

AN-Najah National University



Faculty of Engineering & Information Technology
Computer Engineering Department

Software Graduation Project

Little.
Steps

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Disclaimer statement

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Abstract

For first-time mothers, the transition to motherhood can be challenging and stressful. With the help of this project, new mothers will have access to a useful resource for information, direction, and assistance in caring for their infants. It gives them the confidence they need to face the difficulties and unknowns of early motherhood. In this project we have covered the following aspects: -

Newborn Care: Providing guidance on sleeping, medication, growth and overall health monitoring for newborns.

Appointment scheduling: Calendar view for recording vaccination schedules and doctor appointments. Reminders with notifications and email.

Community Engagement: Facilitating connections among clinics and mothers through chatting.

Articles and Resources:

- Library of articles, blogs, and resources on various parenting topics.
- Search functionality and categorization for browsing content.

Before gathering requirements and prioritizing features, the application and website development process entails extensive planning and research to establish project goals and comprehend customer demands. It is imperative to first design the user experience and visual aesthetics before proceeding to development, in which frontend and backend components are created with necessary technologies. Before the application is deployed to production environments, testing verifies that it operates as intended. For both the application and website, we will be using Flutter language, Node.js framework, and MongoDB as the database.

While there are many websites and apps that provide advice and assistance to new parents, each one may have certain features and areas of concentration.

1. Introduction

1.1 Statement of the problem.

Taking care of new babies can provide major serious difficulties for new mothers, particularly in the critical first two years of an infant's life. These difficulties may comprise, but are not restricted to:

Healthcare Guidance: Obtaining trustworthy information about diet, developmental milestones, and newborn healthcare.

Lack of information: new mothers face the problem of limited knowledge about postpartum care.

Community Support: Seeking advice and emotional support from experienced people and mothers' parents.

For the sake of the mother's and the baby's wellbeing, these issues must be resolved. Thus, the creation of "Little Steps," an application and website devoted to assisting new mothers, seeks to offer a complete answer.

1.2 Objectives

The main goals of our application "Little Steps": -

- 1- To Improve Parental Confidence: By giving moms the ability to take care of their babies by providing them with resources and necessary information.
- 2- To Promote Community Involvement: the platform will help mothers easily interact with medical areas and specialists where she can ask for help and assistance.
- 3- To facilitate Mother's Schedules: A new mother who is all her time is for her new child may not remember or be able to list her appointments and tasks by herself. This application will be developed to address this issue and save mother's time and effort.

1.3 Scope of the work

The following essential elements are included in the "Little Steps" project's scope:

Creation of Mobile Application: We ensured to create a user-friendly, cross-platform mobile application that works with both iOS and Android operating systems. The app included:

An interface that is simple to use and navigate between screens.

Sections on monitoring child health, growth data, medicine intake, vaccination appointments.

Sections with advice on healthcare, parenting, and mother activities.

Push notification integration for reminders and updates on time.

Creation of a website: To go along with the mobile application, a responsive website should be built. The website will have the following features: admin management of the system, extra flexibility for adding, updating and deleting of clinics, with both mothers and clinics access on the same features of the app and permissions.

Testing and Iteration: Carrying out comprehensive testing stages to make sure of the website's and the app's security, usability, and functioning as intended. There will be continuous changes based on testing outcomes and user feedback.

1.4 Significance of our work

Because our project has the potential to improve the lives of new moms and their children, it is extremely useful. The importance of this project is highlighted by the following:

Because our study has the potential to improve the lives of new moms and their infants, it is extremely important. The importance of this attempt is highlighted by the following points:

Assisting New Mothers: For first-time mothers in particular, acclimating to parenthood can be rather demanding. "Little Steps" offers a safe space where moms may get trustworthy information, ask for guidance, and get in touch with medical clinics specialized in this field. This network of support is essential for reducing fears and increasing parental self-assurance.

Improving Parenting Skills: "Little Steps" seeks to provide parents with the fundamental information and abilities they need. Parenting is a learning process. The app offers helpful advice on anything from appointment schedule management to health monitoring strategies that improves parental effectiveness and lowers the stress caused by uncertainty.

Accessibility: Regardless of their background or location, all moms are to be able to participate in this platform. "Little Steps" makes sure that moms can easily access assistance and information, especially in places with limited access to traditional healthcare providers, by providing a mobile app and a flexible website.

1.5 Organization of the report

This report is divided into several sections. a project overview provided in the introduction. The second section describes the limitations, norms/codes, and previous coursework. The third section talks about earlier research. The results are presented in the fourth section, and a discussion of the findings is covered in the fifth. In the end, the conclusion summarizes the key points of the paper and makes suggestions for additional research. Furthermore, the project's references are provided.

2.Constraints, Standards/ Codes and Earlier course work

2.1 Constraints

Compatibility requirements: Because hardware and software configurations vary, it might be difficult to guarantee compatibility across various devices (such as smartphones and tablets) and operating systems (such as iOS and Android).

Content management: To guarantee relevance and accuracy for consumers, the curation and upkeep of high-quality, current content demands constant resources and efforts.

Scalability: Making plans for future scalability to support an increasing number of users and the addition of new features without sacrificing user experience or performance.

2.2 Standards /Codes

Reliability, security, and usability are ensured when we create our application and website in accordance with recognized standards and codes. Important rules and regulations that shall be adhered to are as follows:

Usability and ease of navigation for all users, even those with less technical skills, are ensured by adhering to best practices for intuitive and accessible user interface design.

Data Security and Privacy: Ensuring user information is protected by putting in place procedures like using the JWT authentication.

Accessibility: By implementing Web Content Accessibility Guidelines, the platform is made keyboard navigable and compatible with screen readers for users with disabilities.

Software Development Standards: Complying with best practices recommended by the industry for software development, such as version control and testing techniques

2.2 Earlier Coursework

The information and abilities we had gained from our earlier coursework came in very useful when it came to developing the app and website successfully. Our strategy and the way we made decisions were greatly influenced by ideas like database management, web developments, and software engineering courses. We are quite proud of the fact that, in spite of the early limitations and difficulties, we were able to use free online tutorials, resources and self-learning methods to create the website and mobile application.

3. literature review

“Baby Date: a mobile application for teaching nursing care to newborns in primary care “

To improve nursing education on newborn care in primary care settings, (Carvalho et al., 2024) developed and validated the "Baby Date" mobile application. Based on an Instructional Design framework and incorporating information from a thorough literature review, the authors used Android Studio and IntelliJ IDEA to develop a comprehensive digital tool. A physical examination, neonatal screening, nutrition, dental health, immunization schedules, growth and development, danger indicators, and accident avoidance are just a few of the subjects covered by the application's 67 screenings, which are divided into 12 parts. Nursing students gave navigability a positive rating, and expert validation validated strong content validity (CVI = 1.00). The app allows for flexible study at any time and from any location. (Carvalho et al., 2024)

“A Newborn Baby Care Support App and System for mHealth”

The instructional design research and (Kuo et al., 2012) provide excellent examples of how mobile health (mHealth) technologies can be integrated to enhance baby care and education. Kuo and colleagues created a smart phone application that helps moms record and monitor the health of their newborn, with customized interfaces to improve accessibility and usability. In order to improve educational results, the instructional design project concentrated on creating a mobile application for nursing students that integrated scientific knowledge on infant care. These two studies demonstrate how mobile applications might improve maternal and newborn health outcomes by enhancing healthcare information's accessibility, usability, and education. The literature review provides evidence for the development of our project as an all-inclusive platform that aims to improve the well-being and parenting skills of new mothers during the crucial early years of their children's development by combining insights from these studies. (Kuo et al., 2012)

4. Methodology

4.1. Tools, Methods and programming languages

4.1.1. Tools



Android studio to provide emulator to test the application and sure compatibility on different devices.



visual studio code as a primary IDE for code editing and debugging.



GitHub to provide collaborative development.



Firebase for cloud storage and messaging services according to its real-time database.



Postman as API testing tool for background HTTP requests.



OneSignal to provide the notification services .

4.1.2. programming languages



Our website and mobile application developed using Dart language and flutter framework for frontend, according to their tools and widgets for building user interfaces.



And Node.js for backend programming and server side development which is suitable for robust and scalable web applications.

4.1.3. Database



In our project we used MongoDB Atlas as a cloud database service provides reliability, scalability and security.

Application tables in MongoDB:

User Table:

To Store the information of our app users: Mother, Clinic and Admin

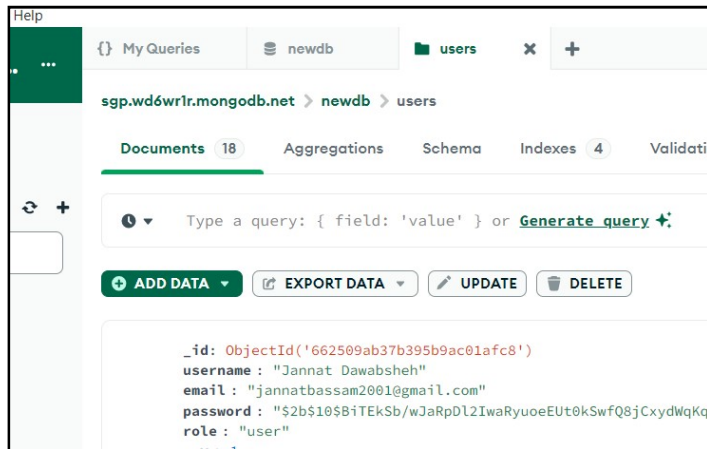


Figure 1: User Table

Children Table:

To Store the information of mother children

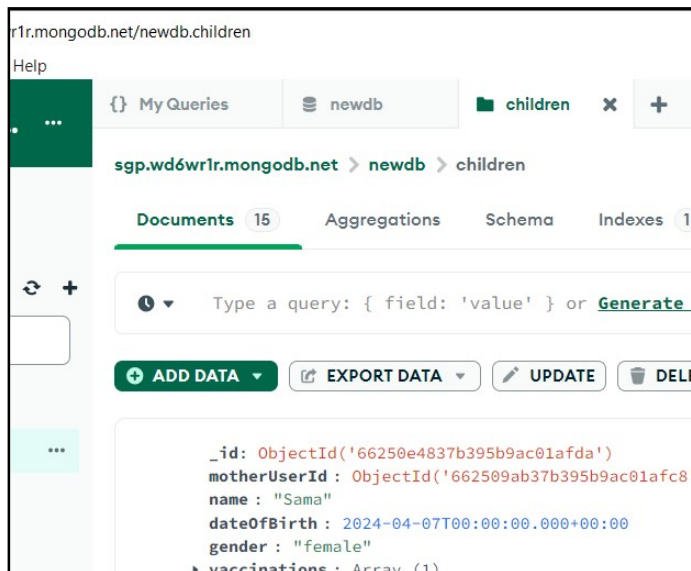


Figure 2: Children Table

Vaccines Table:

To Store all vaccines of children and suitable ages

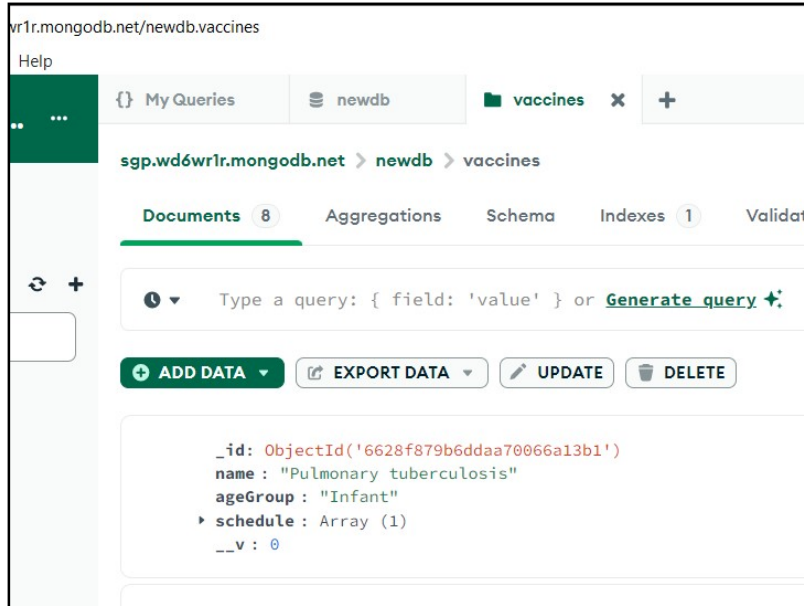


Figure 3: Vaccines Table

Prescriptions Table:

To Store Prescriptions for child with instructions specified by clinic

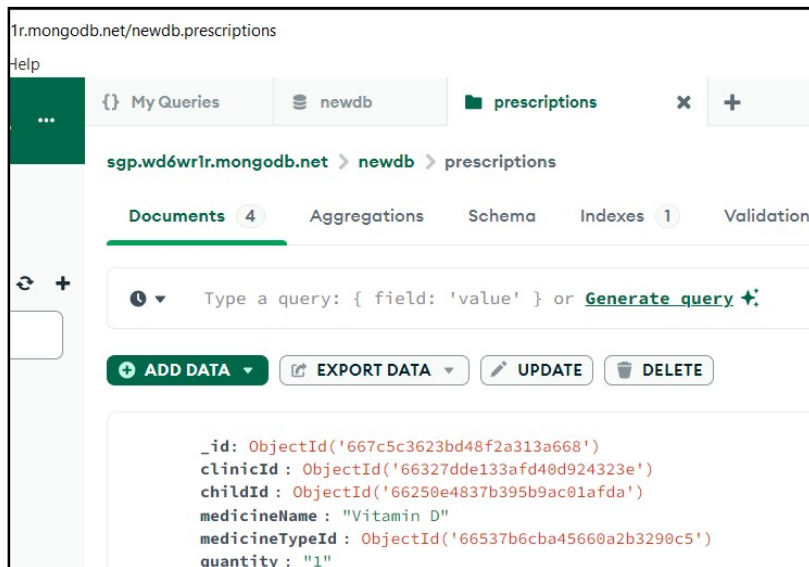


Figure 4: Prescriptions Table

Notification Table:

To Store All user notification content and manage them

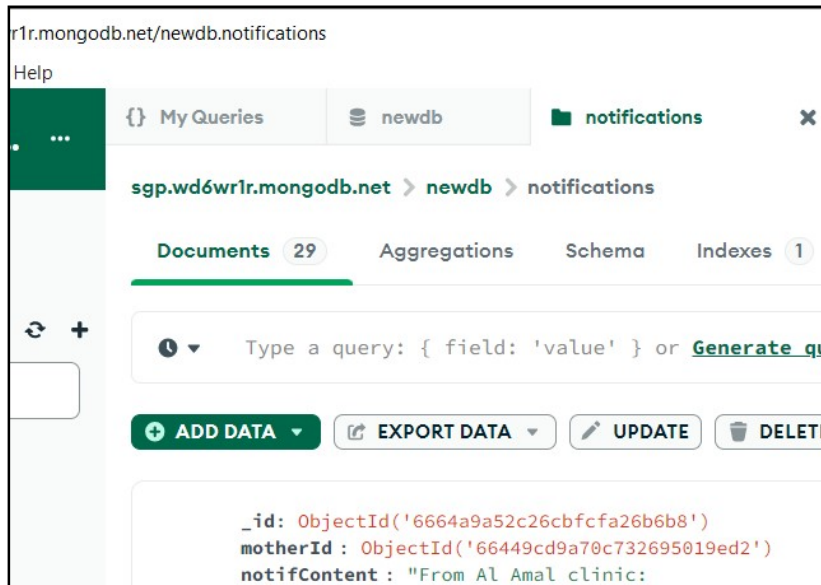


Figure 5: Notification Table

Medicines Table:

To Store all medicines types and units

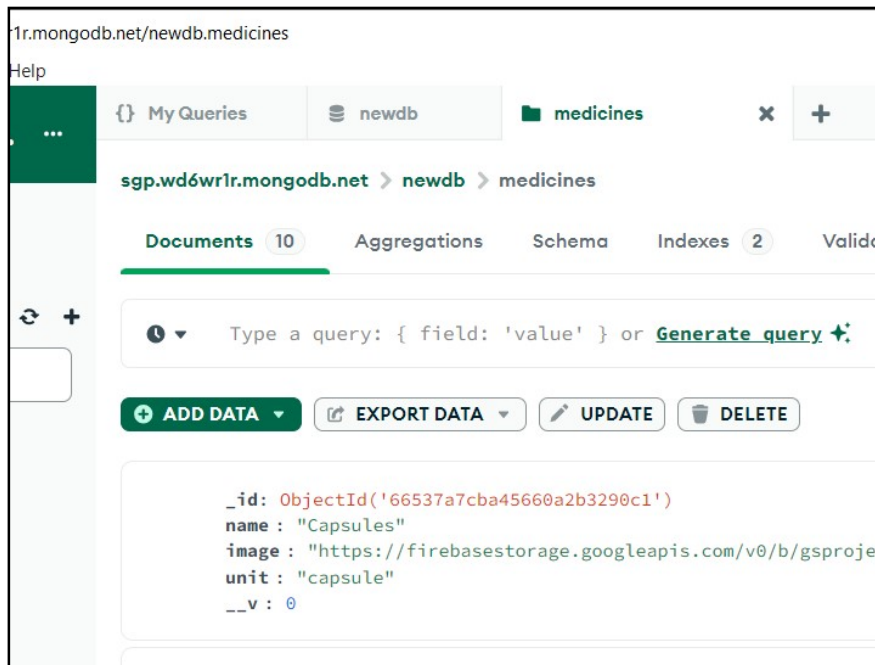


Figure 6: Medicines Table

Lullabies Table:

