

Mini-project

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1 Introduction

I identified that individuals with chronic health conditions struggle to manage their medications and doctor appointments. Currently, many patients rely on memory or manual tracking, which leads to missed doses and forgotten appointments. This lack of a centralized system also makes it harder to communicate with healthcare professionals. I want to solve this because it increases the risk of health complications and adds unnecessary stress to the patient's daily life.

This report describes the development of a new mobile app to help individuals with chronic health conditions manage their medications and doctor appointments. The app will allow users to set reminders, track their medication usage, and communicate with healthcare professionals [3].

The demo and other links are also at the end of the report.

2 User research and persona creation

2.1 User research

To help understand the needs of my application, I chose 3 core research areas to guide my design decisions. First, I analyzed an article focused on user behaviours within mobile applications to understand general engagement patterns of users. Second, I reviewed a study on the efficiency of reminders for healthcare appointments to determine the most effective notification strategy for the app's scheduling system. Finally, I did some research on patient medication habits to pinpoint common adherence weaknesses. By identifying these behavioural gaps, I can implement targeted features in my application that directly counter user challenges and support long-term health management.

2.1.1 Users' behaviours on mobile health apps

To gather insights into target users' needs, challenges, and behaviours, I decided to use secondary research. There is an interesting article about the continued use of mobile health apps by individuals by Isaac Vaghefi, an assistant professor of Information Systems at Baruch College [15], and Bengisu Tulu, a professor of Information Technology at Worcester Polytechnic [13]. They collected data through 34 interviews (before and after) and 193 diaries from 17 candidates over two weeks [16]. The paper concludes with "most users stop usage soon after initial use" [16]. In the main findings, it is important to provide clean, simple user interfaces and easy navigation across different parts of the app, as well as navigation wizards. The automation of data collection, such as automatic food suggestions, improves both users' interactions and experiences in apps. However, we should take these implications with caution:

It is very challenging to consider all these factors at the same time when designing an mHealth app. Therefore, future research can investigate varying conditions and app-related characteristics that are relevant to each or a subset of factors promoting continued usage, which will provide a more granular view of the identified factors. Overall, these findings echo the calls for user-centered and goal-directed design approaches in the previous research [17]. ([16])

The authors also remind us the four limitations of the study: 1) "more than half of the participants were female, used an iPhone, and were highly motivated to take care of their health" [16], 2) all information was self-reported and there was no objective measures, 3) the limited range of mobile health apps, they only focused on health and wellness, but apps that encourage fitness could be part of mobile health apps (such as Strava), 4) "participants were recruited in universities (although only 1 was a student) and received compensation for their participation" [16]. They also received daily reminders to fill their diary and could have encouraged continued use of health apps.

2.1.2 Mobile phone reminders for attendances

Furthermore, there is also an interesting Cochrane systematic review about how the use of phone messaging reminders for attendance by Car et al. (2012). The authors, who come from different universities, like Imperial College London and others from the University of Edinburgh, conducted a comprehensive meta-analysis of eight randomized controlled trials that involved 6,608 participants [2]. The review concludes that "mobile phone text message reminders are more effective than no reminders" in improving attendance rates at healthcare appointments [2]. One of the primary findings

of the study is that text message reminders significantly increase the possibility of patients attending their scheduled appointments compared to no reminders at all (RR 1.14). Additionally, the research suggests that SMS reminders are "similar in cost and effectiveness to telephone call reminders", making them a more efficient administrative tool for healthcare clinics. Automating those notifications can make the patient experience more streamlined by giving scheduled prompts instead of using traditional manual calling, and its higher cost of resources.

2.2 Impact of cognitive function on medication management

To learn more about how internal patient factors influence long-term treatment success, I reviewed a pooled analysis by Stilley et al. (2010) regarding the impact of cognitive function on medication management [12]. The researchers, led by Carol S. Stilley from the University of Pittsburgh School of Nursing, compared findings from 3 longitudinal studies involving adult patients with diverse diagnoses, including hyperlipidemia, diabetes, and breast cancer [12]. The paper concludes that "deficits in attention/mental flexibility and/or working memory predicted non-adherence" across all patient groups, regardless of the complexity of their medical procedure [12]. A primary finding of the study is that "mental efficiency" is a stronger predictor of adherence than the specific type of disease being treated. The studies found that patients who struggled with working memory (so when you have to hold and manipulate information) and attention were significantly more likely to miss doses or fail to follow timing instructions.

2.3 Persona creation

For persona creation, I used Figma, and I also found more information on their website on how to create a persona [1].

Nathan Normandeau
"Impatient angry dad"

Bio

Hey, I've been working at a big insurance firm in Montreal for around a decade and all I do at the job is risk assessment and mitigation. Unfortunately, two years ago, I was diagnosed with type 2 diabetes. Two years later, high blood pressure appeared after a yearly checkup due to work. I can handle work chaos calmly, but not health. Sometimes, I can hold a long streak of perfectly taking my pills, but sometimes I can't. Big amount of meetings increase my stress and I fail to keep track of my health at times. I don't need motivation, but something that automates my life even when I feel drained. I am ready to commit for a tool that can do that and reduce friction in my daily life.

More about him

Education: Master's degree	Average income: \$100,000 per year	Personality traits: driven, structure, self-reliant, analytical
Professional background: 9 years as a project manager experience		
Behavioral attributes: Wakes up at 6 AM, Loves to use whiteboards and JIRA (software management tool), Time-blocks everything, loves Google Calendar, Sleeps at 11PM	Pain points: Cognitive fatigue after long days of work, Stress negatively affect blood pressure, makes him eat snacks, Irregular medication timing when lot of meetings, Worried about cardiovascular complications on long-term	Goals: Avoid cardiovascular complications, Keep my A1C and blood pressure within the target range, Build consistent habit system, Stop being dependent of memory for medication, Maintain focus during meetings
	Frustrations: Have to rely on my wife to be on time, Healthcare systems that don't have a centralized database, Cluttered emails, Unnecessary notifications	Motivations: Being here for wife and kids, Staying healthy emotionally and physically, Optimize my health, Improve my bad habits to prevent complications

Figure 1: Used a Figma Template for the style, and a stock image of a man [10]

Catherine Gagnon
"Old kind teacher"

Bio

Hello I taught elementary school for 30 years and I was always organized whether it was planning lessons, planning class activities, parent meetings, grading, outside activities with class, but now it's all about prescriptions and appointments. I often doubt myself of whether or not I took that pill. I don't want my children to be worrying about me. If there is something that helps me stay on track, I would use it.

More about her

Education: Bachelor	Average income: \$70,000 per year	Personality traits: independent, curious, responsible, patient
Professional background: 30 years as an elementary teacher		
Behavioral attributes: Wakes up at 11AM, Reads books in the morning, Likes to cook, Likes when things are simple, Paints in the evening, Sleeps at 9PM	Pain points: Second-guesses a lot if she took that pill, 5 different pills to manage, Managing many appointments from different specialists, Long instructions on how to take a pill	Goals: Avoid being dependent of people (her children), Not get hospitalized, Stay healthy enough to see her grandchildren
	Frustrations: Doesn't want to feel like a burden to her children, Worried about her memory, Has wrist pain when opening hard bottles, Not respecting the dose of medication and endangering her health	Motivations: Being healthy enough to be able to see her grandchildren

Figure 2: Used a Figma Template for the style, and a stock image of a woman [14]

3 User journey mapping

I used a user journey map to explore various perspectives on what a user might experience while interacting with my app.

