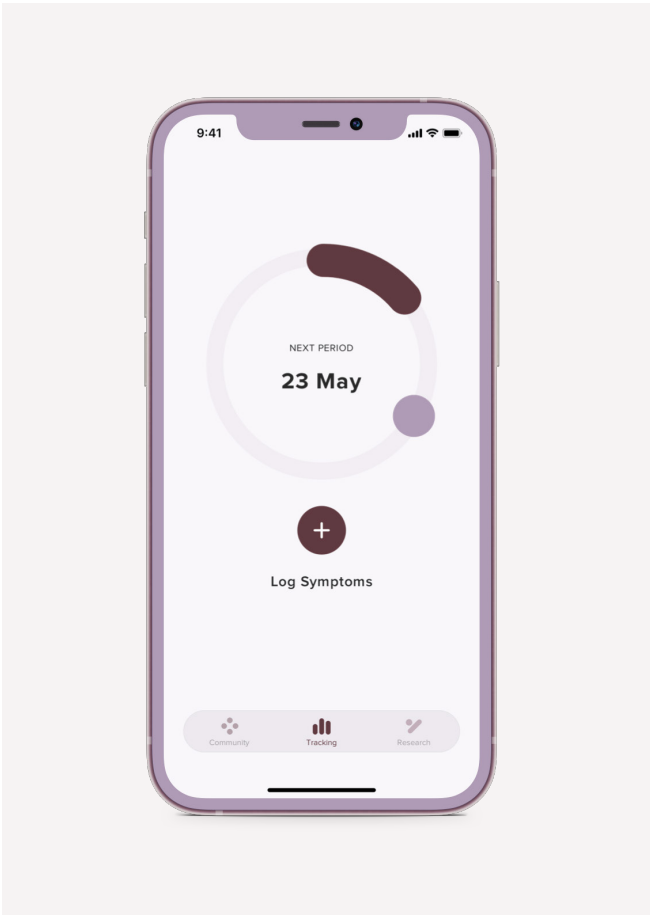


Fig 44: Tracking

tracking

Through the tracking feature, users can easily track the symptoms and experiences required for the clinical study they are participating in.