To Store all sleep lullabies url for child

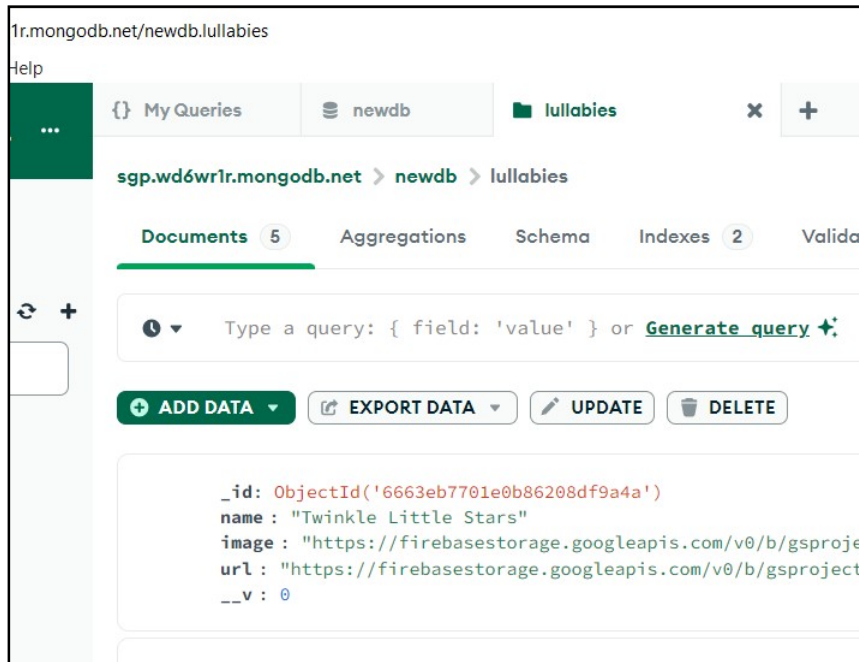


Figure 7:Lullabies Table

Help Table:

To Store all help request for admin

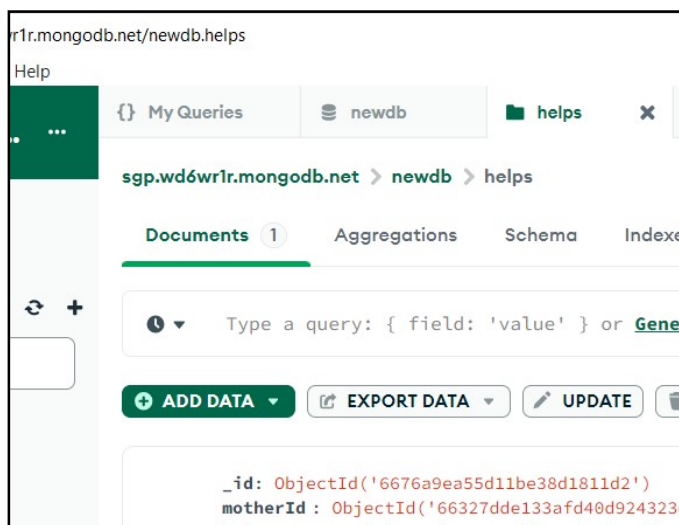


Figure 8:Help Table

Growth Table:

To Store growth data record for child in specific date

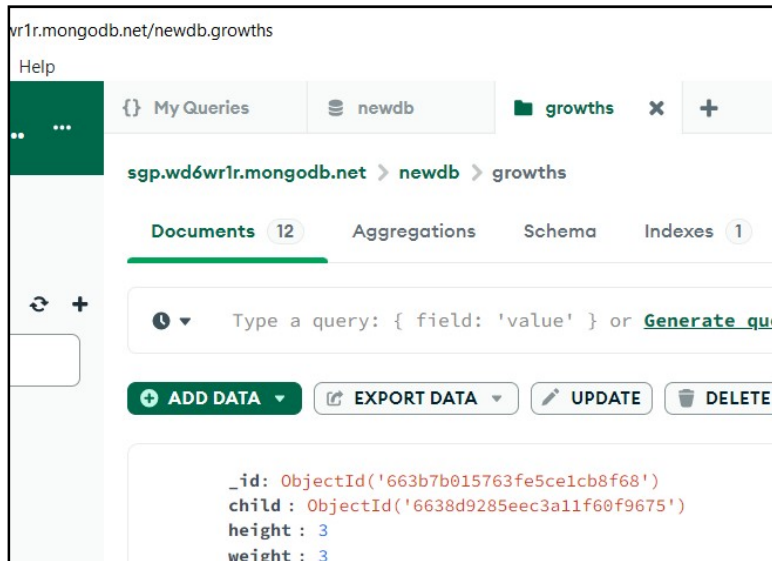


Figure 9:Growth Table

Feedback Table:

To Store all users feedback for admin

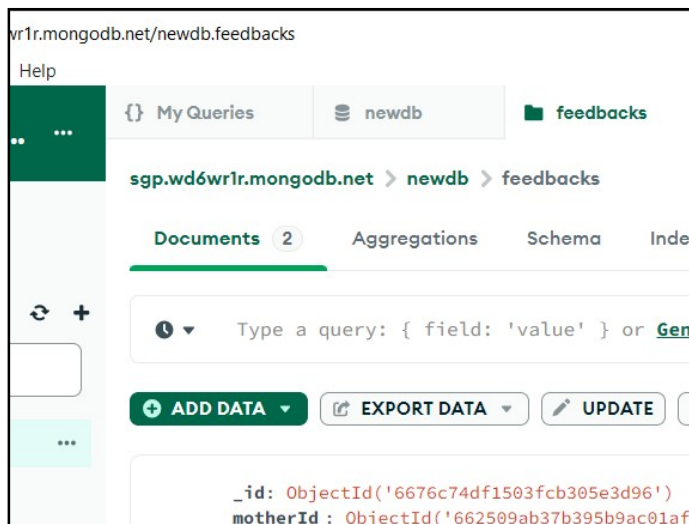


Figure 10:Feedback Table

Favorites Table:

To Store Favorites exercises for users

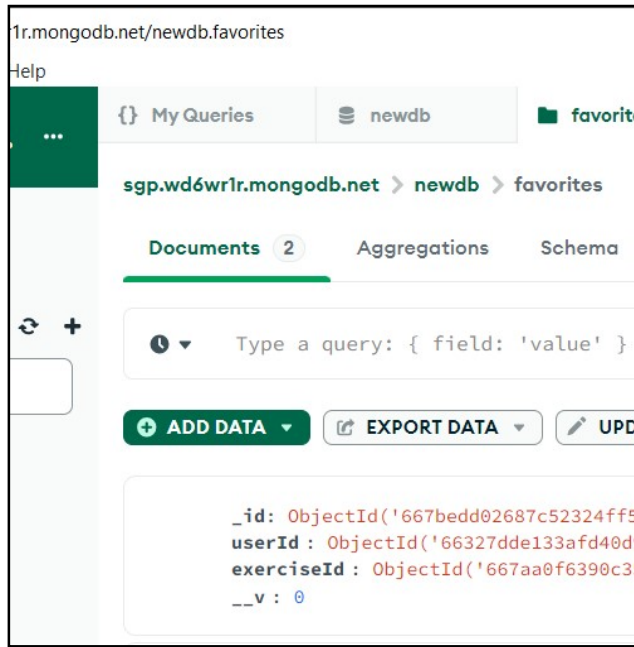


Figure 11: Favorites Table

Exercises Table:

To Store all exercises and types for mothers provided by clinic

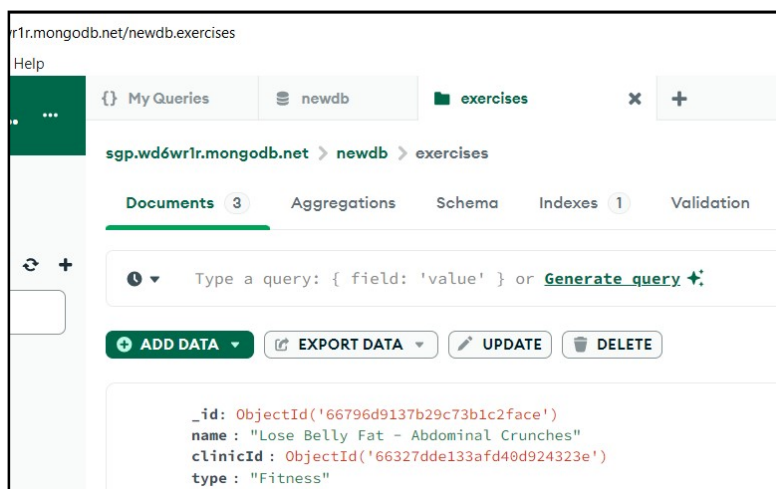


Figure 12: Exercises Table

ChildGrowth Table:

To Store the normal growth data for every children ages

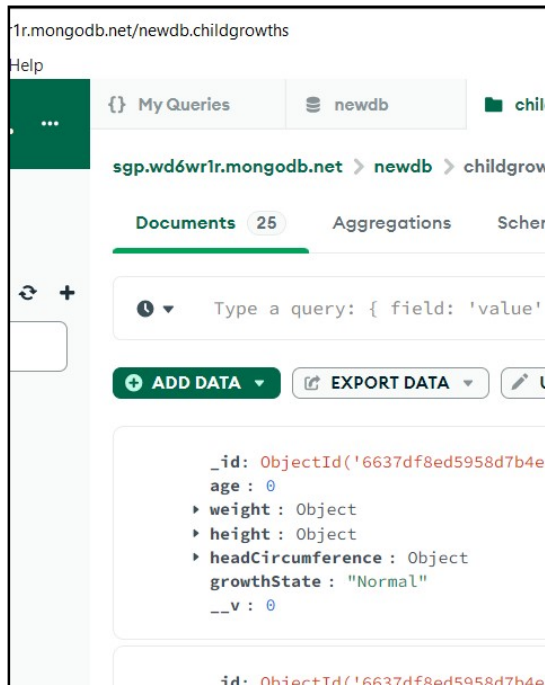


Figure 13:ChildGrowth Table

Bookmarks Table:

To Store article booked by mothers to retrieved them later

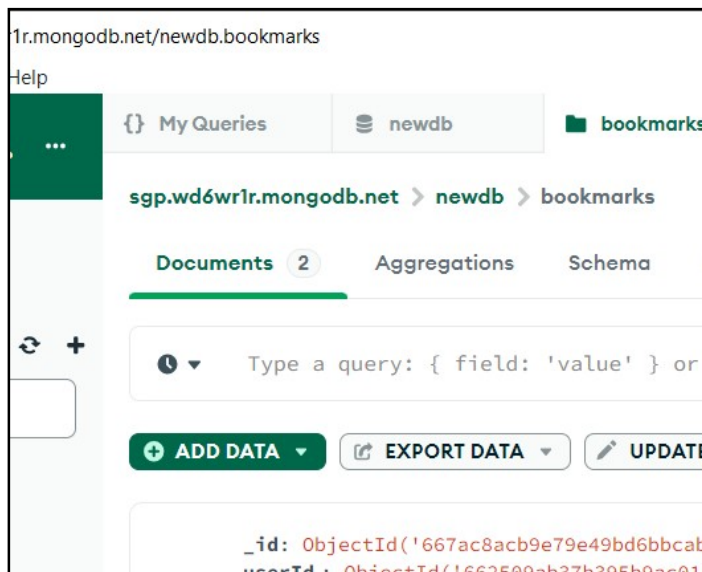


Figure 14:Bookmarks Table

Articles Table:

To Store all articles by clinic and admin

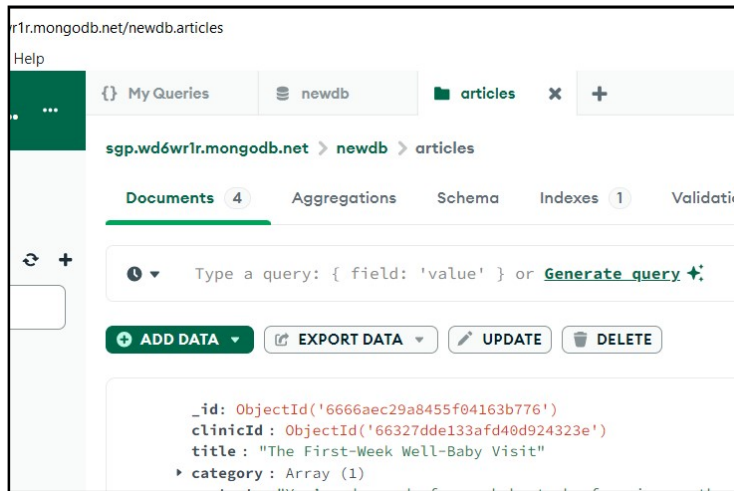


Figure 15:Articles Table

Appointments Table:

To Store appointment details for each users

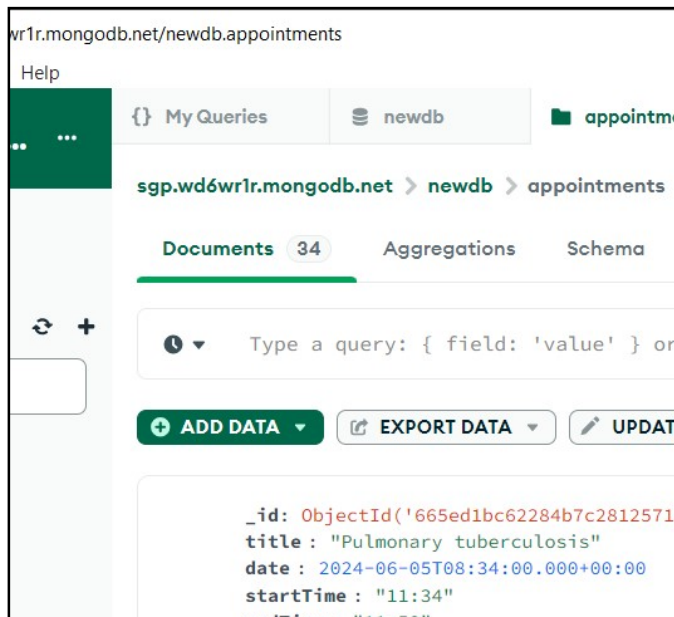


Figure 16:Appointments Table

Allergies Table:

To Store child food allergy

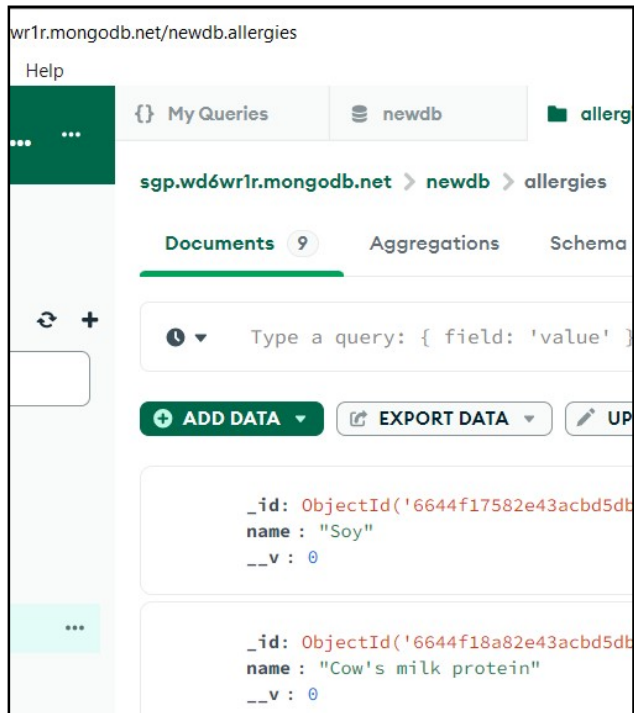


Figure 17:Allergies Table

Alarm Table:

To Store Prescriptions alarm for mother

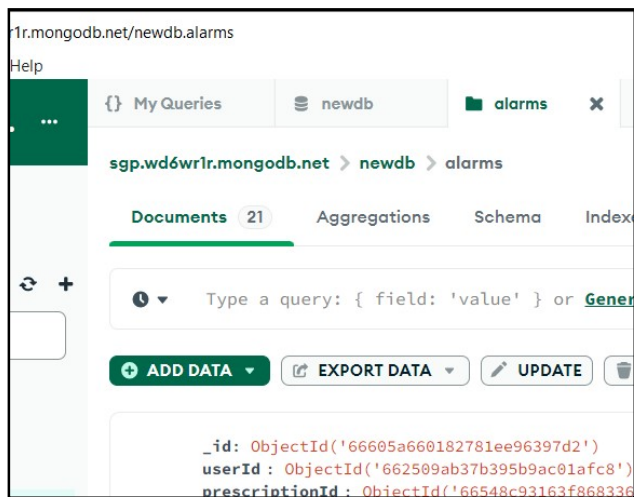


Figure 18:Alarm Table

4.2. System Features implementation

4.2.1. Mobile Application

4.2.1.1. Mothers side

Our mobile application “little steps” developed to help new mother to taking care of her child, managing vaccination appointment and child history.

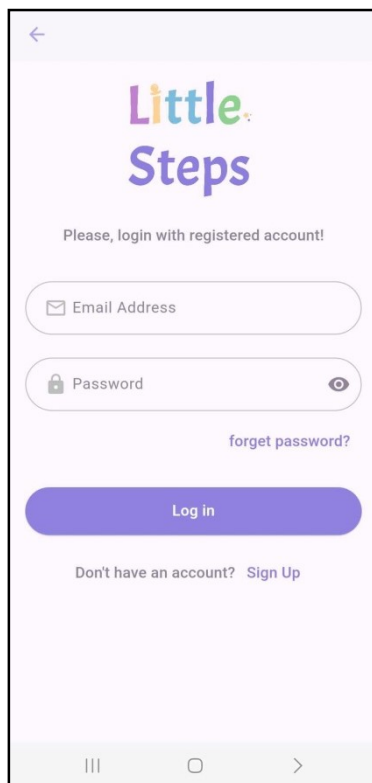
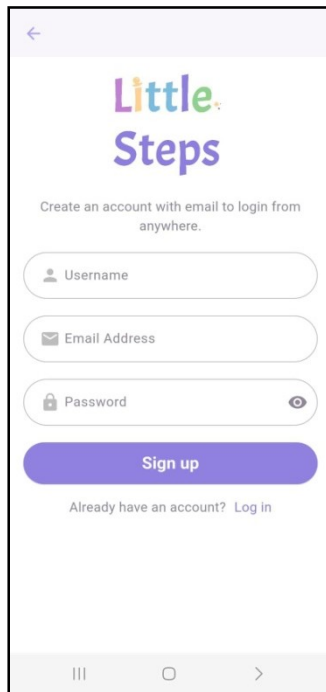


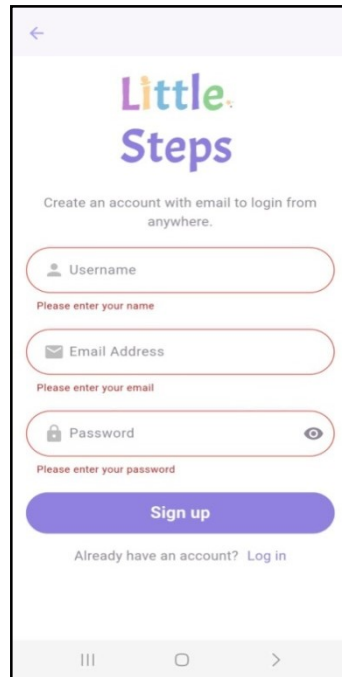
Figure 19: Mobile application

Signup page: mother can register to this app provide her name, email and password, and all this field is required:



The screenshot shows the 'Little Steps' mobile app's signup page. At the top, the app's logo is displayed. Below it, the text reads 'Create an account with email to login from anywhere.' There are three input fields: 'Username', 'Email Address', and 'Password'. The 'Password' field has a toggle icon for visibility. A purple 'Sign up' button is positioned below the fields. At the bottom, there is a link that says 'Already have an account? Log in'.