3.1 User journey map

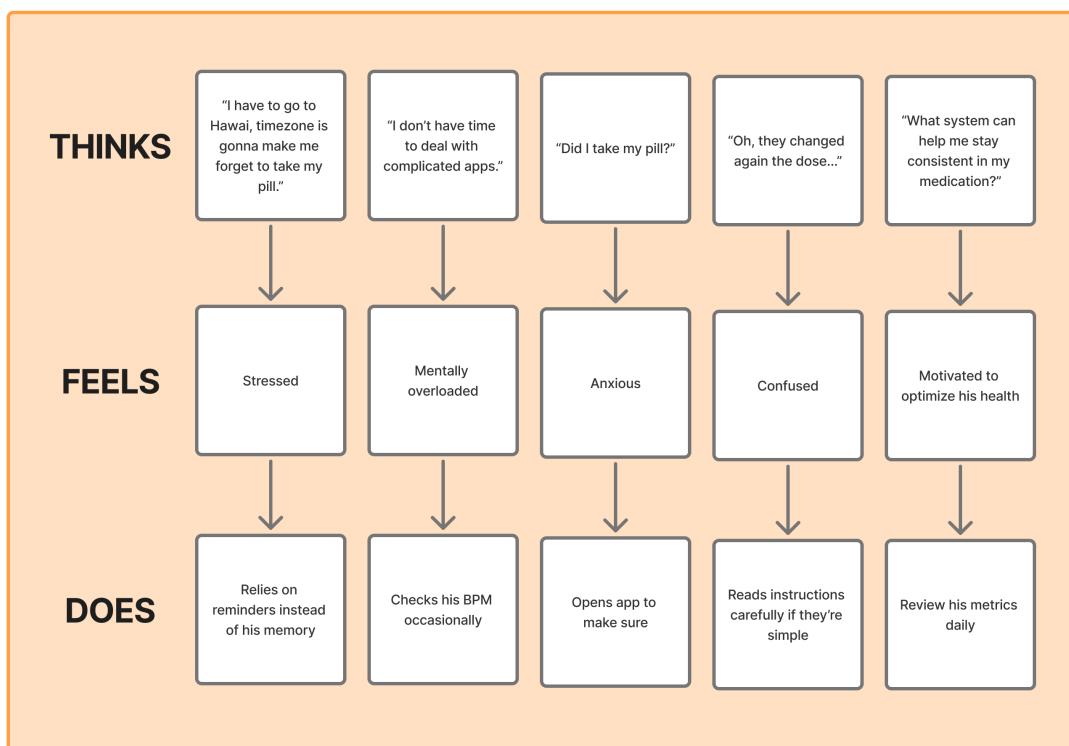


Figure 3: User journey map. Used Figma

3.2 Storyboard

Additionally, I created a storyboard with low-fidelity sketches of some of the app pages. While it is a first iteration, its purpose is to visualize how and in what specific circumstances a user would engage with the product.

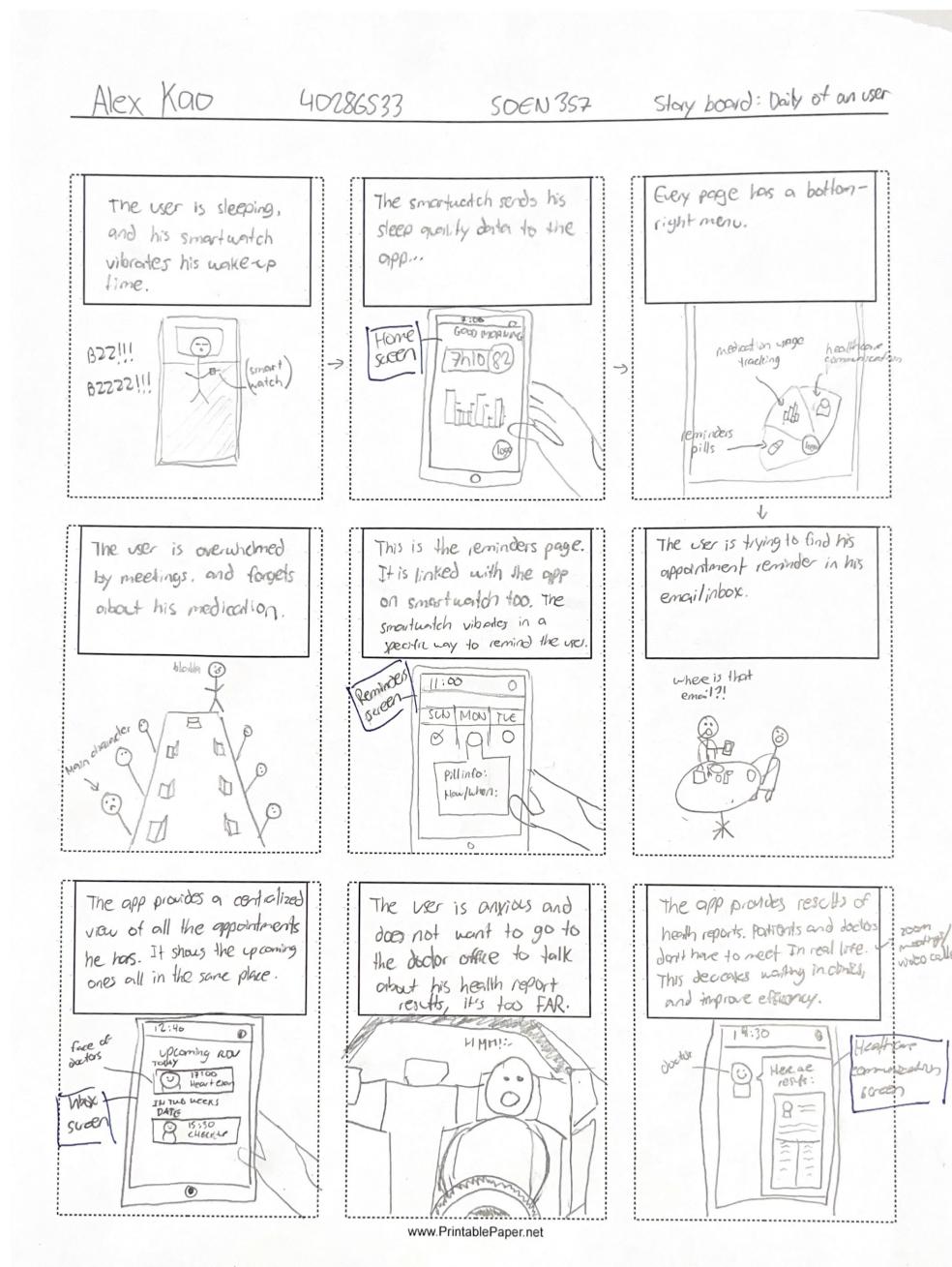


Figure 4: Storyboard

3.3 User flow chart

Finally, I developed a user flow chart to map out the app's logic. This has been essential for the wireframing and prototyping phases, as it defines the necessary functionality and what elements to put on each page.