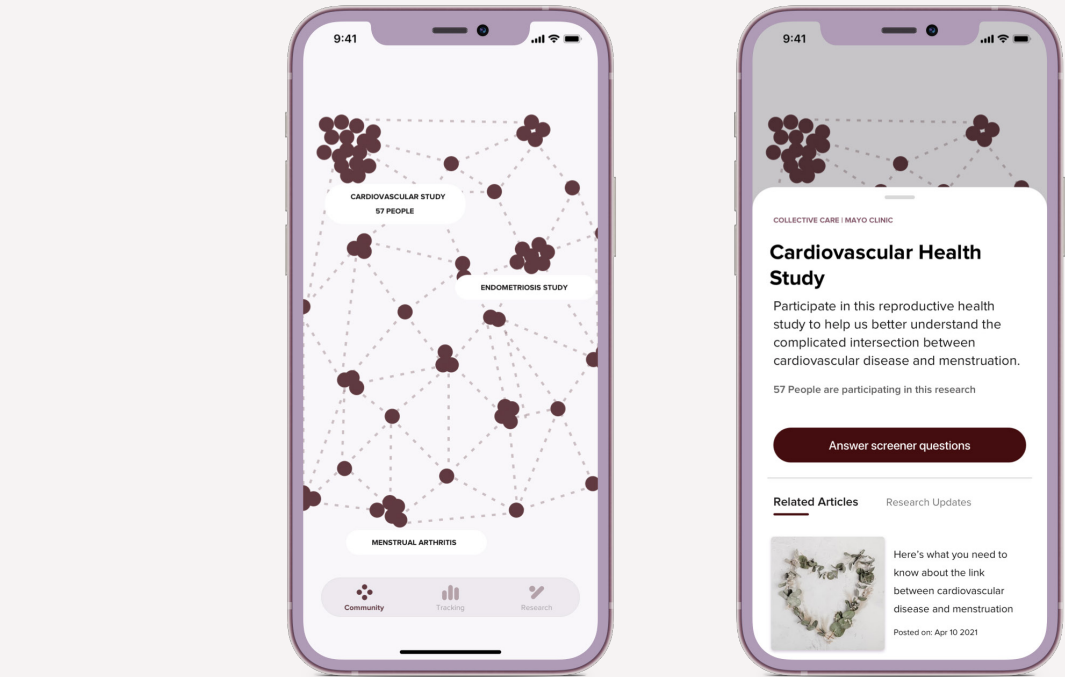


Fig 45: Community

community

The community section of Collective Care introduces users to the collective efforts of all menstruators in participating in clinical research for advancement of menstrual health.

Users can see how many users are participating in studies and discover new ways to contribute to research. This emphasizes the feeling of motivation to track periods and empowerment.

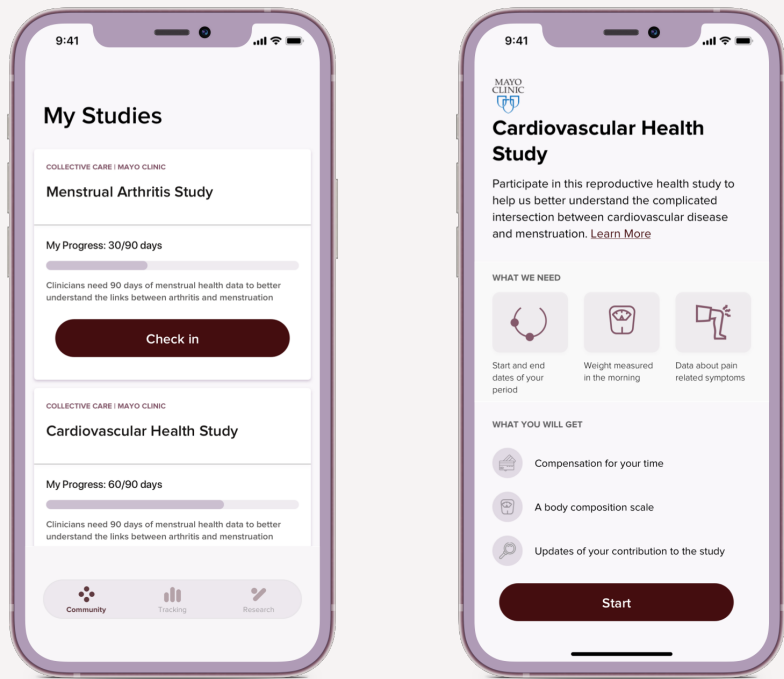


Fig 46: Research

research

The research sections provides users details about research studies they’re participating in as well as all the details of each study.

Conclusion

Reflection and learnings

reflection and learnings

When I started working on this thesis, my goal was to enable menstruators to understand their bodies better so that they can navigate through challenging situations related to their menstrual health with confidence and feel empowered through self-awareness and knowledge. My understanding was that the currently available menstrual tracking tools have several limitations in terms of the value they provide to their users. Through my research, I learned that these limitations are a result of the gap between the needs of menstruators and the capabilities of menstrual tracking tools. These tools fail menstruators in many ways like wrongly assuming sexual identities of users, predicting inaccurate period dates, bias towards fertility, etc.

Additionally, the historic stigmatization of menstruation has left it in an under-researched state which limits menstruators from having adequate information to understand their bodies better. The outcome of my thesis, “Collective Care” is an effort to tackle these two problems by collecting menstrual health data to advance research. My learnings from this thesis aren’t limited to design for menstrual health; through my research, I discovered that gender bias is deep rooted in society but also in healthcare and technology. I think of this thesis as a seed which has a potential to grow into opportunities for dismantling these gender biases and making healthcare more equitable.

Acknowledgments

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