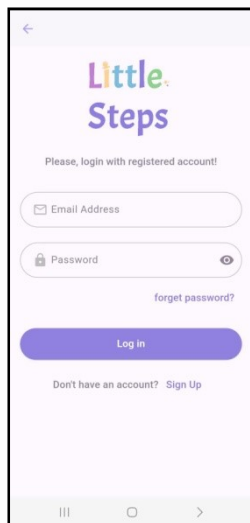
Figure 20: Mobile signup



This screenshot shows the same signup page as Figure 20, but with red validation lines around the input fields. Red text prompts are visible: 'Please enter your name' under the Username field, 'Please enter your email' under the Email Address field, and 'Please enter your password' under the Password field. The 'Sign up' button and the 'Log in' link remain visible at the bottom.

Figure 21: Text validation

After sign up correctly, mother will be navigated to login page:



The screenshot shows the 'Little Steps' mobile app's login page. The text at the top says 'Please, login with registered account!'. There are two input fields: 'Email Address' and 'Password'. A link for 'forget password?' is located below the password field. A purple 'Log in' button is at the bottom. At the very bottom, there is a link that says 'Don't have an account? Sign Up'.

Figure 23: Mobile sign in

And it received a welcoming notification:

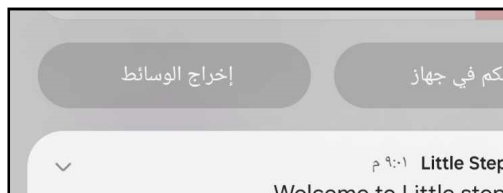


Figure 22: welcome notification

There is a forget password page , which send a verification code to user email to let him later change password:

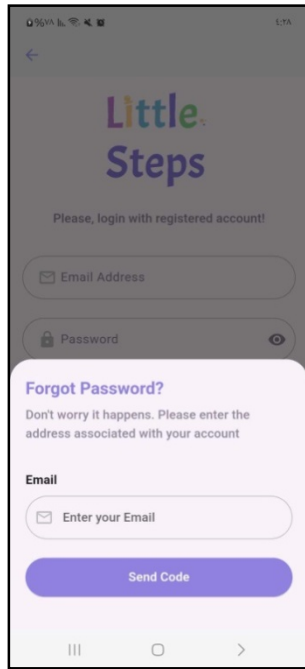


Figure 24: forget password

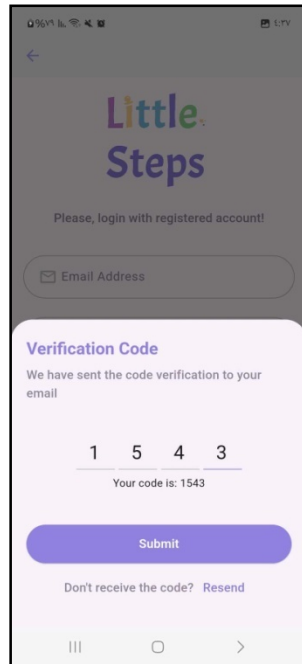


Figure 25: validation code

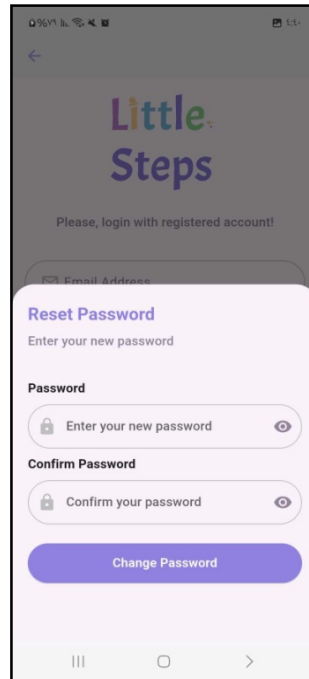


Figure 26: Reset password

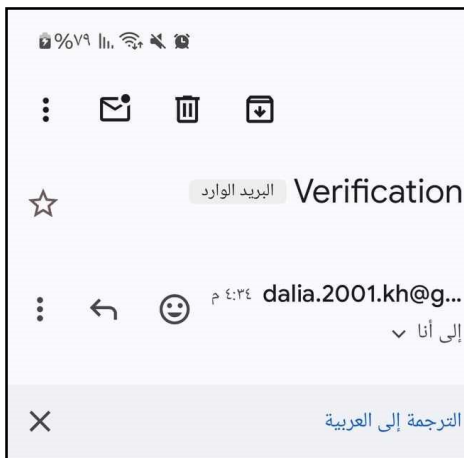


Figure 27: Email validation code

After mother login correctly she navigated to add child page if it doesn't has any child yet, or to home page if it is has one

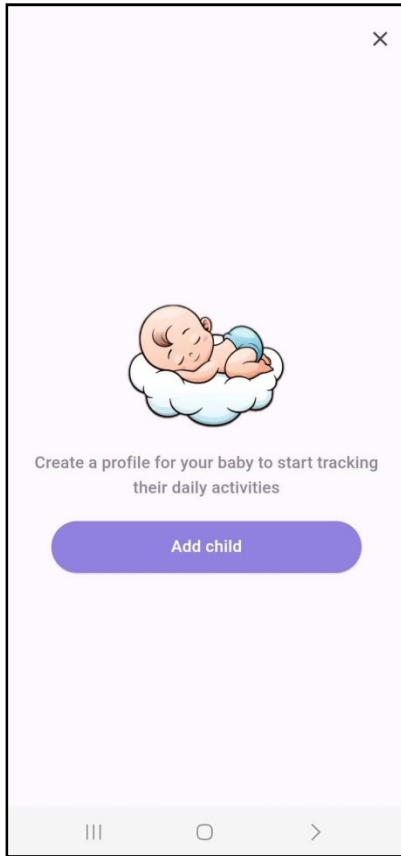


Figure 28: Mobile add child

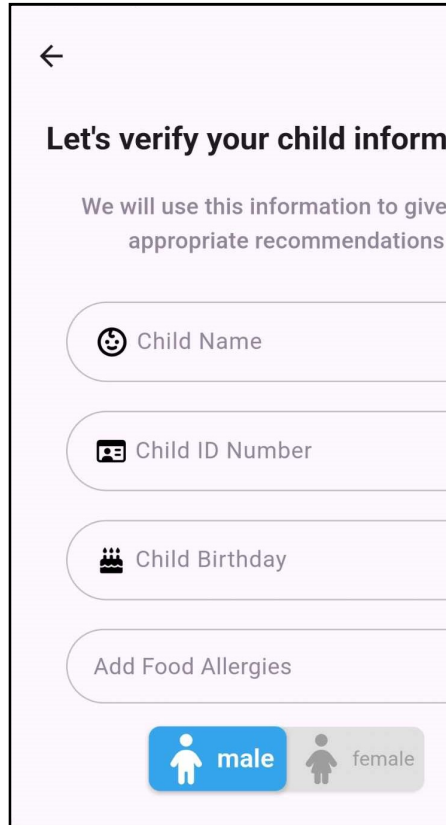


Figure 29: child information

After adding child mother will be navigated to address page to select its address or can skip this later and go to home page:

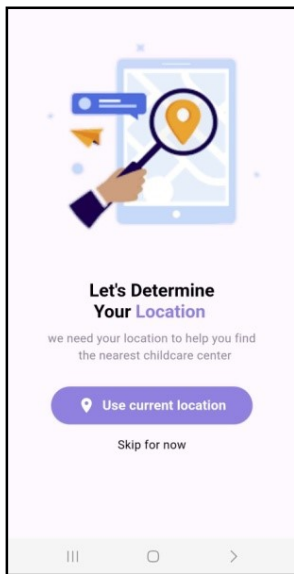


Figure 30: select address



Figure 31: map

Mother home page:

In the home page mother can see its upcoming appointment, when she pressed see all it will navigated to upcoming appointment page:

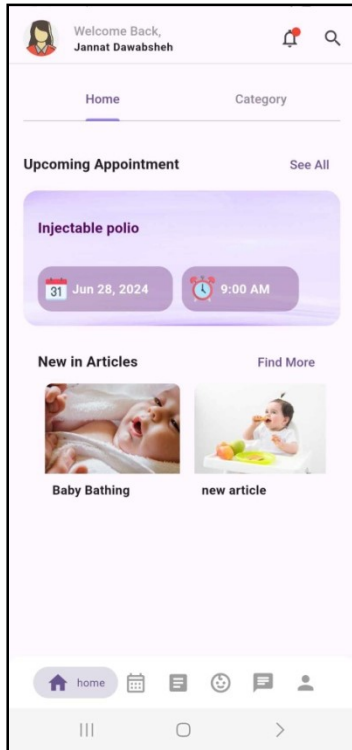


Figure 32: mother home- mobile

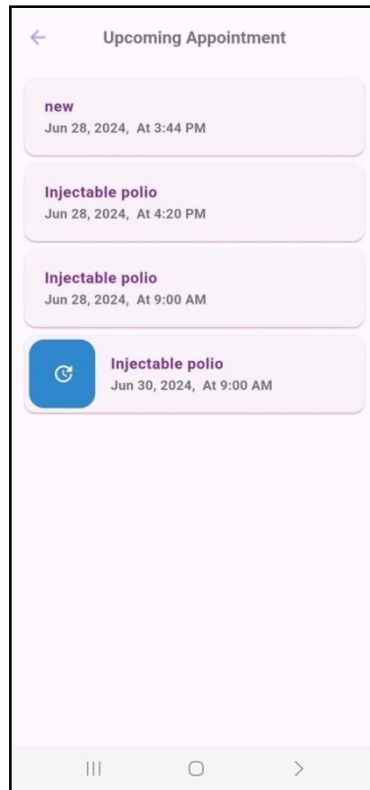


Figure 33: mother appointment-mobile

In upcoming appointment page mother can send a request to clinic that she want to change appointment, this request received as a notification to clinic:



Figure 34: request to edit notification

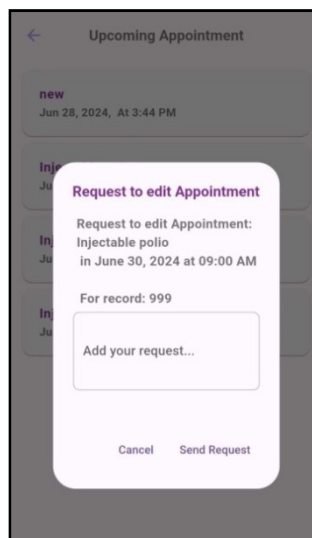


Figure 35: request to edit-mobile

From notification icon in the top:

Mother can access all appointment and messaging notifications, and can delete them by press seen:

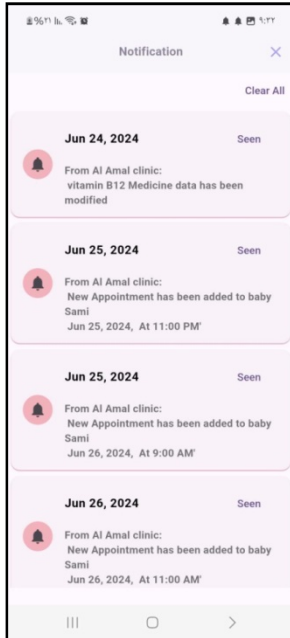


Figure 36: mother notification-mobile

Category tab :

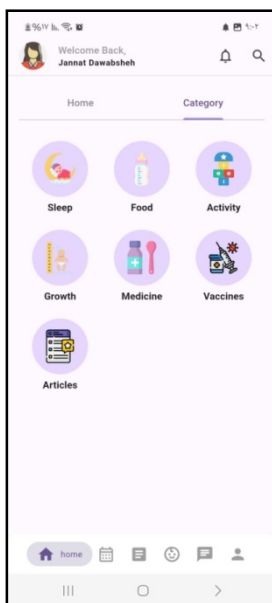


Figure 37: mother category-mobile

In sleep category: mother can hear a lullabies for his child to help him sleeping



Figure 38: lullabies list -mobile



Figure 39: lullaby-mobile

In activity category: mother can view health exercises and add them to her favourite list to save them for later:

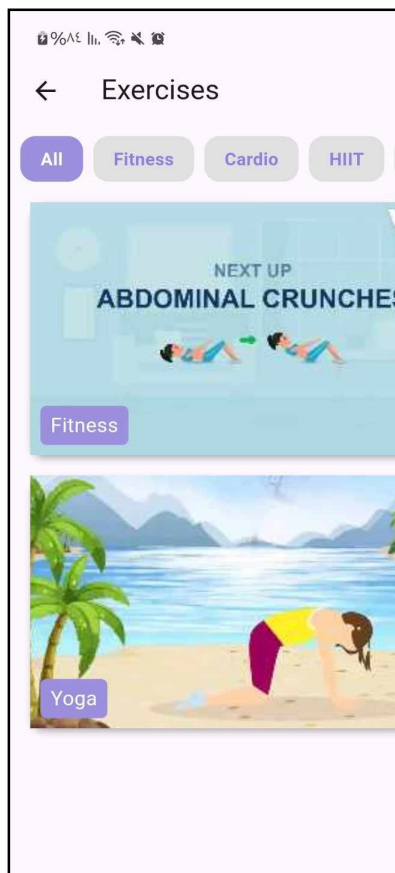


Figure 40: exercises list-mobile

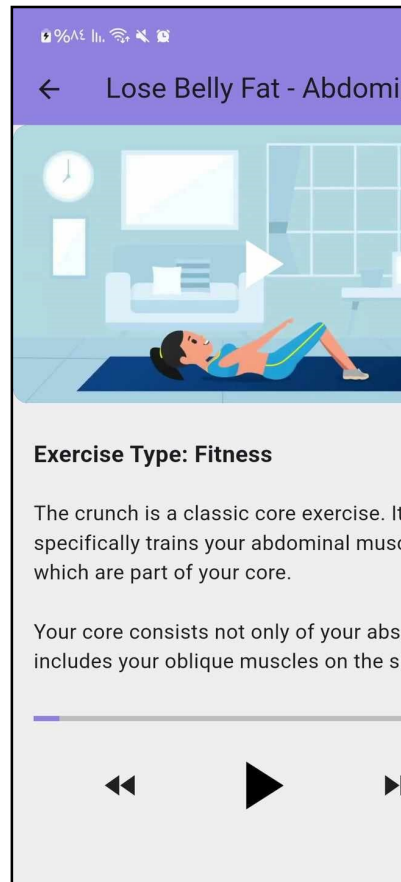


Figure 41: exercise -mobile

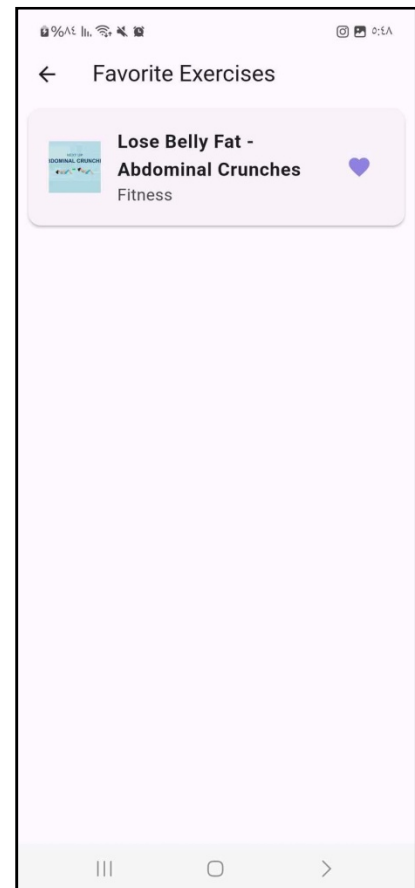


Figure 42: favorite exercises-mobile

In growth category: mother can view baby growth data with child age in this moment :



Figure 43: baby growth list-mobile

In vaccination : mother can view vaccination history, which vaccine her child tacked and which not.