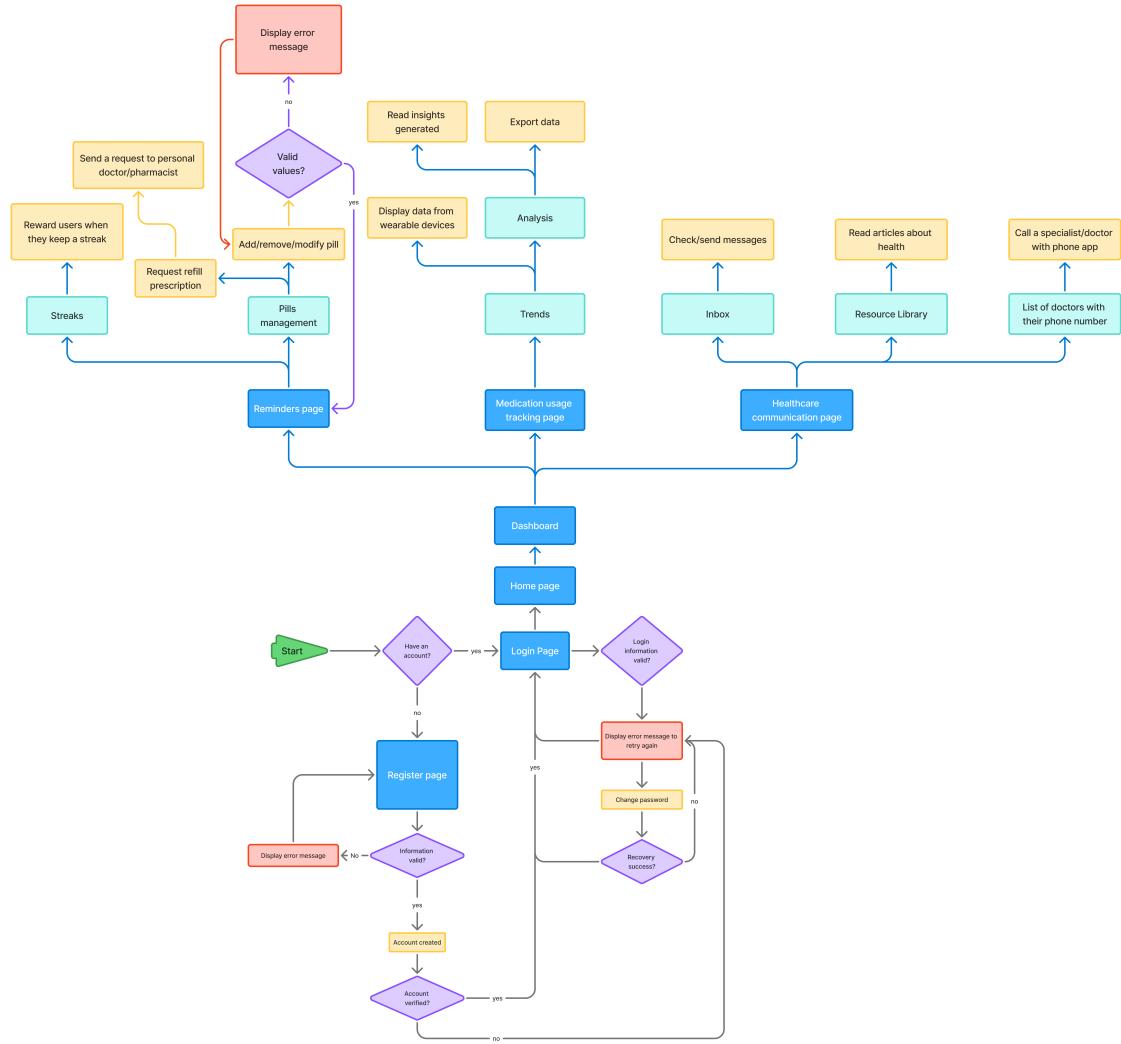


Figure 5: User flow chart

4 Wireframing and prototype design

4.1 Low-fidelity wireframe

I drew these low-fidelity wireframes to get an idea of the future prototype design. It is a second iteration of the storyboard that includes some of the first versions of the pages. I did not draw more screens because I did not see the point; wireframing should be brief and provide a clear idea without taking too much time. It is meant to act as a guideline for the prototype, which is where I plan to invest more of my time.

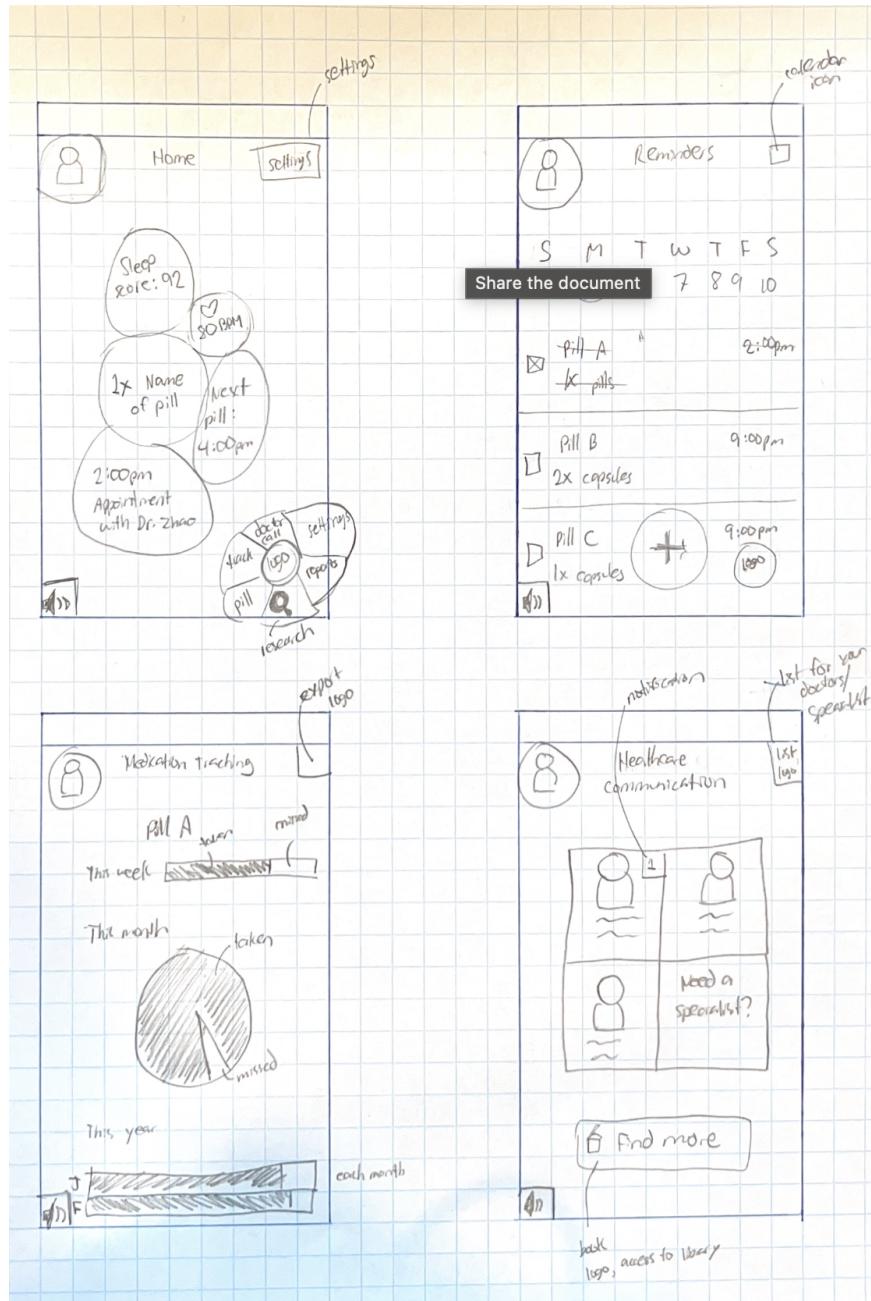


Figure 6: Low-fidelity sketch

4.2 Prototype design

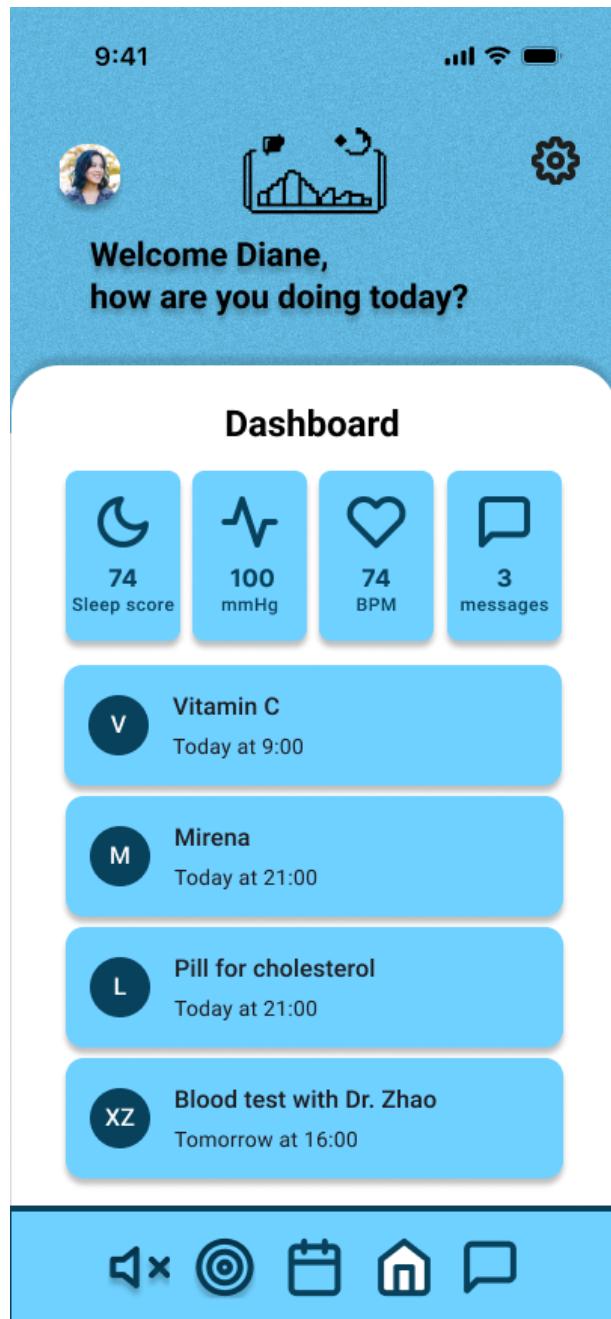


Figure 7: Home page

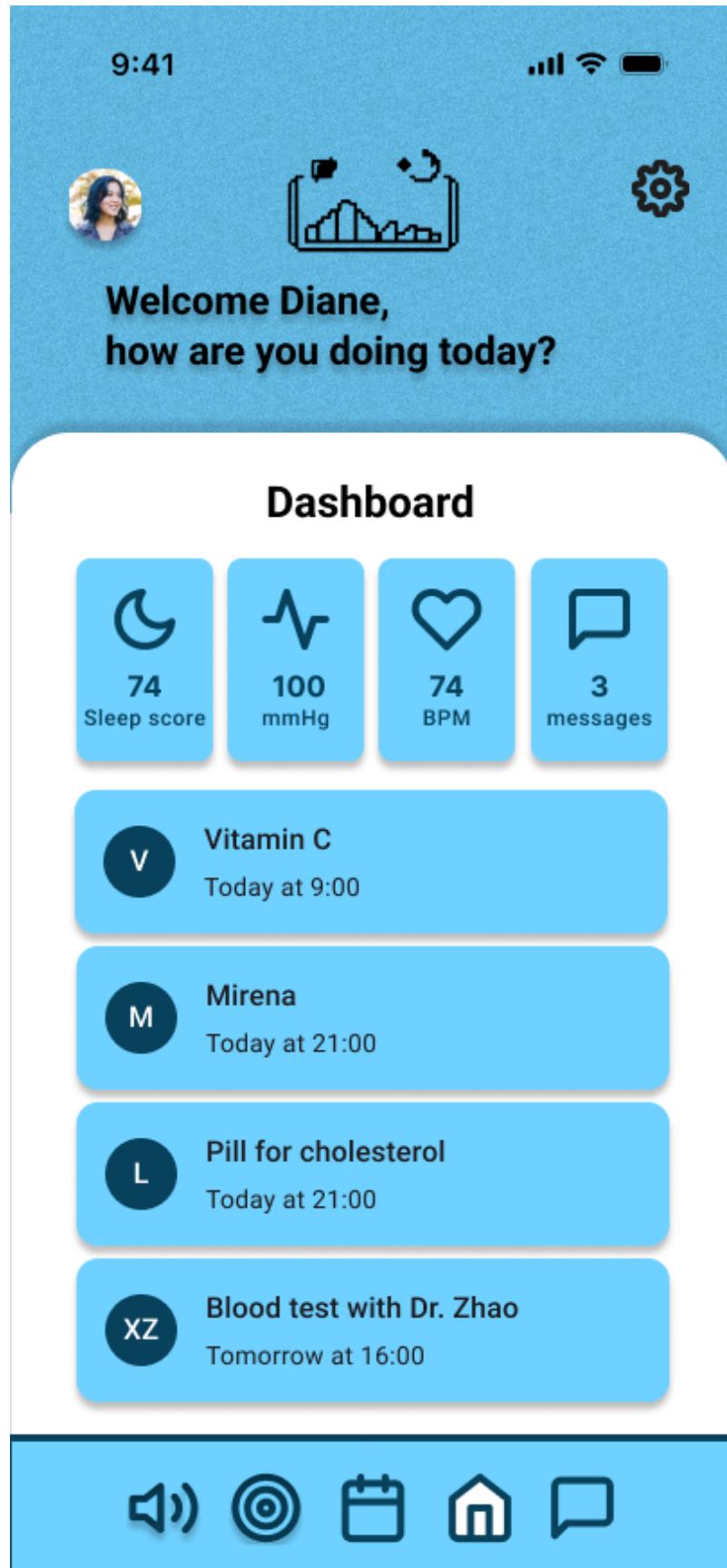


Figure 8: Home page for the hearing impaired