Figure 44: vaccination-mobile

In medicine : mother can view all medicines added by clinics and its details and added alarms to it:

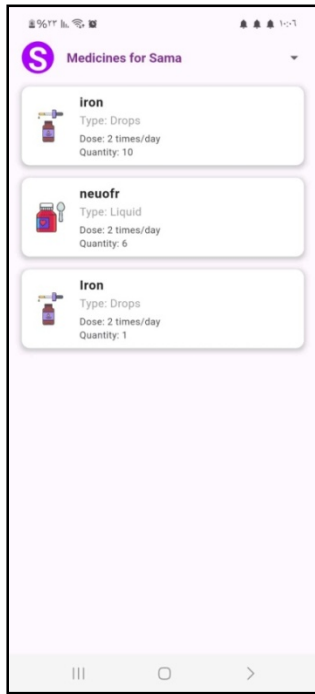


Figure 45:medicine-mobile

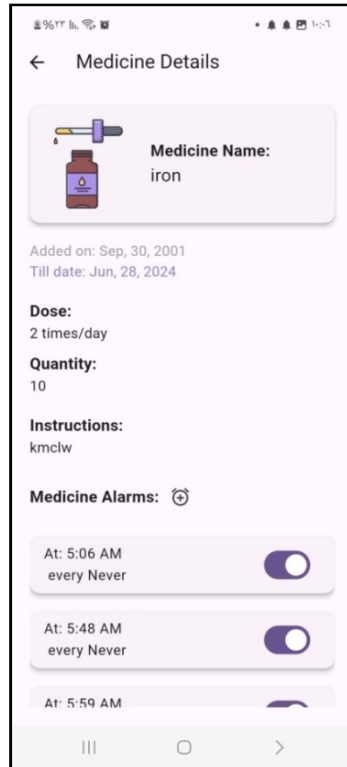


Figure 46:medicine details-mobile

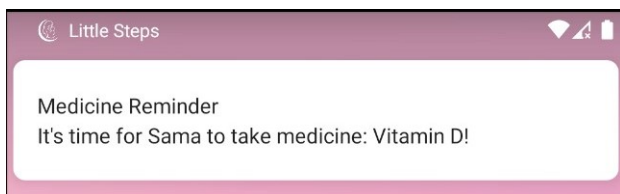


Figure 47: medicine notification

Appointment tab :

Mother can see all her appointment and details:

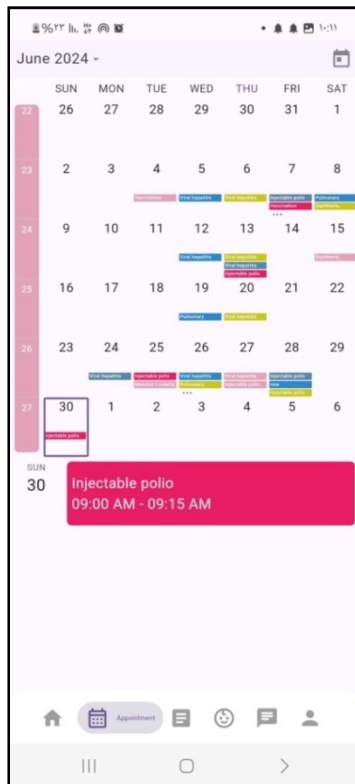


Figure 48: appointment-mobile

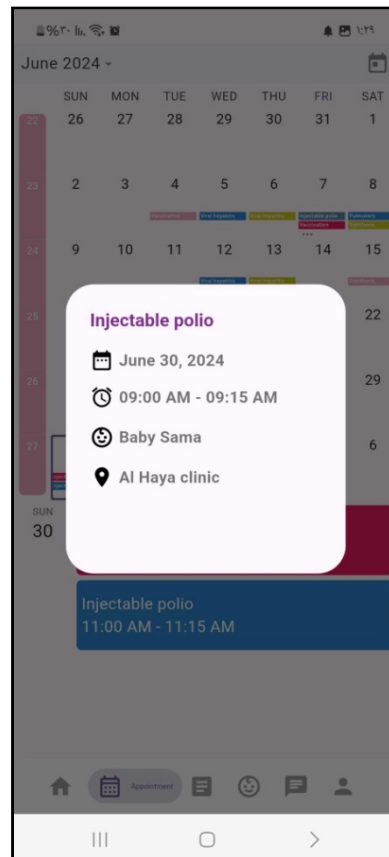


Figure 49:appointment details-mobile

Article tab :

Here where mother can view articles added by admin and saved it to read later

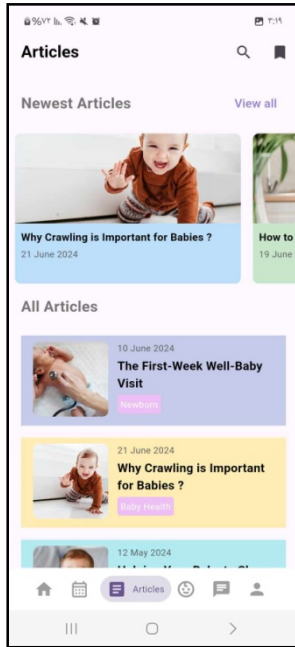


Figure 50:articles-mobile

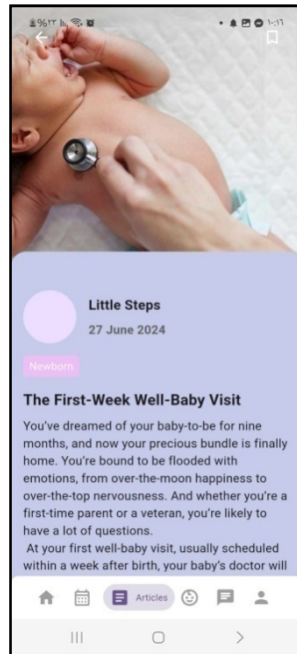


Figure 51:article details-mobile



Figure 52:saved articles-mobile

Child profile tab :

Here where mother can add allergy food for child, choose his clinic and view growth data,

Mother can choose allergy from list or add custom one, and search for clinic according to its location.

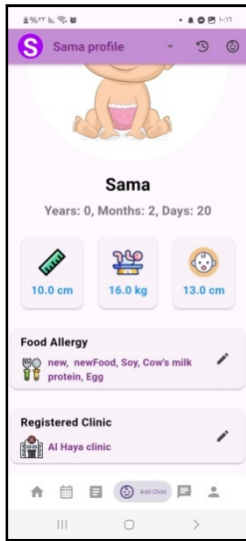


Figure 53:child profile-mobile

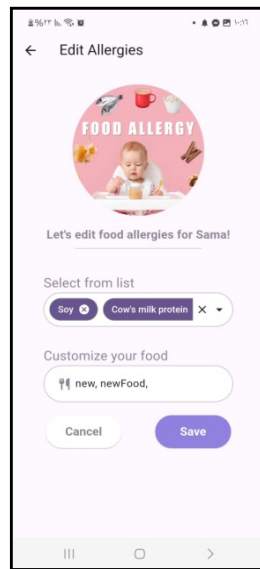


Figure 54:allergy food-mobile

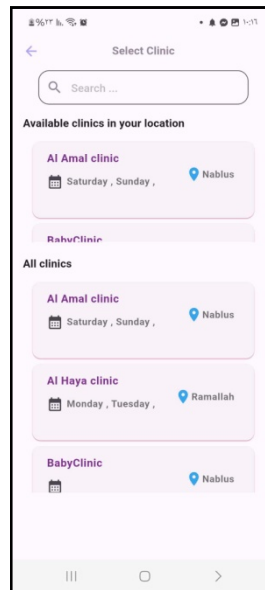


Figure 55:clinics list-mobile

messaging tab :

where mother can chat with clinics, and notification will be send to that clinic:

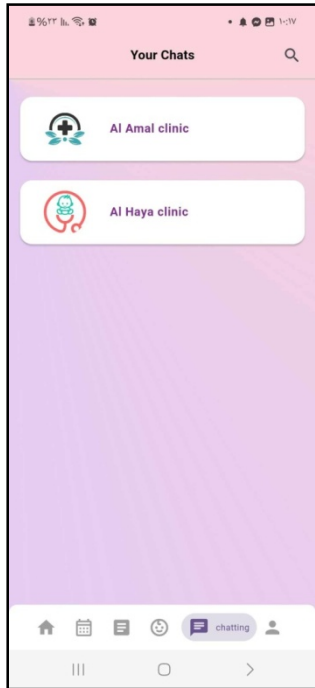


Figure 56: conversation-mobile

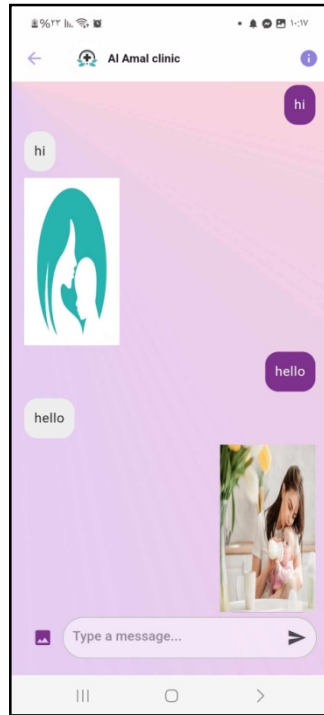
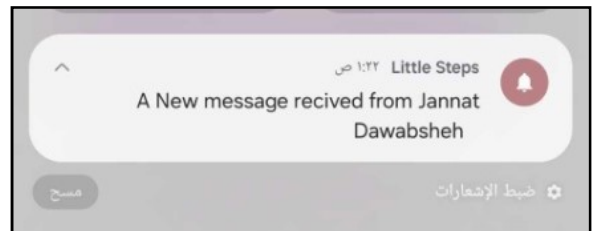


Figure 57:chat-mobile



profile tab :

Here where mother can change her information and password:

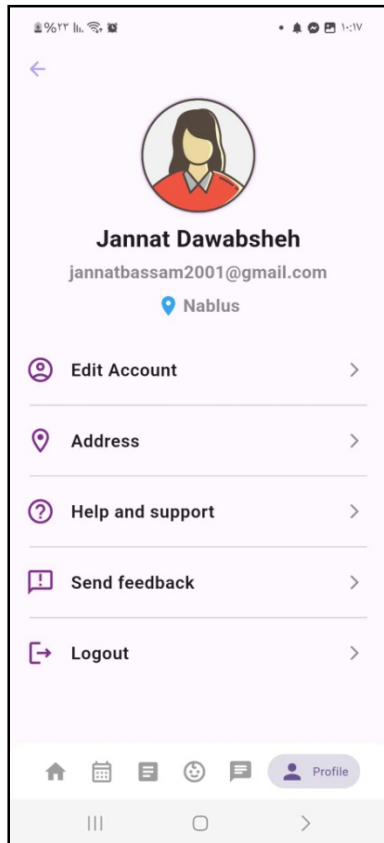


Figure 58:mother profile-mobile

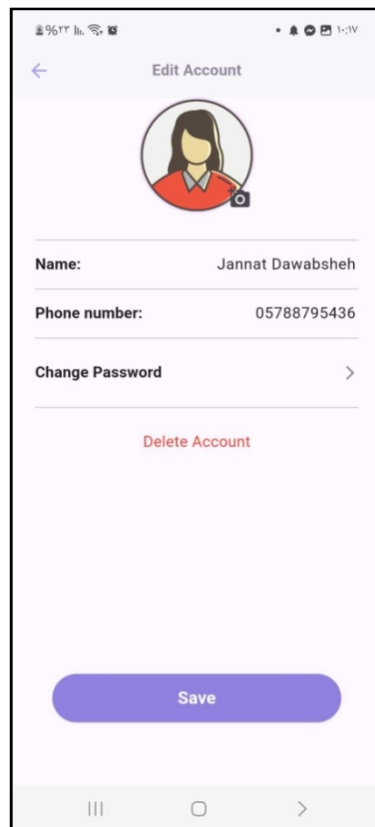


Figure 59:edit account-mobile

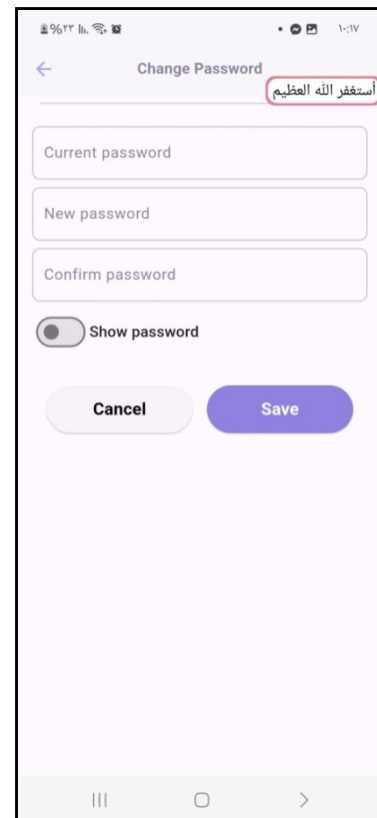


Figure 60:change password-mobile

Here where mother can send help request and feedback to admin:

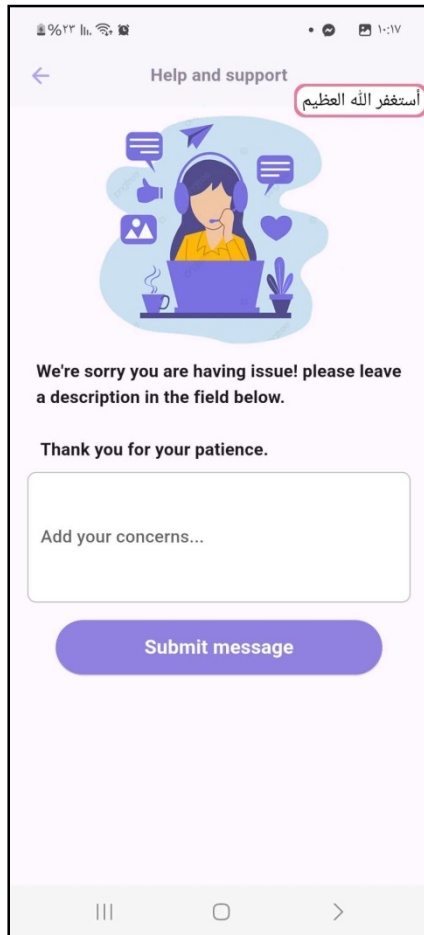


Figure 61:help-mobile

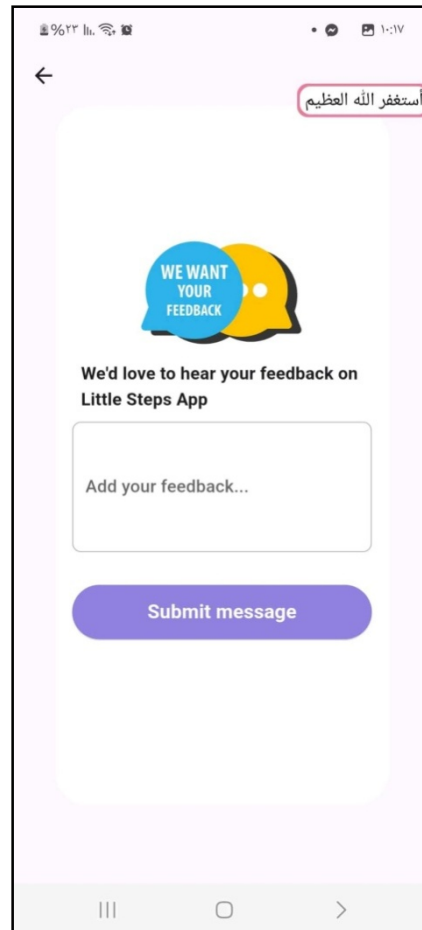


Figure 62:feedback mobile

4.2.1.2.Clinic side

Clinic account has been added by admin with initial password

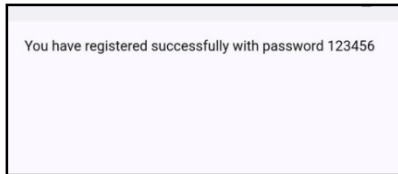


Figure 63:clinic registered email

****Note: Clinic notification and messaging pages and child growth data and vaccination history the same as mother page**

Clinic home page:

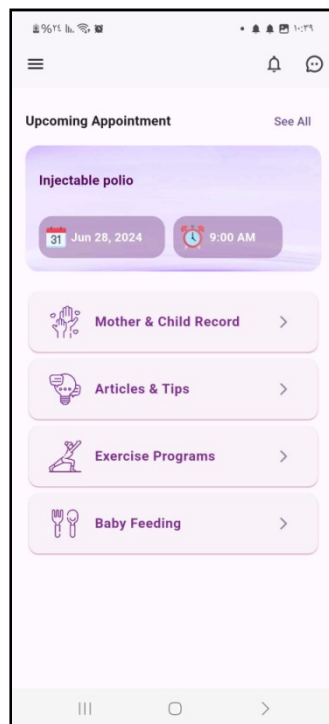


Figure 64:clinic home-mobile

Clinic category and services: clinic enter baby id record then will be navigated to:

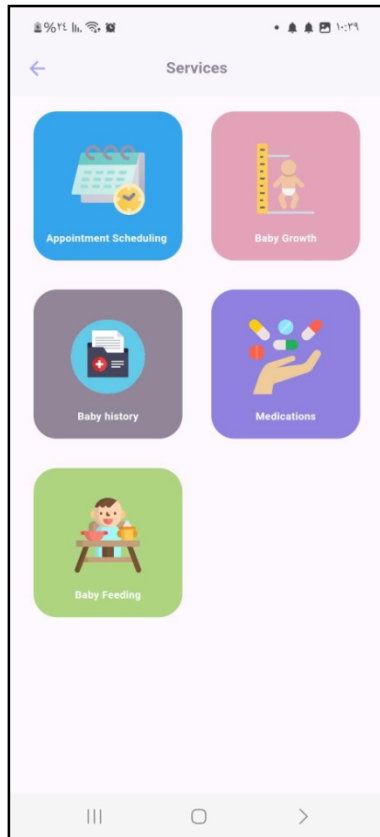


Figure 65:clinic category-mobile

Clinic appointment: clinic can add appointment to mothers and send notification when added or to remember them