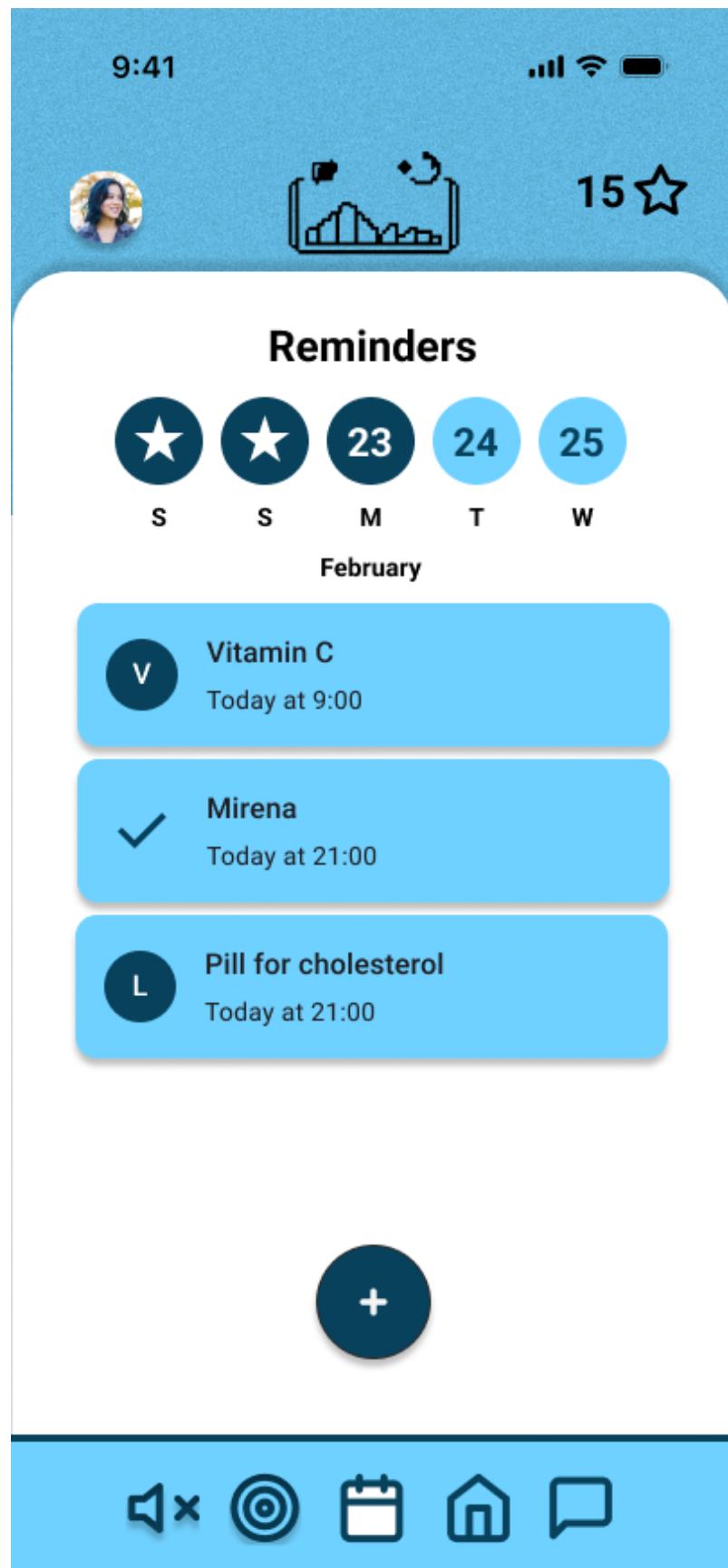


Figure 9: Marked as done pill

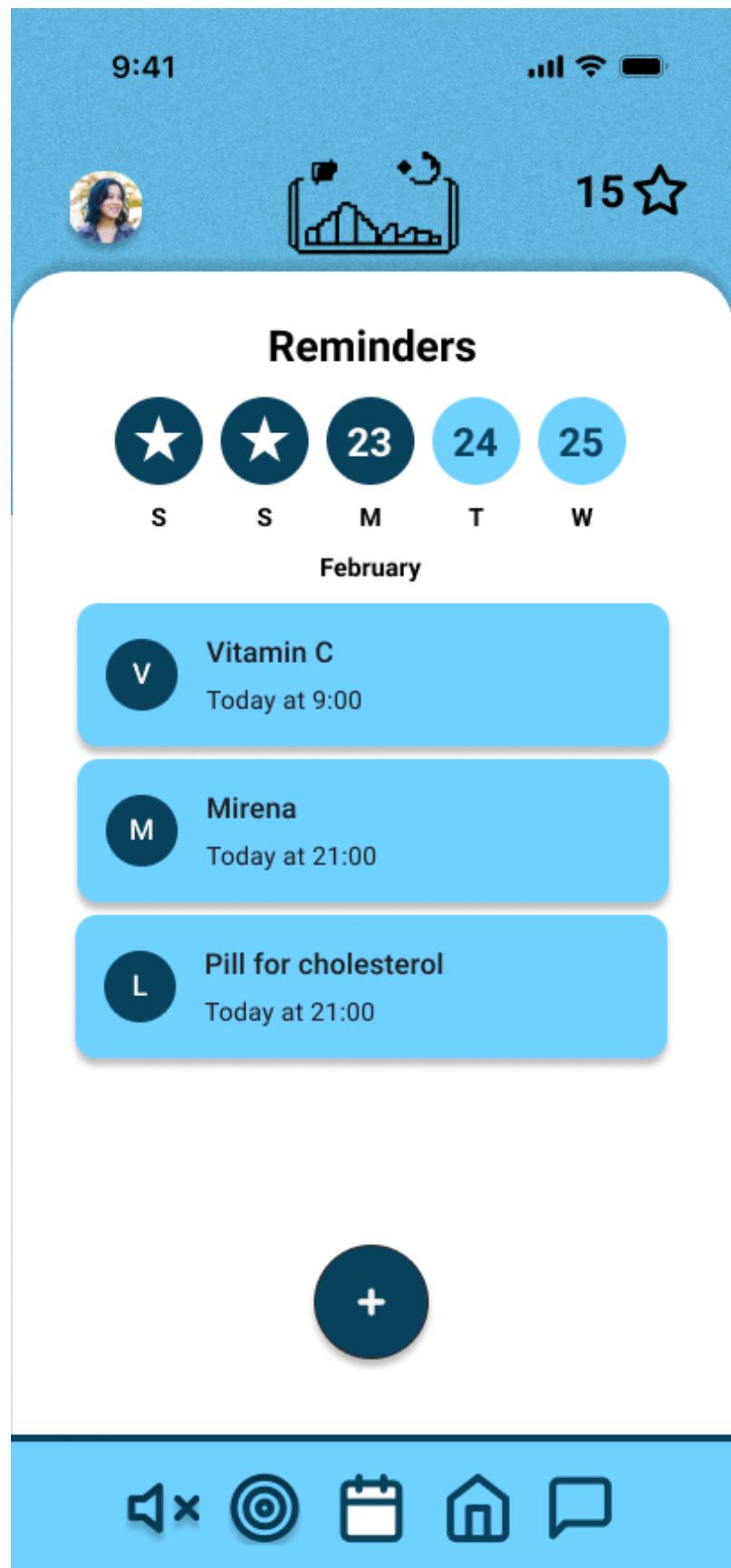


Figure 10: Pill reminders page

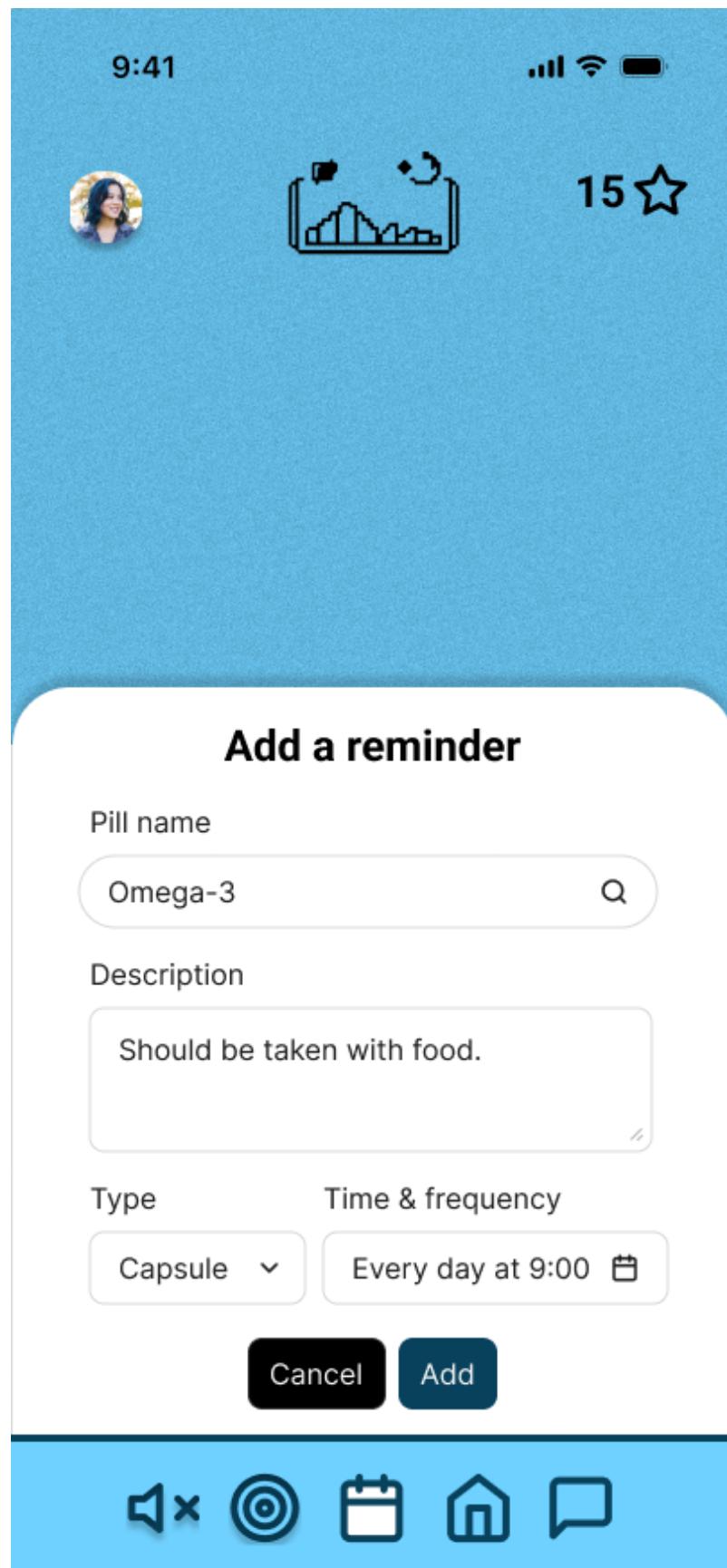


Figure 11: Add a pill

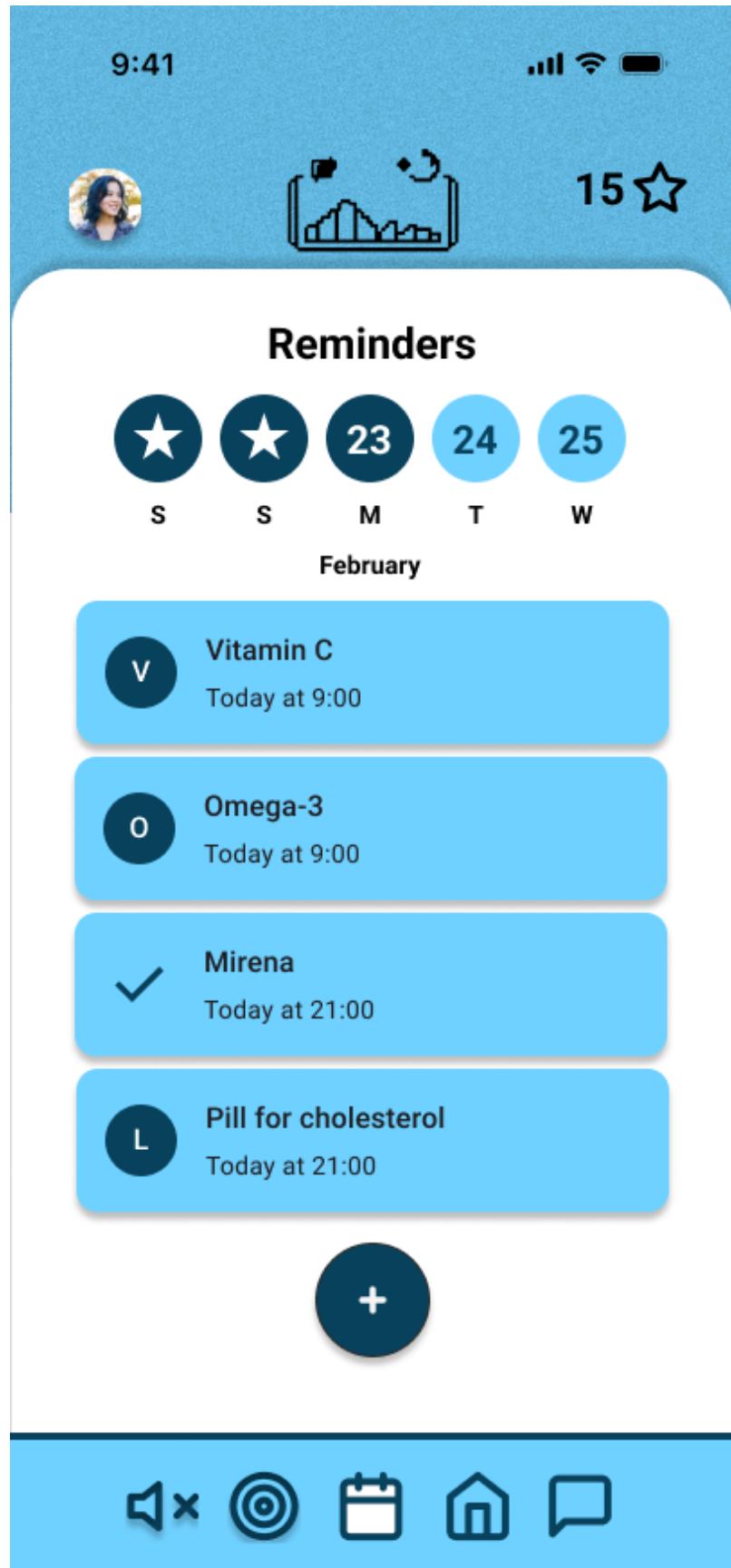


Figure 12: Added a pill

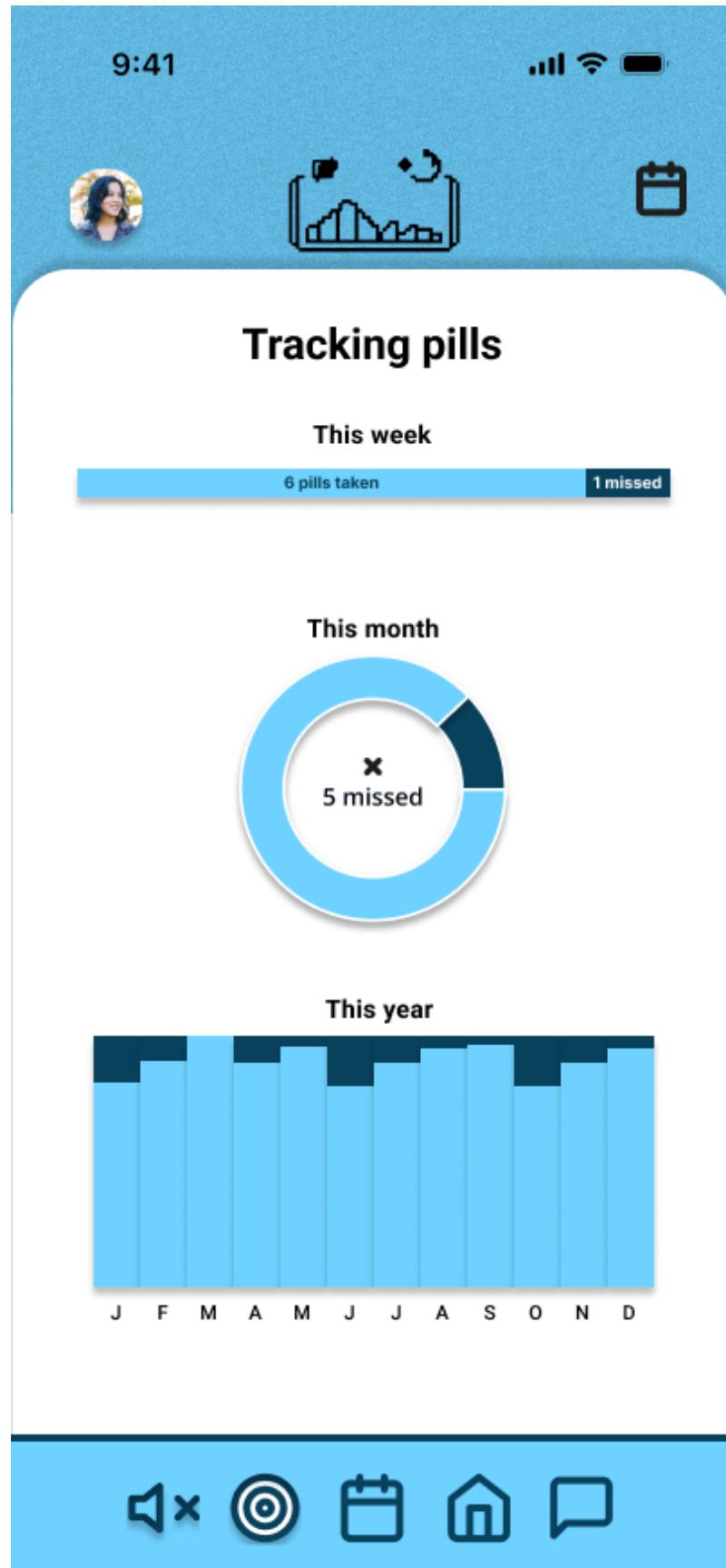


Figure 13: Tracking pill usage

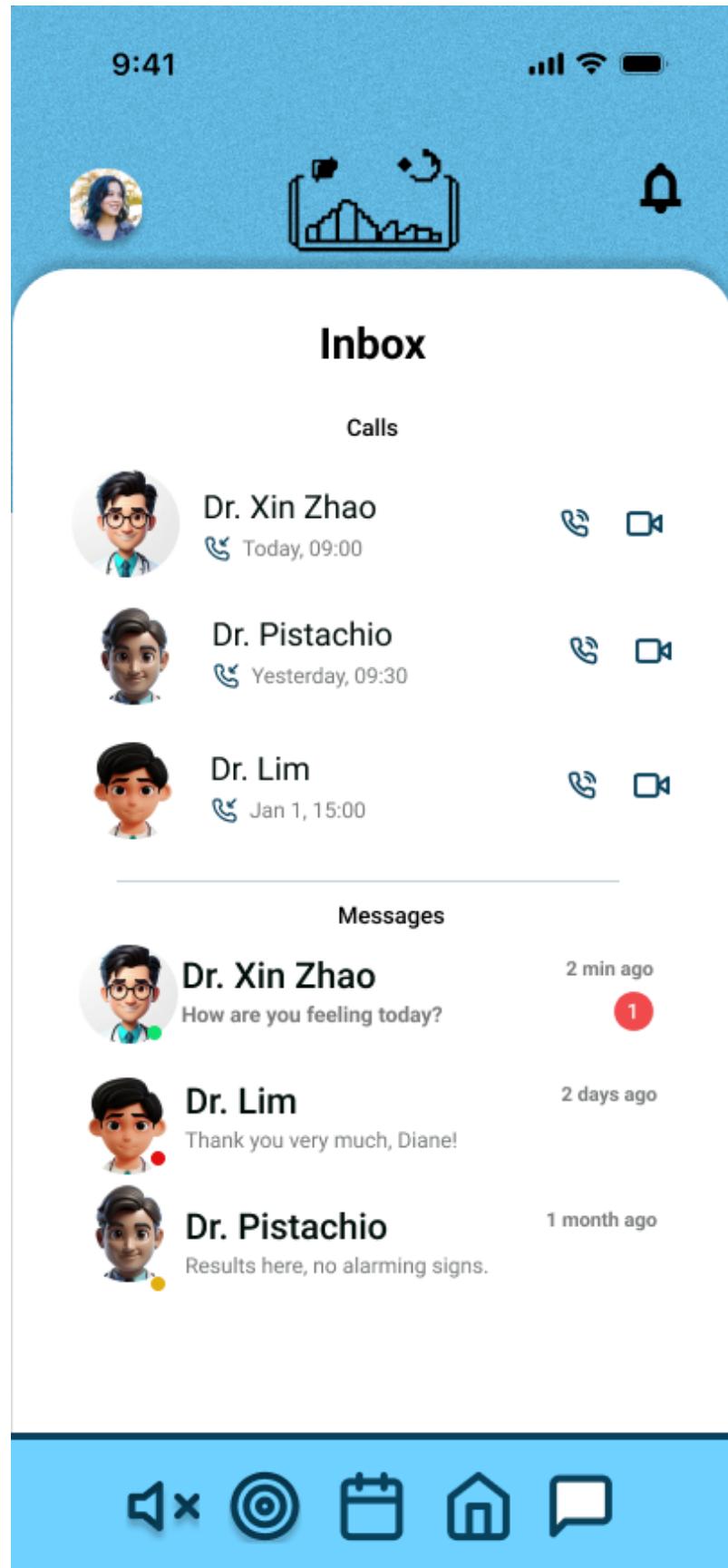


Figure 14: Inbox

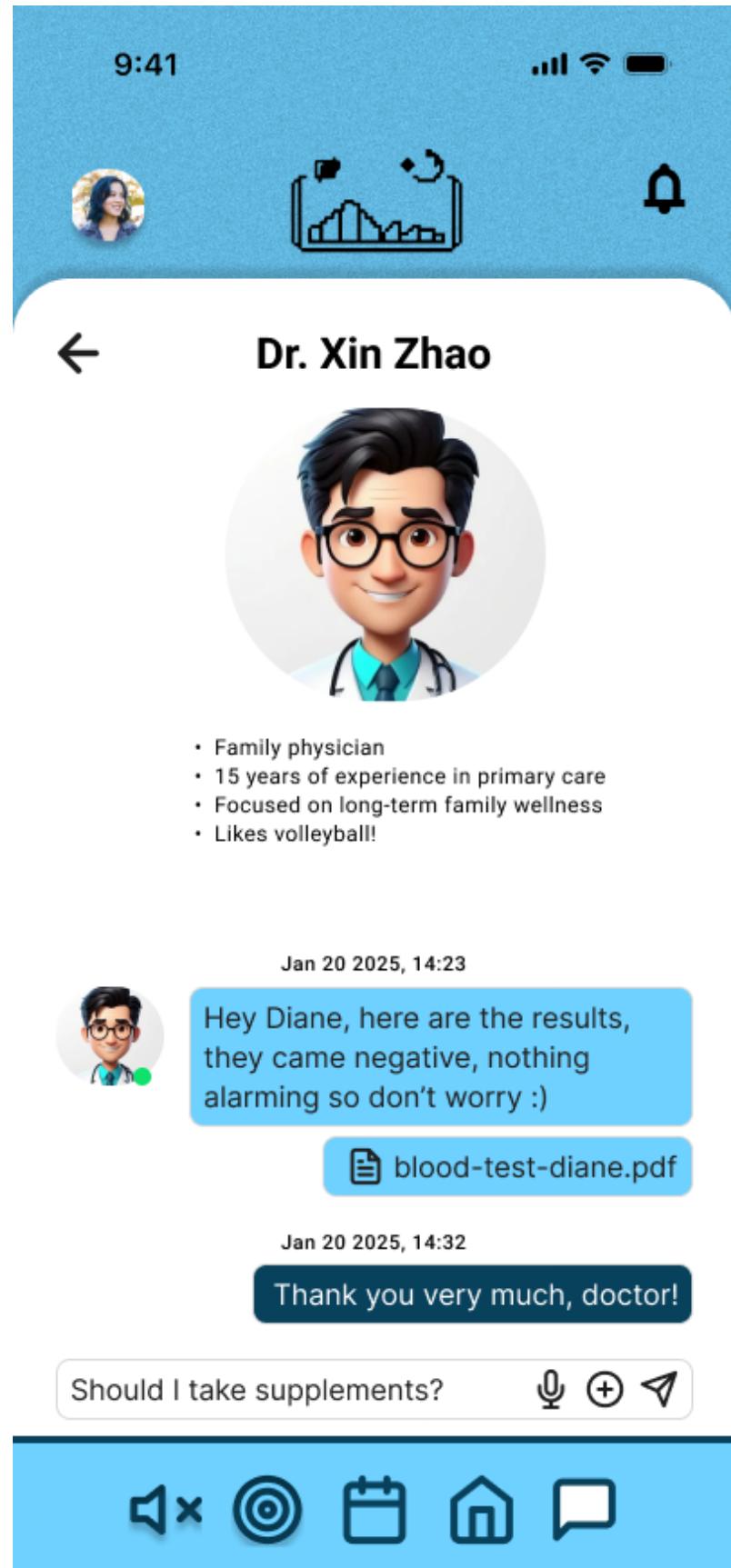