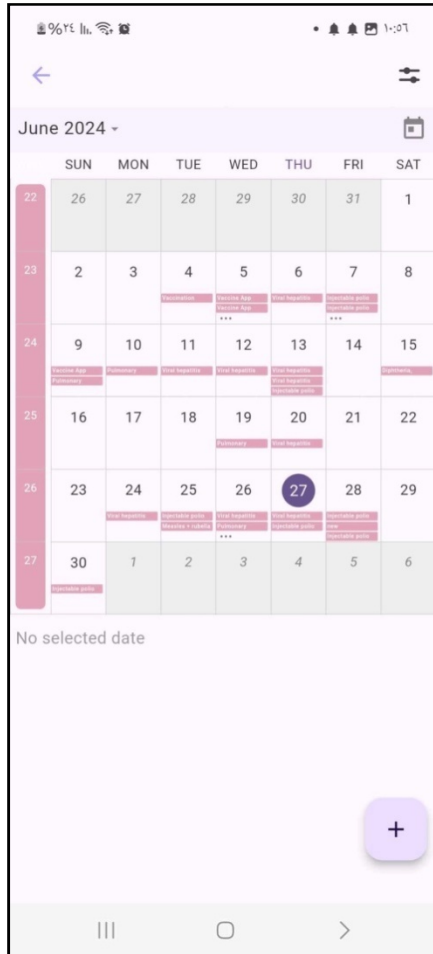


Figure 67:clinic appointment-mobile



Figure 66: add appointment notification

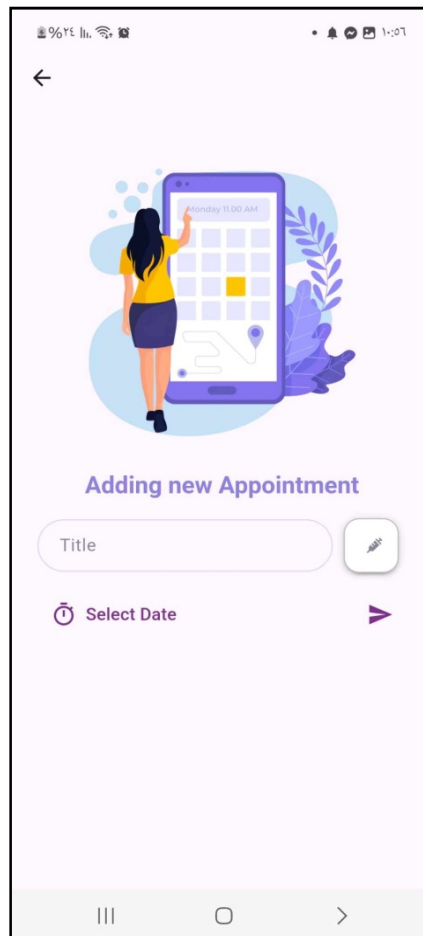


Figure 68:clinic add appointment-mobile

Clinic medication: clinic enter medicine to child with specific dose and instruction, and a notification will received mother about that:

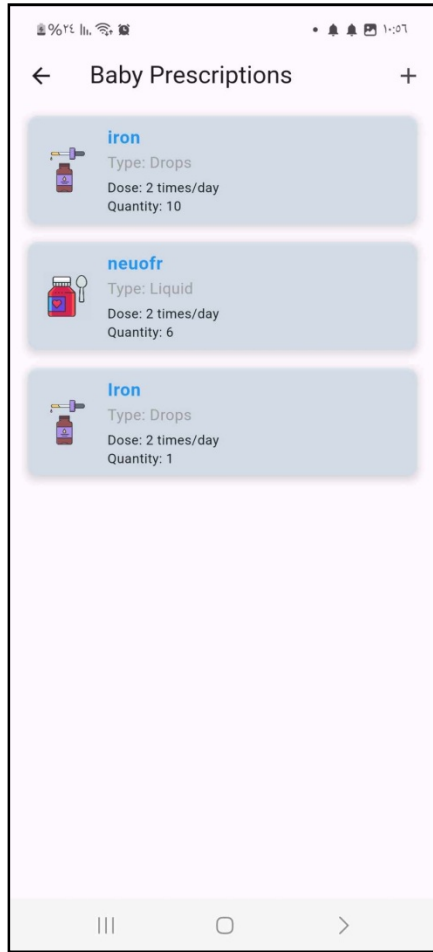


Figure 69:clinic prescriptions-mobile

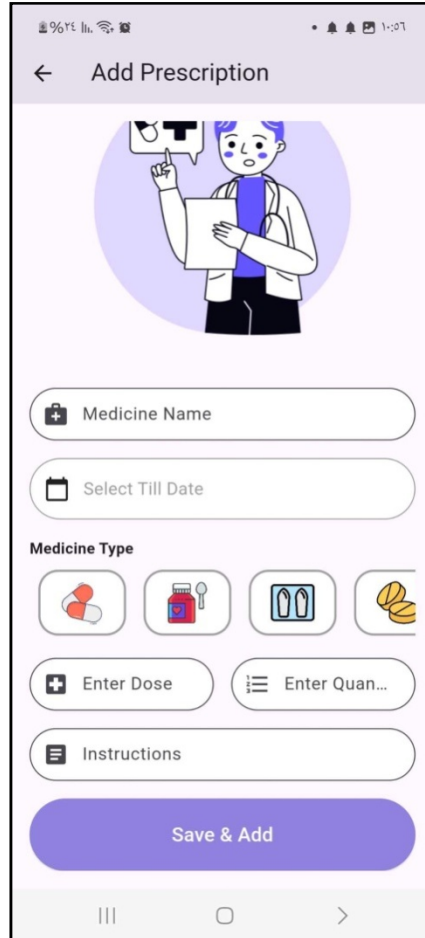


Figure 70: add prescription-mobile



Figure 71: add prescription notification

Clinic articles and tips:

Clinic can load article with specific content and category useful for mother and child

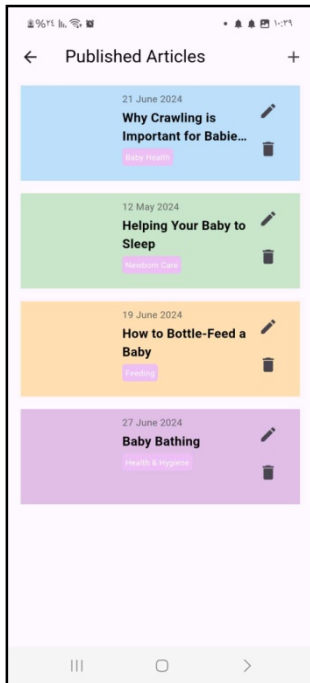


Figure 72: published articles-mobile

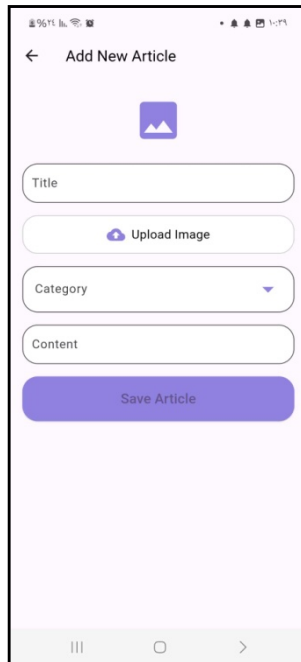


Figure 73:add article-mobile

Clinic exercises program :

Clinic can load exercises for mother, with video and description

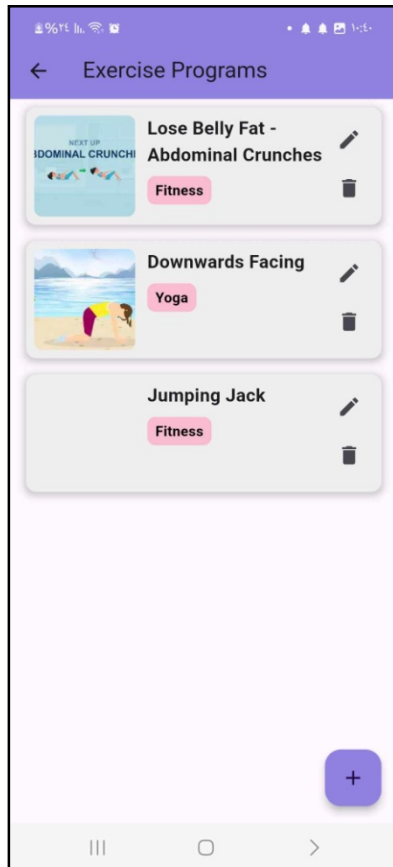


Figure 74: exercise programs-mobile

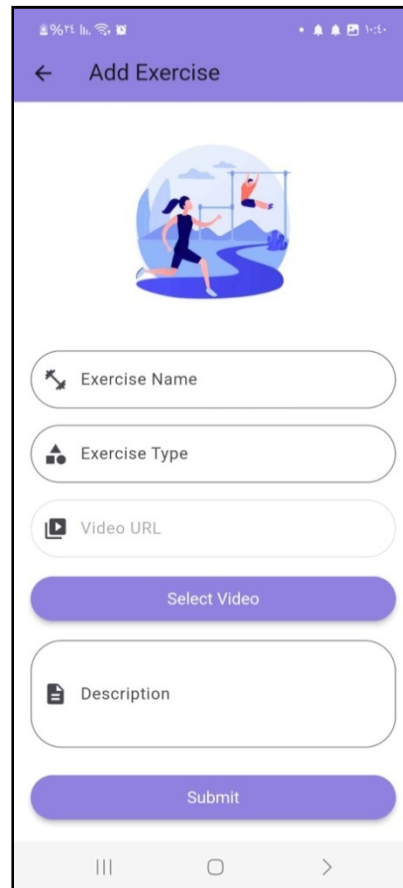


Figure 75: add exercise-mobile

4.2.2. Website

We develop “little steps” to Website used by mothers, clinics and admin.