Figure 15: Conversation with doctor

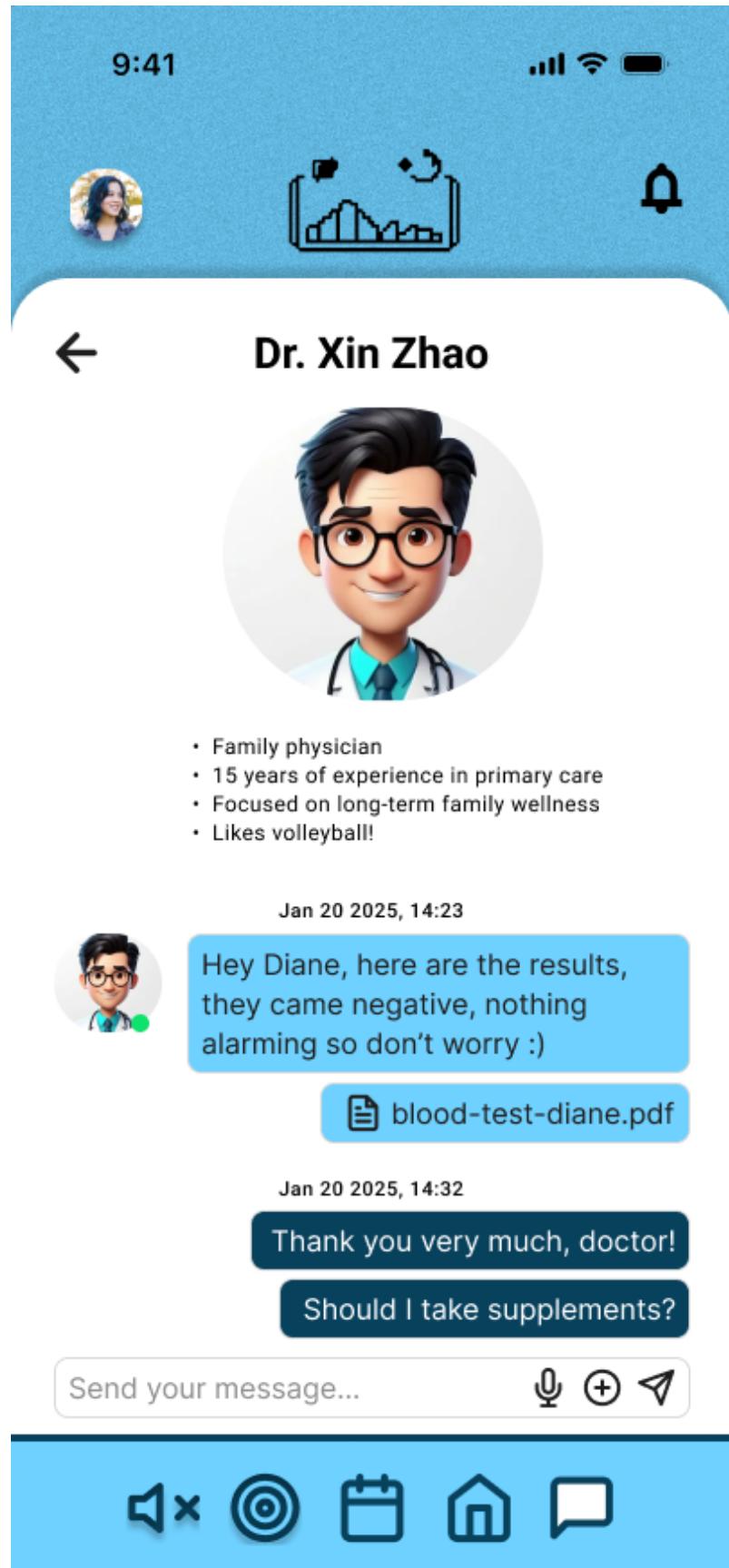


Figure 16: Sent the message

4.3 Visual research

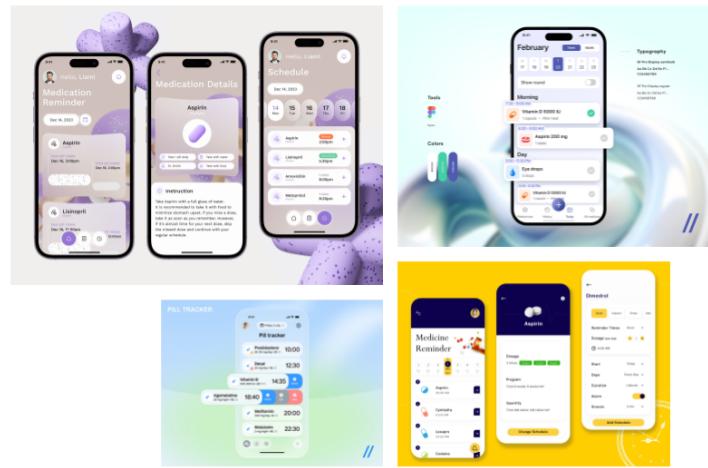


Figure 17: Inspiration part 1 [9] [8] [11]

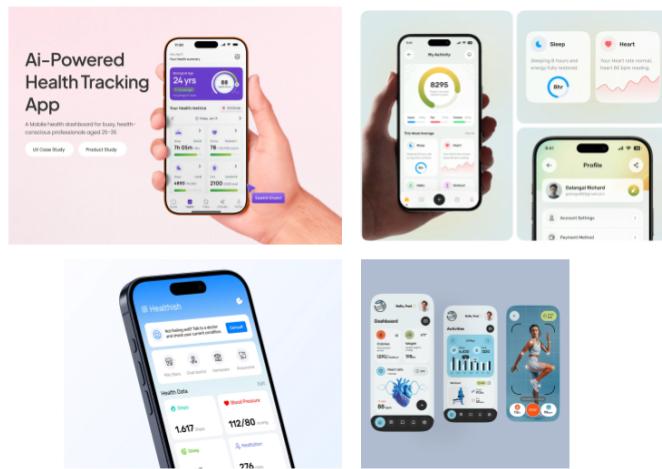


Figure 18: Inspiration part 2 [4] [5] [7] [6]

4.4 Color palette

This colour palette contains carefully chosen colours: the white is for the cleanliness of health institutions, the light-blue as the primary is also a well-known colour in healthcare, and it is for familiarity; the dark blue is chosen for accentuations and is a darker shade of the light-blue used as a secondary color.

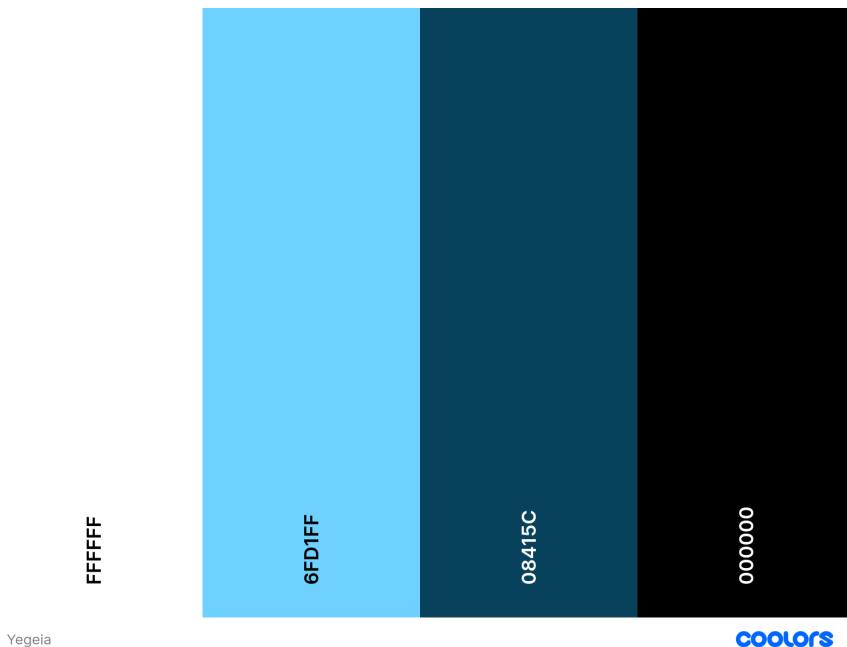


Figure 19: Colour palette generated in Coolors

4.5 Typography

For the application's typography, I chose Roboto as the primary typeface because of these reasons:

- Readability: it's a sans-serif designed for mobile platforms, it offers high legibility, which is important for users who might have accessibility issues.
- Professional: it looks professional and trustworthy, which is important if I want users to take this seriously.

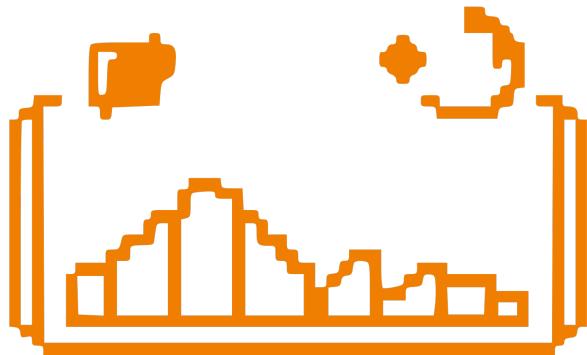
Professionalism and Trust: The font's geometric yet approachable nature strikes a balance between a professional medical tool and a friendly personal assistant.

4.6 Icons & Illustrations

The icons are from the default set from Figma's Simple Design System, I wanted to use Font Awesome, but you need the premium version of Figma to be able to use the developer mode.

4.7 Naming & Logo

The app's name is "Yegeia" from Greek language "ygeia" and it means "health". The logo is a graph with a sun and moon, meaning it tracks your health life from day to night. Logo used to be orange, but now is black for aesthetic purposes.



Yegeia

Figure 20: Logo

4.8 Animation

The animations are mostly faded and "smart-animation" from Figma which is basically the same thing as "morph" on PowerPoint, it looks for similar forms and "morphs" it onto the next screen.

5 Usability testing

To validate my design, I made a targeted usability test to ensure the interface was intuitive for a first-time user.

5.1 Test objective

The goal was to determine if a user could successfully navigate the app to add a new medication (Omega-3) using the primary action button without guidance.

5.2 The defined task

I chose my dad (60 years old) as a tester because he has chronic cholesterol, and he takes pills for that. I presented my dad, who has low tech literacy, with the following scenario:

- "Dad, you have just started taking a daily Omega-3 supplement. Try to use the app to add this to your reminder list so you don't forget to take it every morning at 9:00."

5.3 Observations

During the test, I looked at two things:

- Did my dad successfully access the pill reminders section despite the confusing icon?
- Did he figure out how to add a pill once he's on that page?
- How much time did it take for him to figure out?

5.4 Results

My dad struggled to find the "Pill reminders" section until I gave him a few hints, like "think of how you plan events." However, once he was on the right page, finding the "Add" button was very fast and efficient. It was likely because it was right near his thumb and centered alone at the bottom of the screen. While he found the button in only 5 seconds, he still needed a lot of guidance to actually complete the process of adding a pill. Overall, it took him about 2 minutes just to figure out how to access the section in the first place.

I think this is way too much time, but I repeated the test with two friends of mine (both 22 years old), and they both figured out how to access and add a pill in less than 30 seconds. What took them the most time was finding the pill section, but I think it is understandable, and I knew it could have been misleading. I felt this was way too much time, so I repeated the test with two friends (both 22 years old). They both figured out how to access the section and add a pill in less than 30 seconds. Just like with my dad, the part that took them the most time was finding the initial "Pills" section in the navigation. I think this is understandable, as I knew the placeholder icon I used could be misleading.

6 Reflection

6.1 Future features

I'm planning to add a search section where users can find health resources, such as podcasts or short videos tailored to their interests. While this would eventually require a backend to function, that's currently out of scope for this project.

6.2 UI components vs efficiency

During the process, I hit a snag between designing for the prototype and designing for efficiency. I struggled to get the navigation bar to work as a single component. I wanted the icon for the "active" page to change colour automatically on each screen, but any change I made would apply to every instance across the entire project.

I experimented with "component variants", but I couldn't quite get them to behave the way I needed for the prototype. To keep things moving, I decided to create a unique navigation bar for each screen. It's a bit of a workaround, but it got the job done for this version!

6.3 Learnings

I've really levelled up my research skills during this project. I learned how to digest academic papers more efficiently, like starting with the abstract and conclusions before diving into the methodology to truly understand the study.

On the design side, I touched Figma for the first time. I used to design interfaces in Canva or just sketch them out on paper, but since I needed a functional, clickable prototype, I did some digging. While I value open-source options like Penpot, it felt a bit buggy and less polished compared to Figma, which is currently the industry leader over Adobe XD. I decided to go with the tool the pros use because I think it will be helpful for me in the long-term to get familiar with Figma.

I also explored many UX fundamentals for the first time:

- User flow charts: I'm proud of my first attempt at mapping out the logic of the app
- Storyboarding: this was incredibly insightful for visualizing exactly how a user interacts with the product in real life
- User personas: creating these helped me design for a specific audience rather than just myself

Overall, this project helped me understand the general idea of the entire lifecycle of an app's development.

7 Demo

The demo is on YouTube through this link: [Demo video](#)

The prototype can also be interacted on Figma: [Figma prototype](#)

The hosting of the report is done through GitHub: [PDF hosted on GitHub](#) (repo will be private after this semester)

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