4.2.2.1.landing page, login and signup

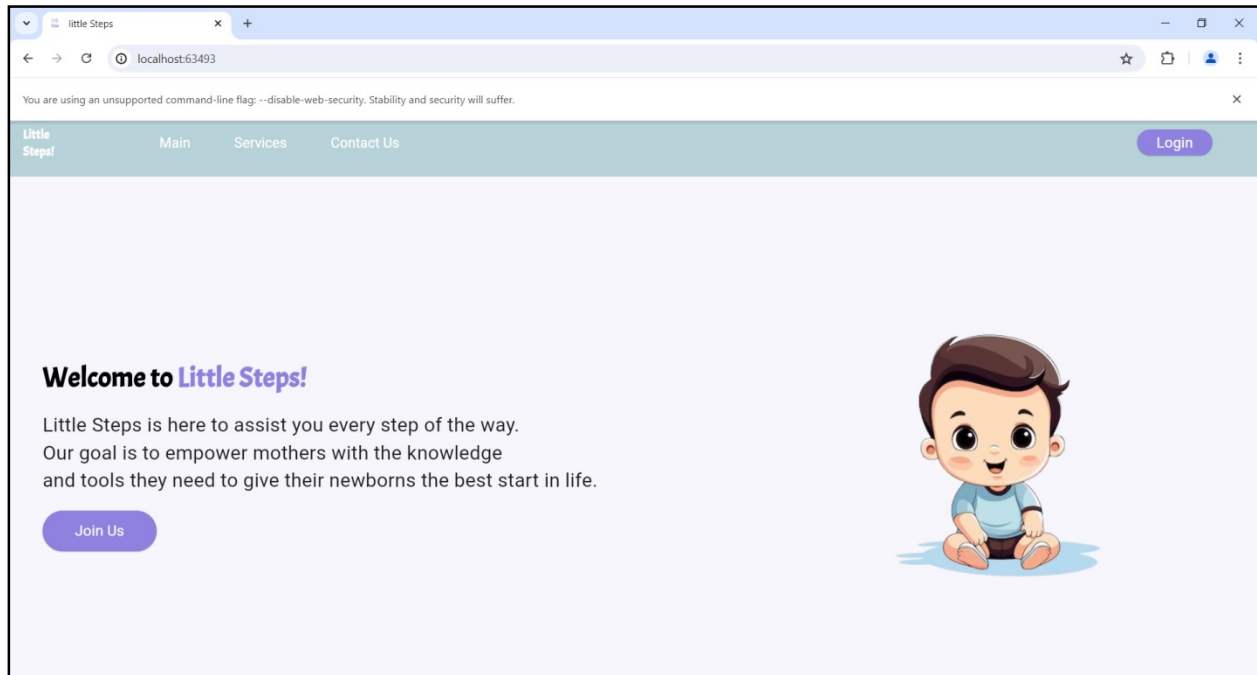


Figure 76landing page1

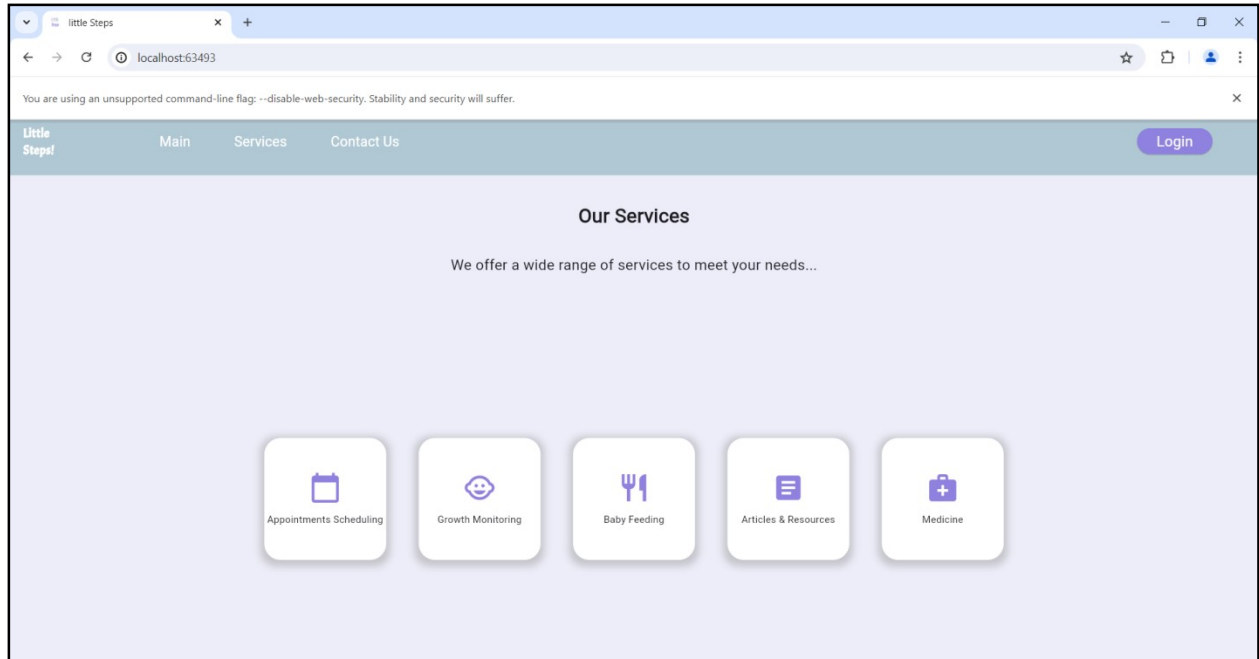


Figure 77:landing page2

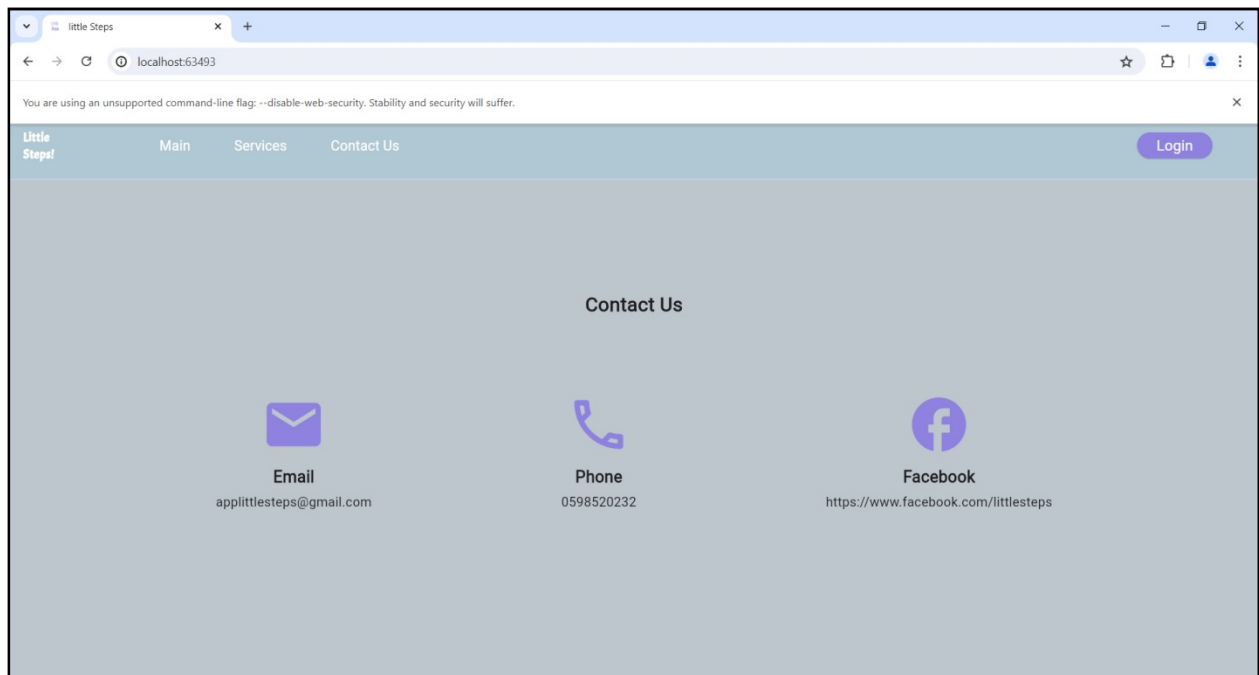


Figure 78:landing page3

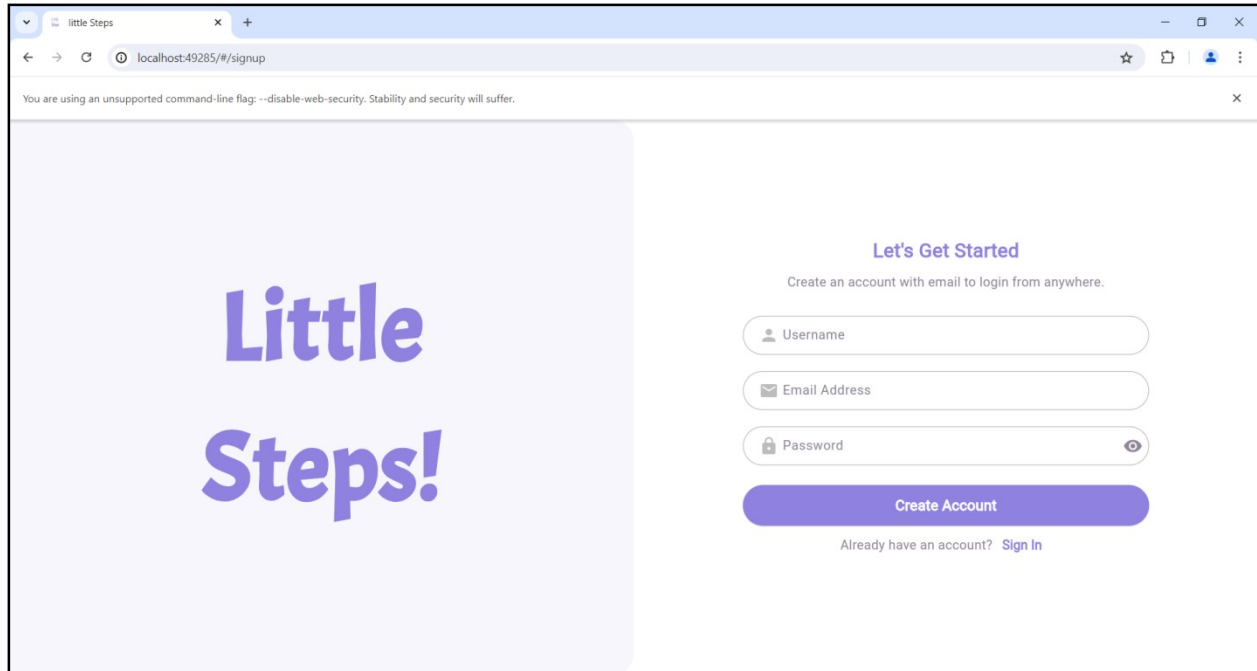


Figure 79:sign up page-web

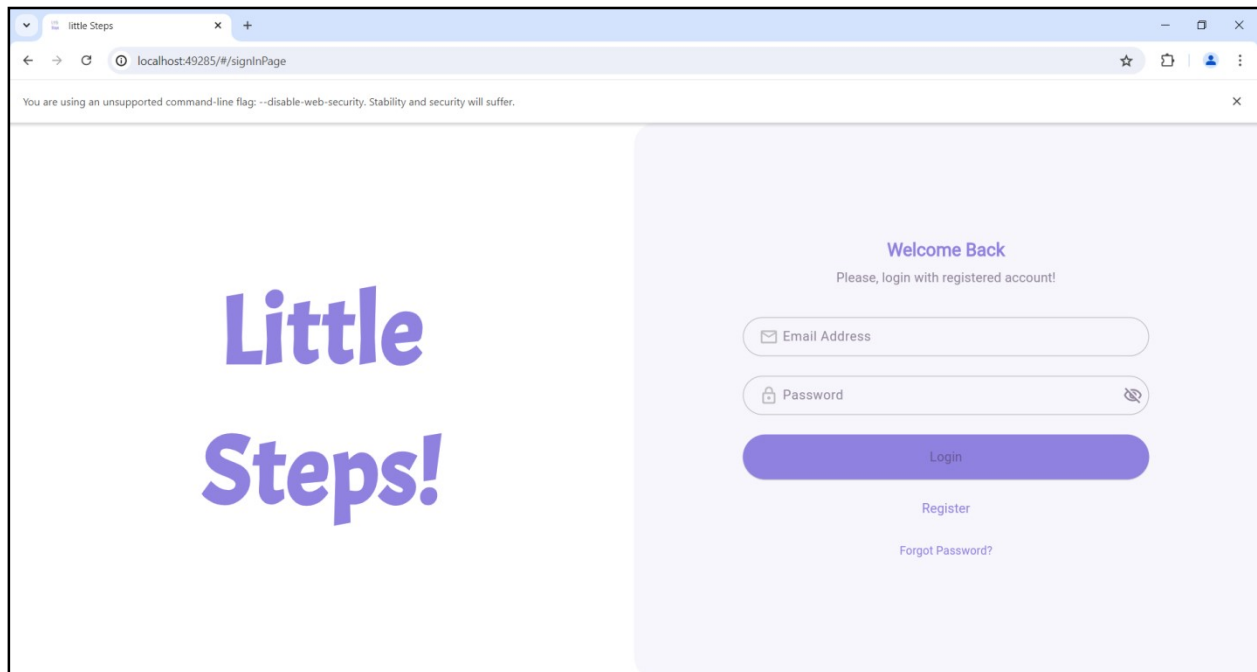


Figure 80:login page-web

4.2.2.2.Admin side

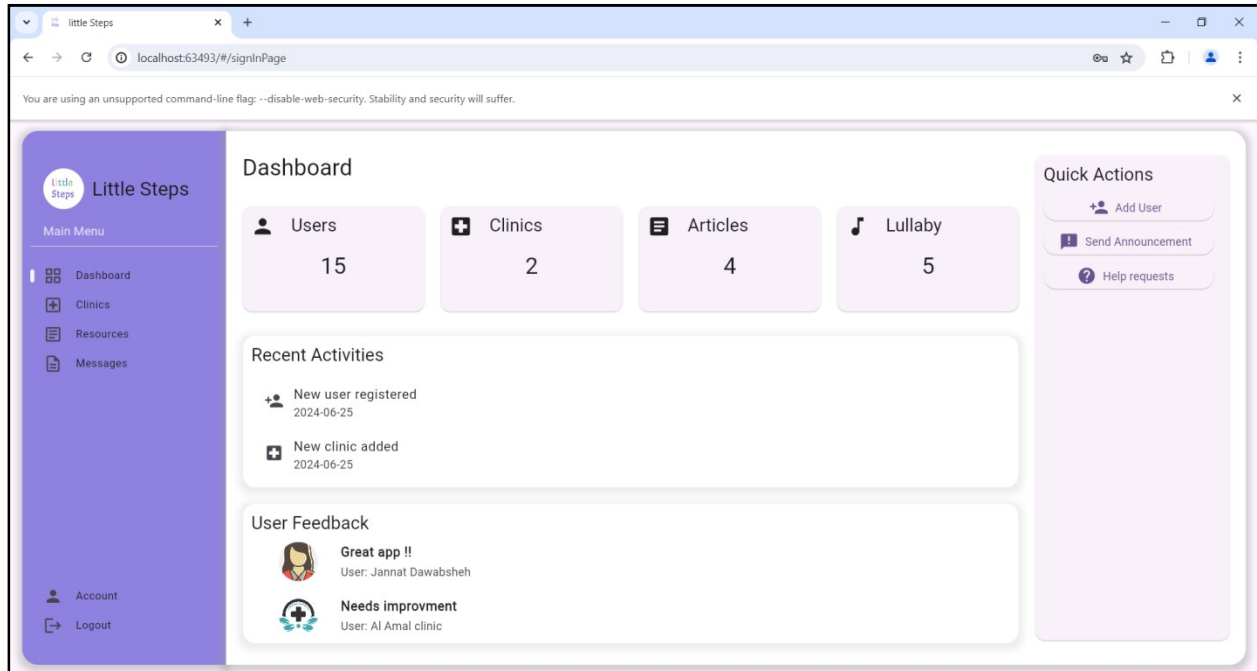


Figure 81: admin dashboard

Admin dashboard view number of app users: mothers and clinics and number of app resources: articles and lullabies.

Also, view the recent activities of adding users, and the users feedback.

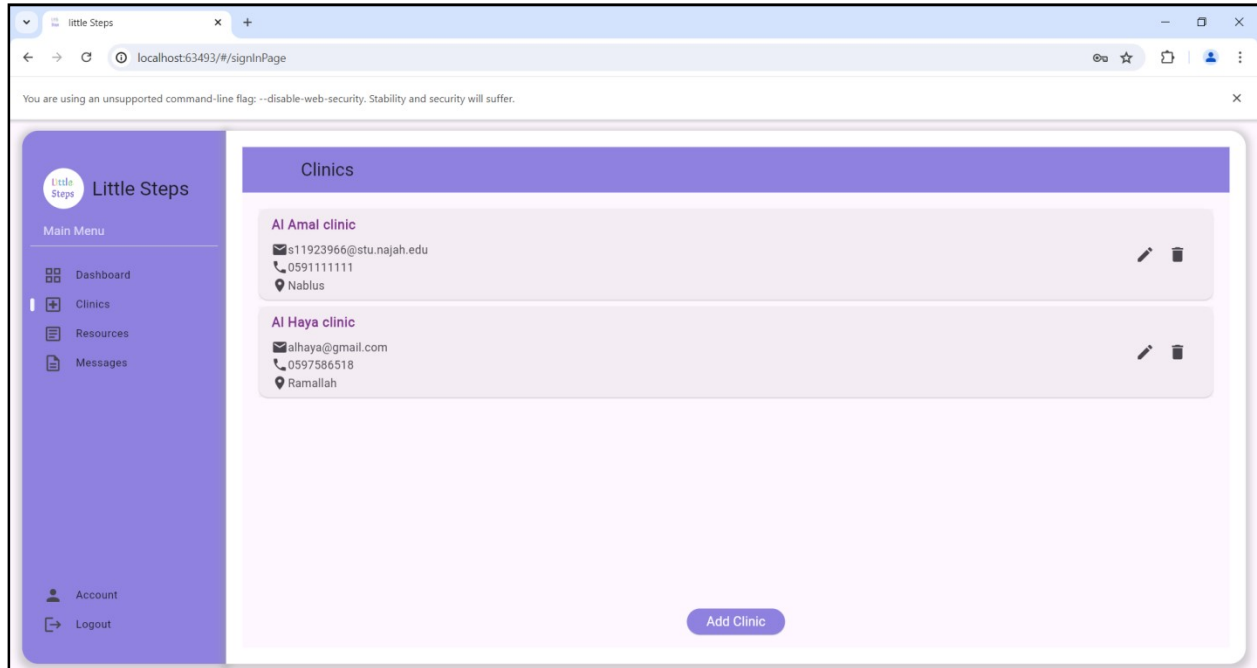
From the side menu - clinics:

Figure 82: clinics page-web

Here admin can view all clinics details and edit it, or delete this clinic

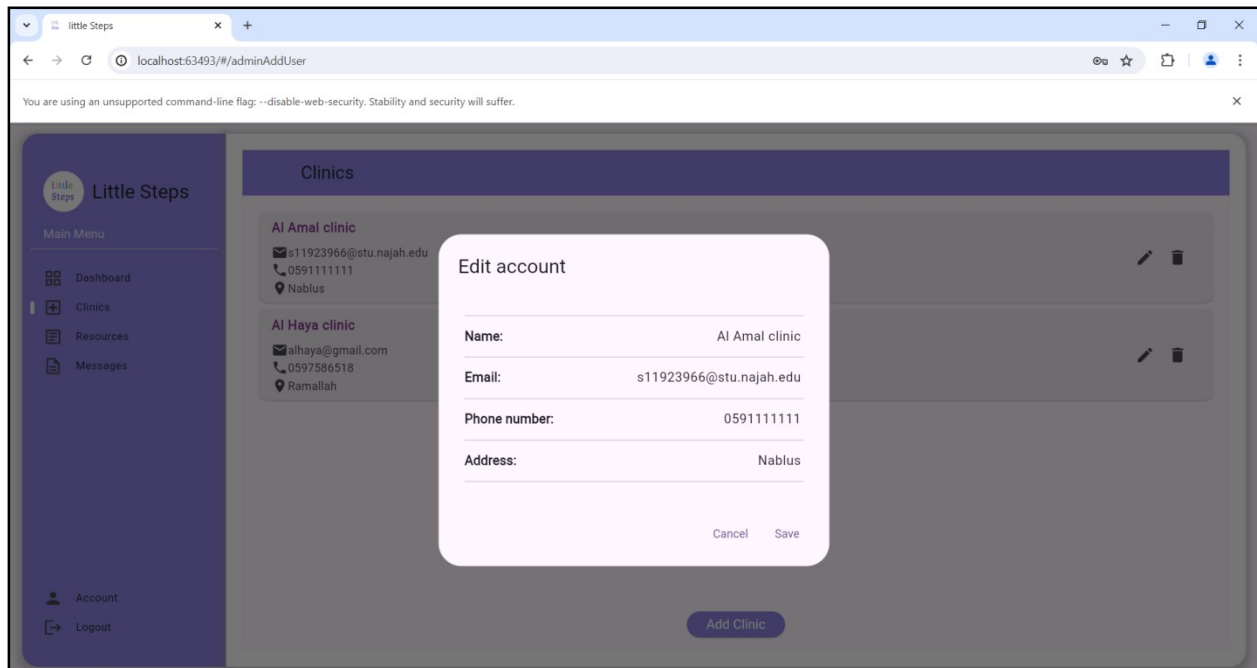


Figure 83:edit clinic

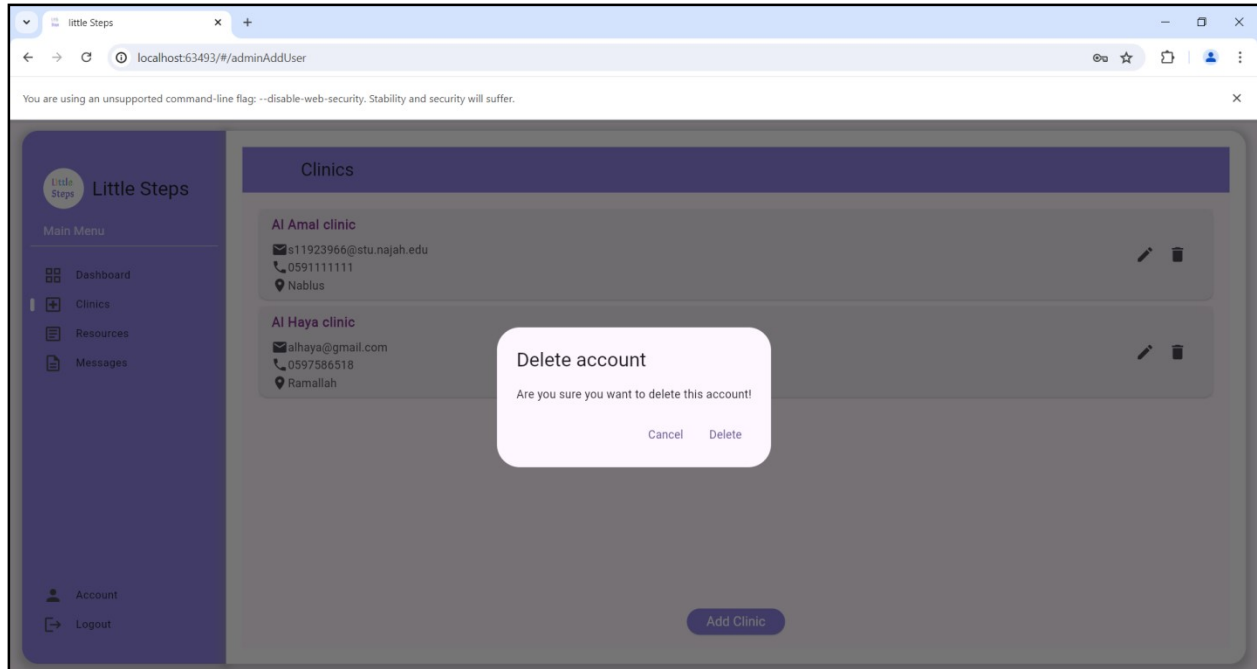


Figure 84:delete clinic

Also adding new one

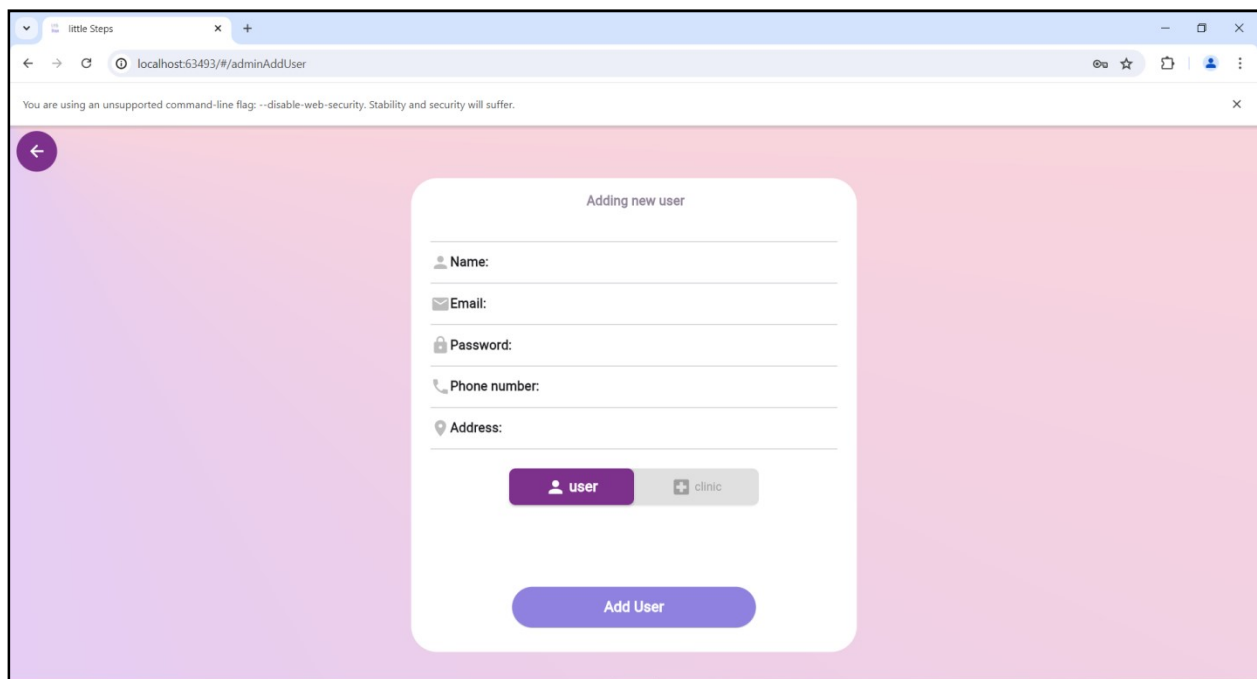


Figure 85: add clinic

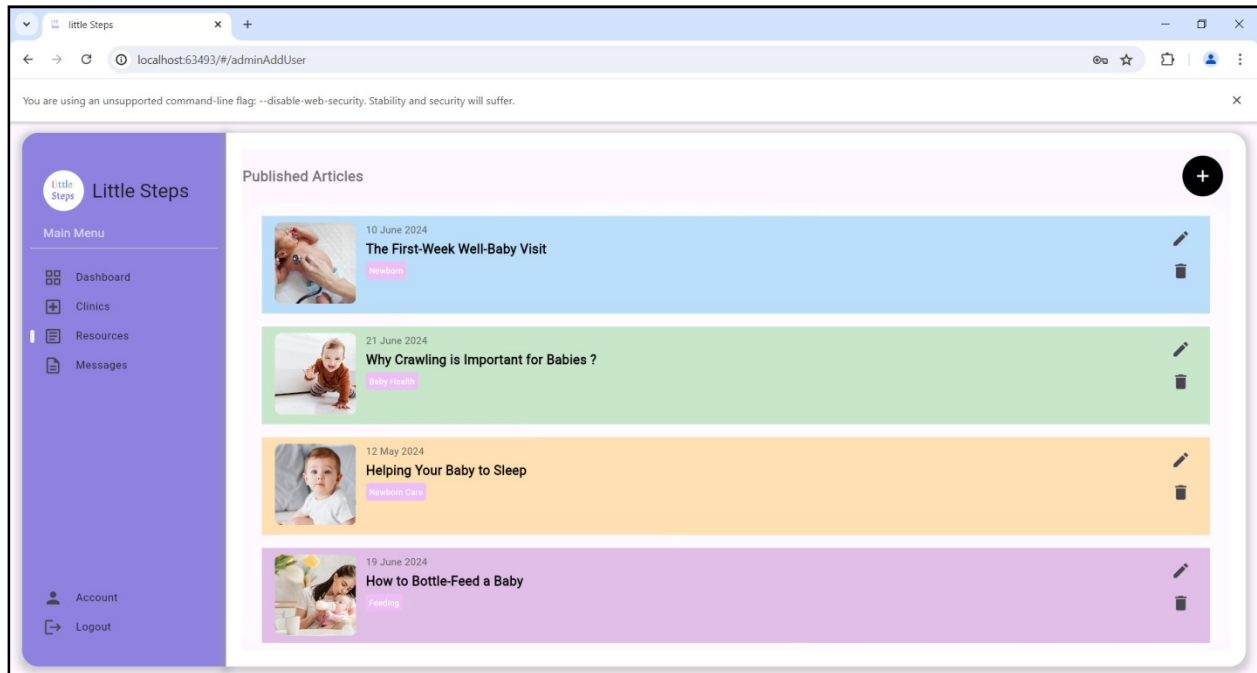
From the side menu - Resources:

Figure 86:side menu - Resources

Here admin can view all resources added by clinics and edit it or delete it if needed, also adding new one

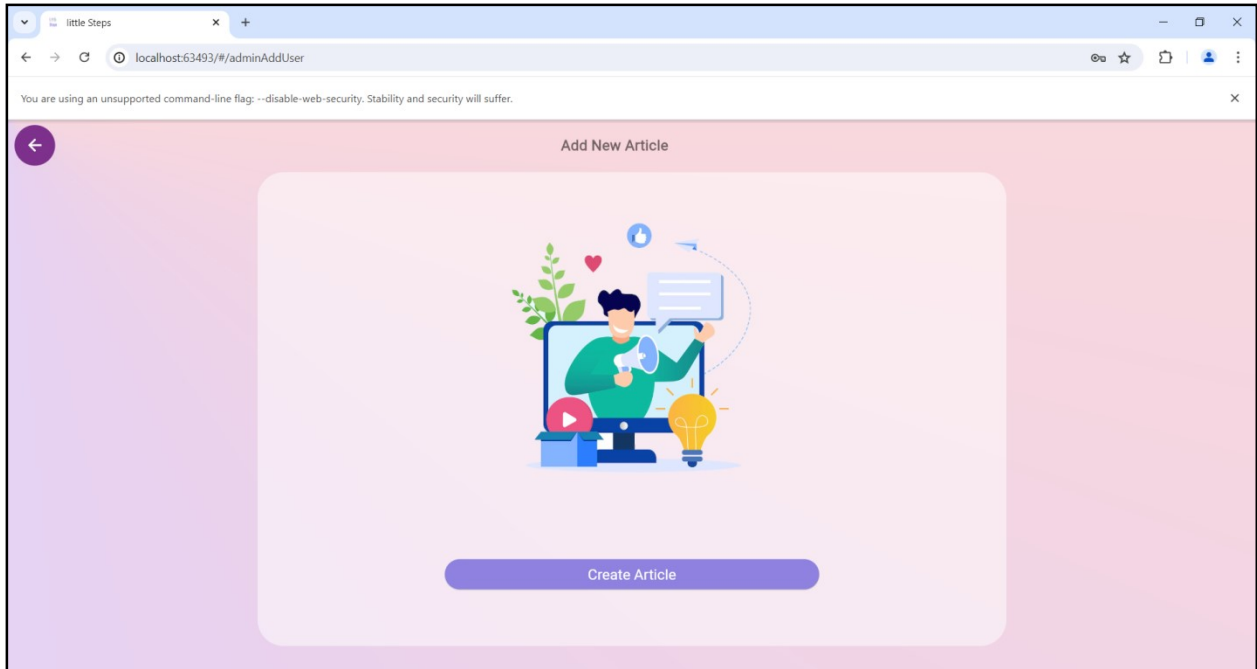


Figure 87:add article –web

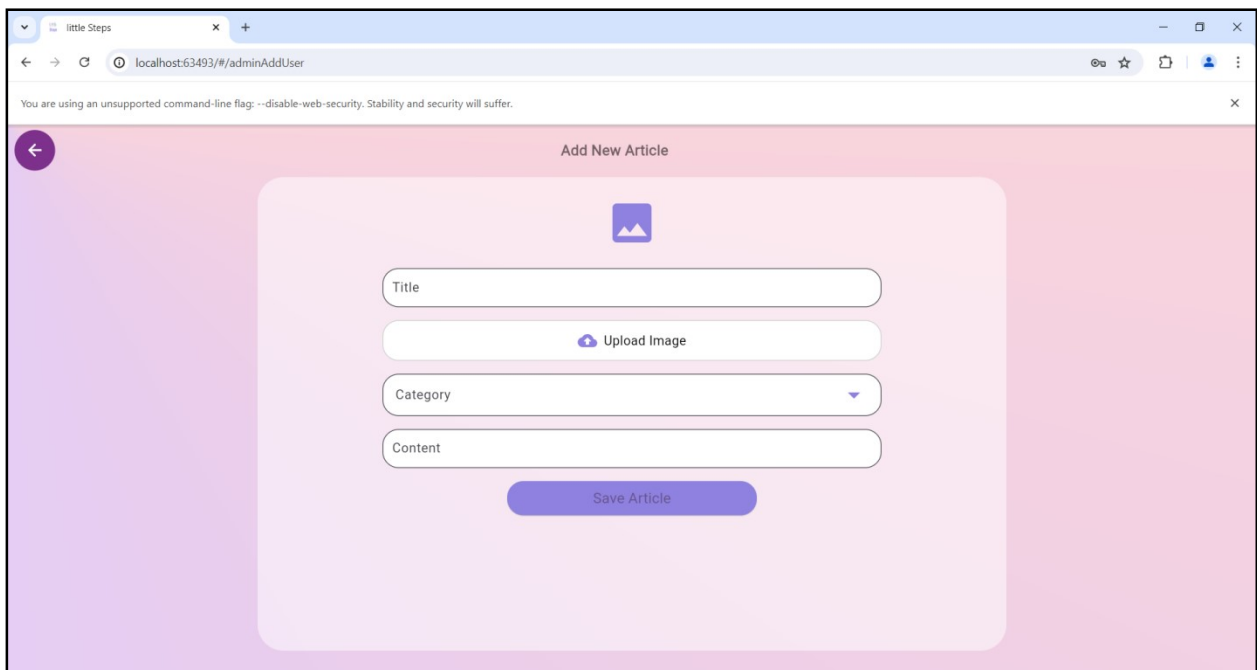


Figure 88:add new article-web

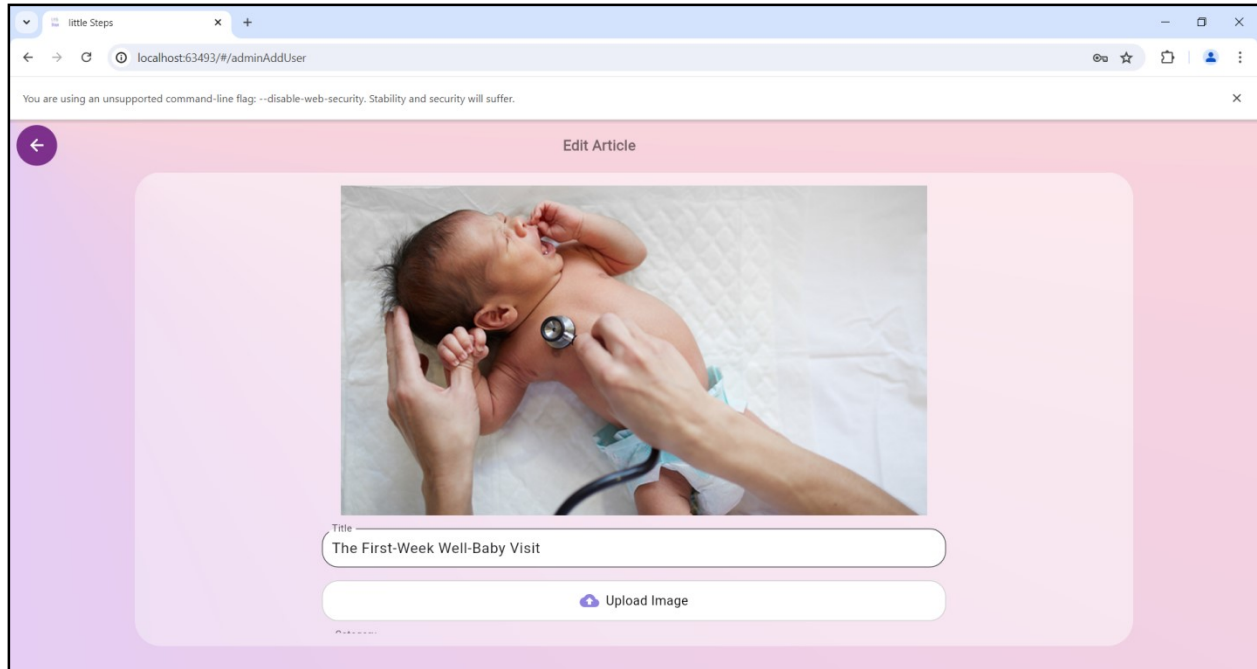


Figure 89:edit article1-web

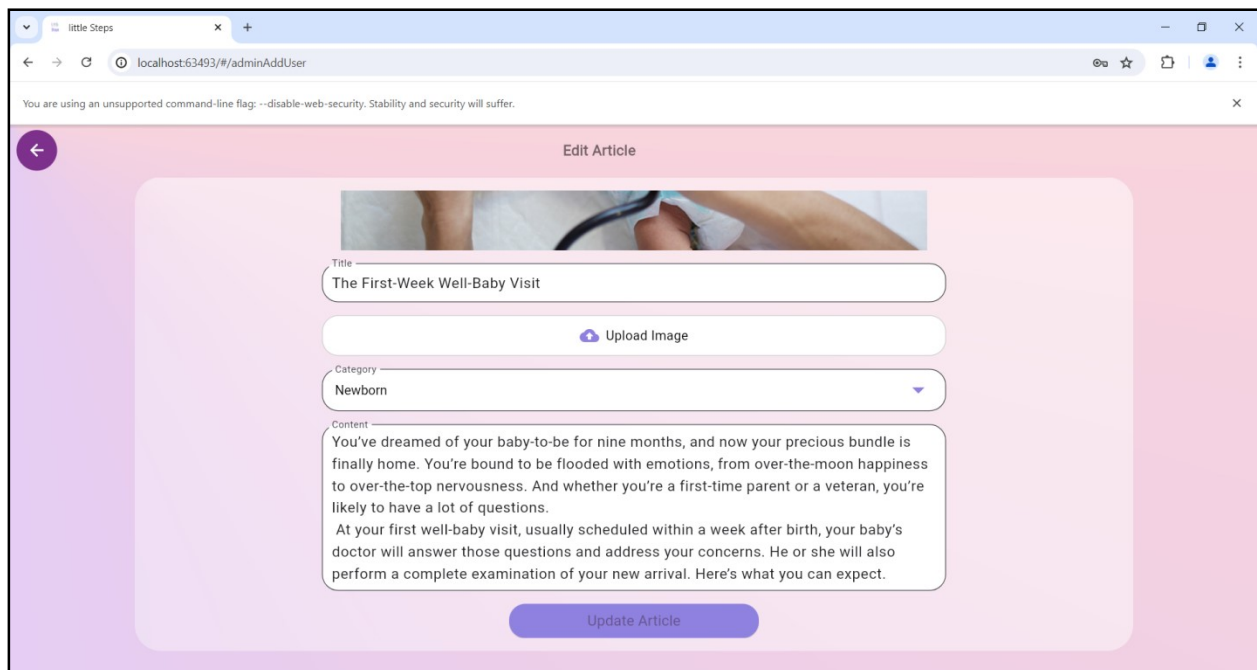


Figure 90:edit article2-web

From the side menu - messages:

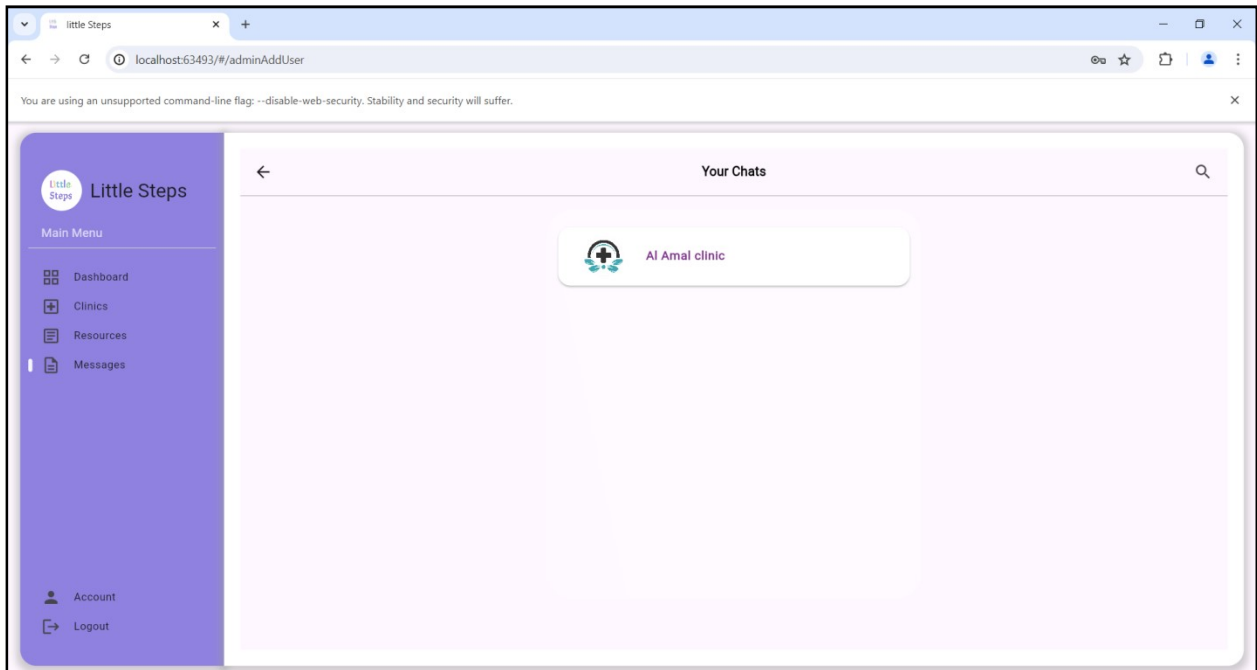


Figure 91:side menu – messages

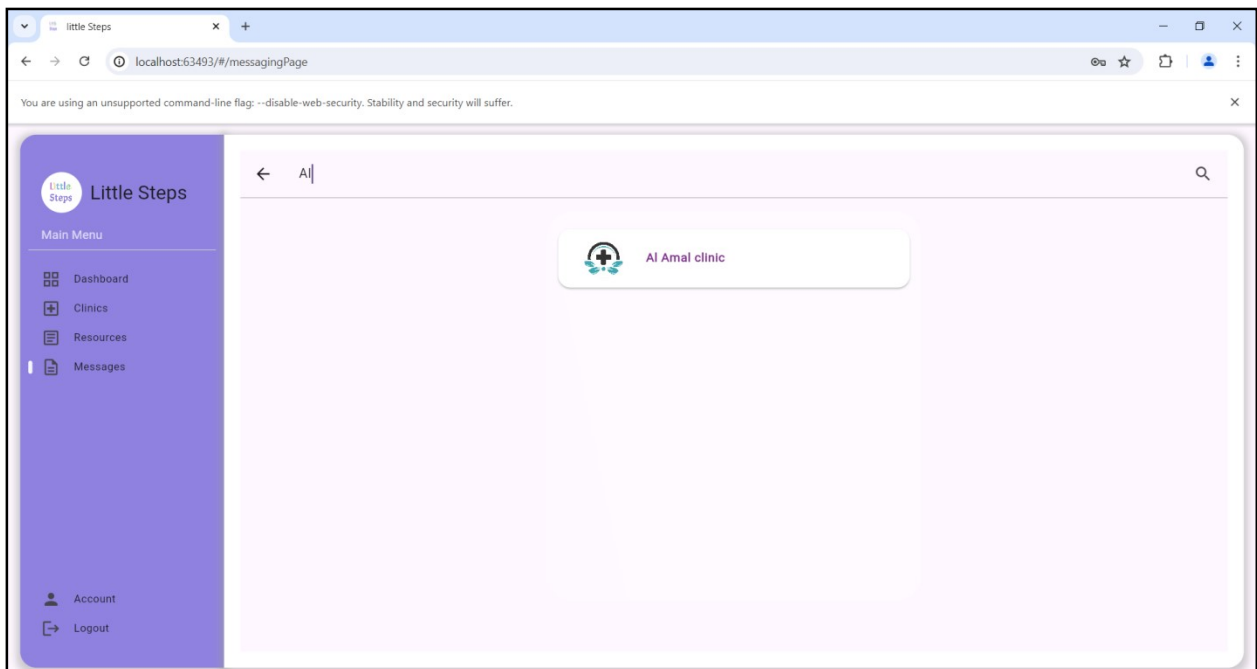


Figure 92:search conversation

This page views all admin conversations and search about one , each conversation navigate to messaging page:

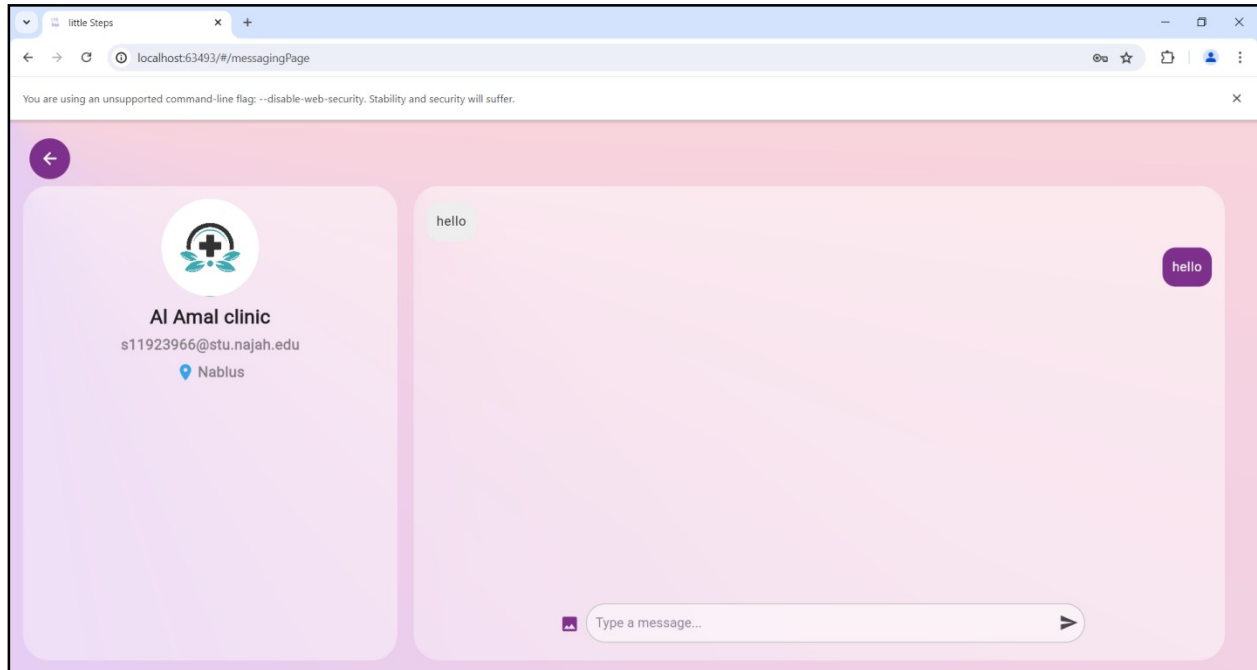


Figure 93:admin chat

From the side menu - account:

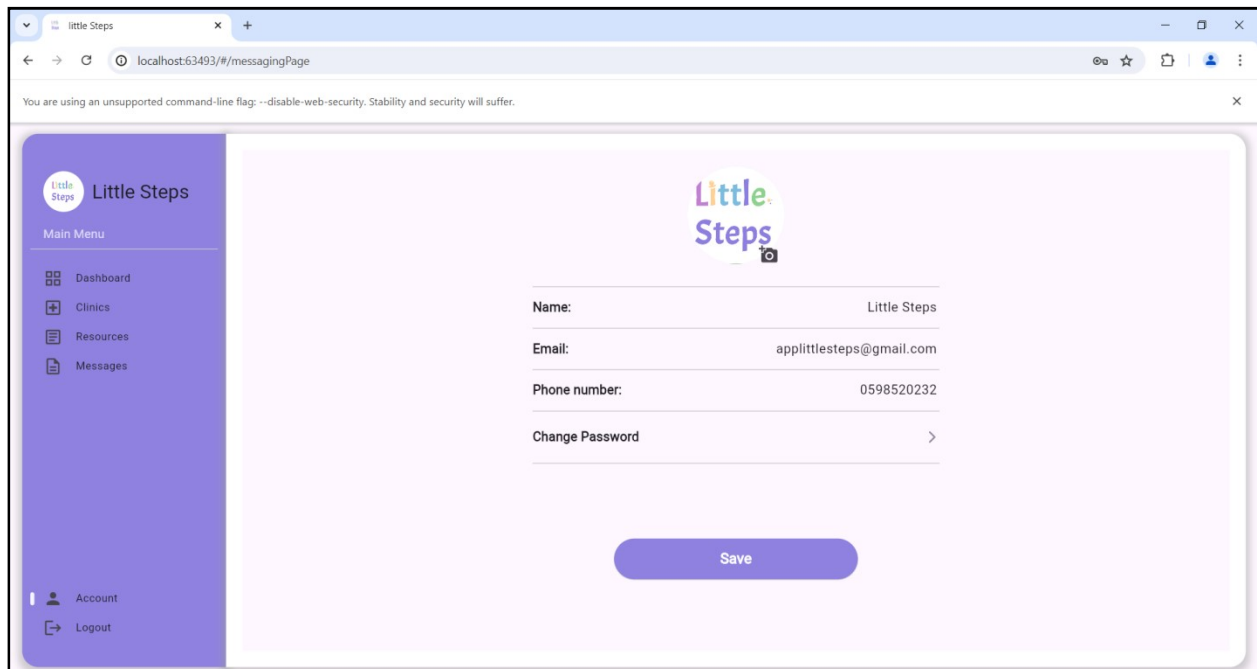
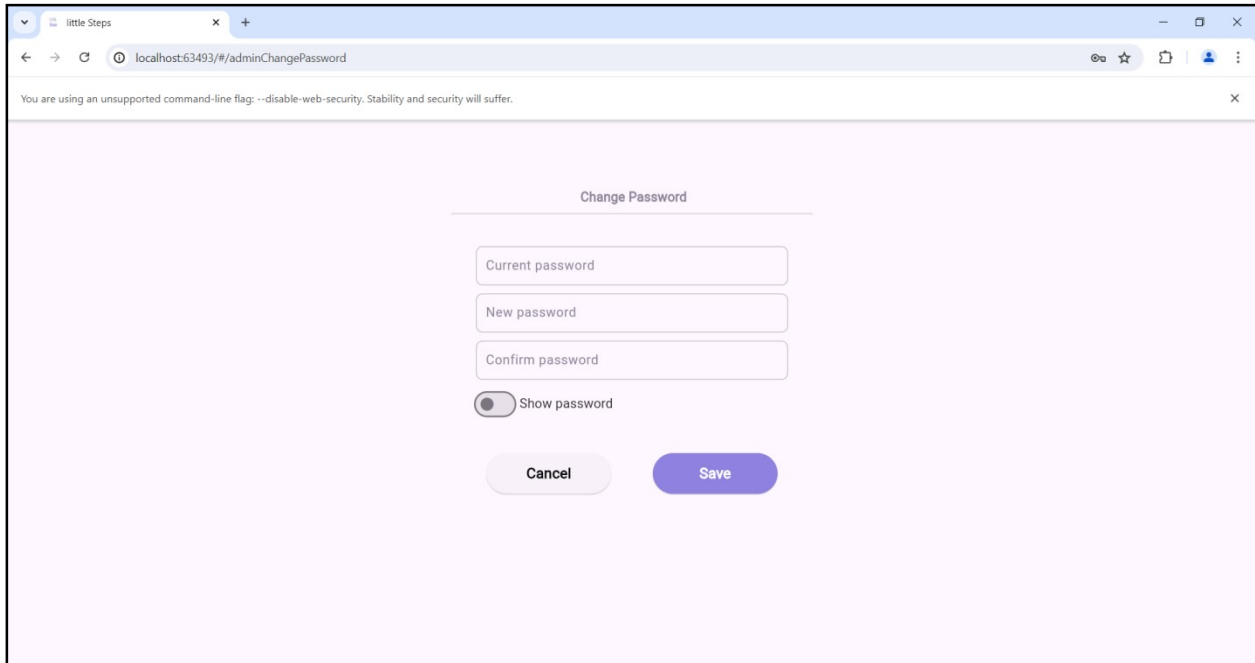


Figure 94:side menu - account

Here admin can edit his information and image profile, and change password from :

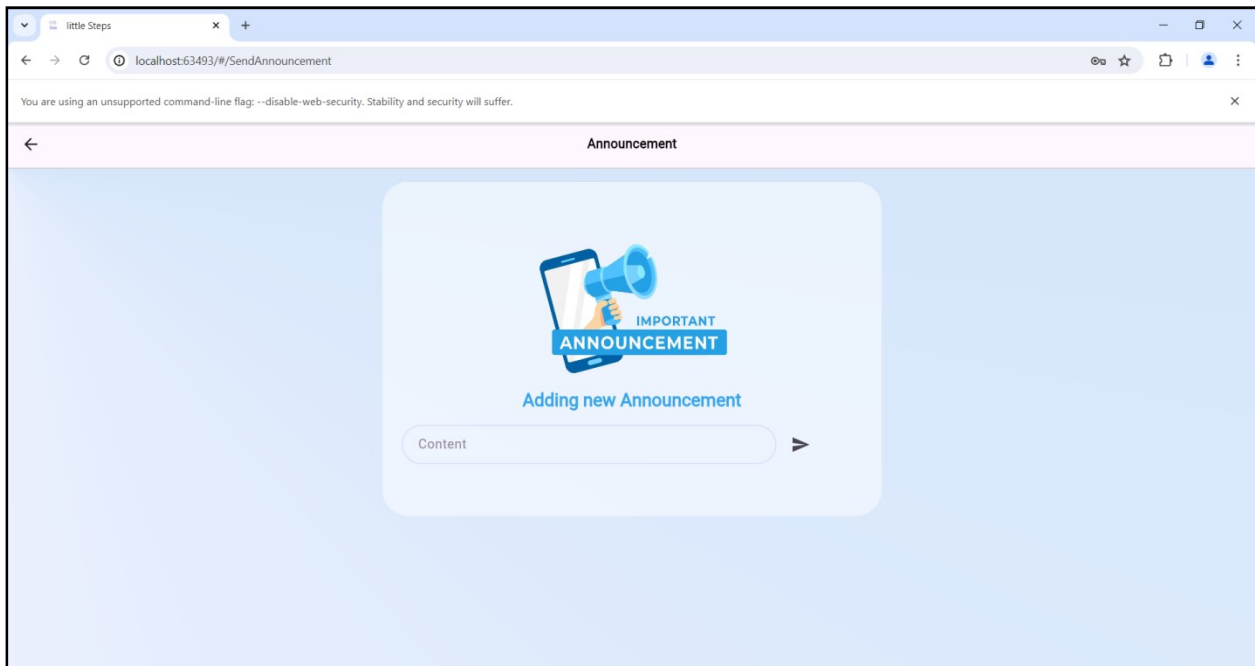


The screenshot shows a web browser window with the address bar displaying 'localhost:63493/#/adminChangePassword'. The page content is a 'Change Password' form with the following elements:

- Three input fields for 'Current password', 'New password', and 'Confirm password'.
- A 'Show password' toggle switch, currently turned off.
- Two buttons at the bottom: 'Cancel' and 'Save'.

Figure 95:change password-web

From the Quick action menu – send announcement:



The screenshot shows a web browser window with the address bar displaying 'localhost:63493/#/SendAnnouncement'. The page content is an 'Announcement' form with the following elements:

- A header area with a back arrow and the title 'Announcement'.
- A central graphic featuring a smartphone and a megaphone with the text 'IMPORTANT ANNOUNCEMENT'.
- The text 'Adding new Announcement' below the graphic.
- A text input field labeled 'Content' with a right-pointing arrow button.

Figure 96:send announcement

Here admin can send announcement to all app users

From the Quick action menu – help requests :

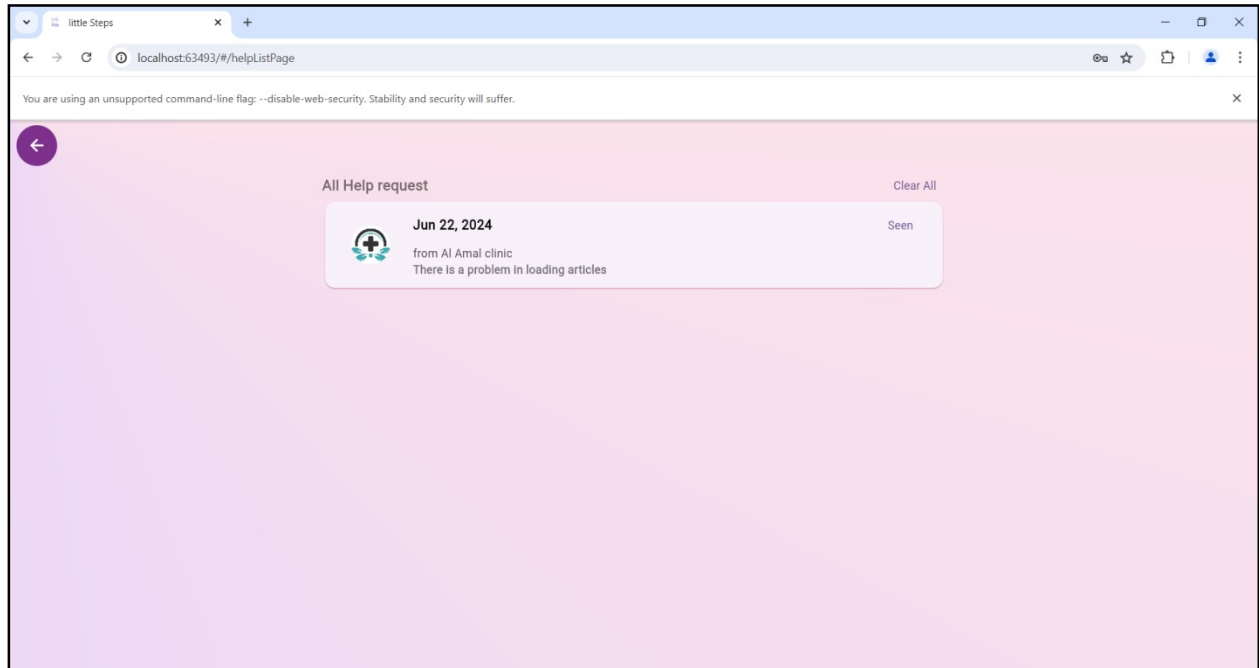


Figure 97:help requests

Here admin view all users help request about technical problems in the app

4.2.2.3. Clinic side

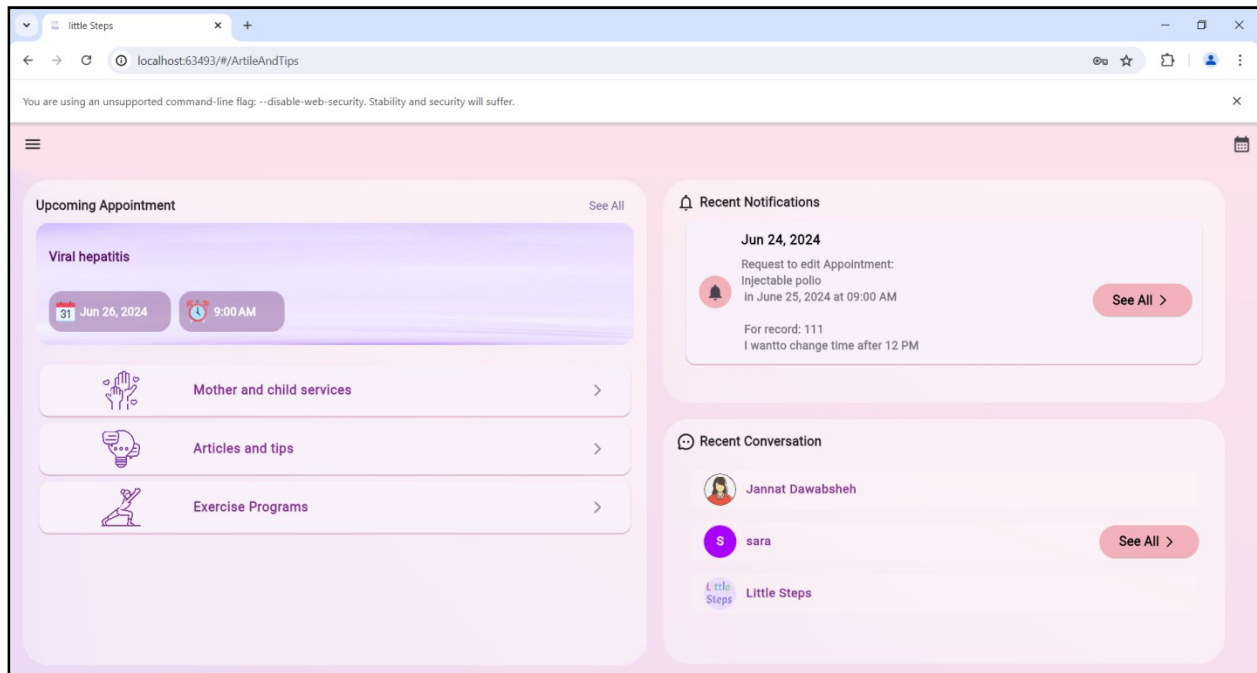


Figure 98: clinic home-web

Clinic home page view nearest upcoming appointment for clinic, and clinic services for child and mother, adding articles and exercises, Also view recent notifications and conversations.

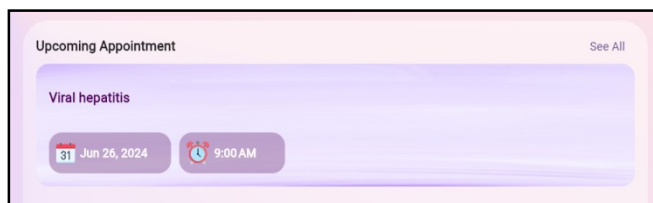


Figure 99: upcoming appointment

Here when clinic pressed see all, it will be navigated to upcoming appointment list where clinic can delete or edit each appointment:

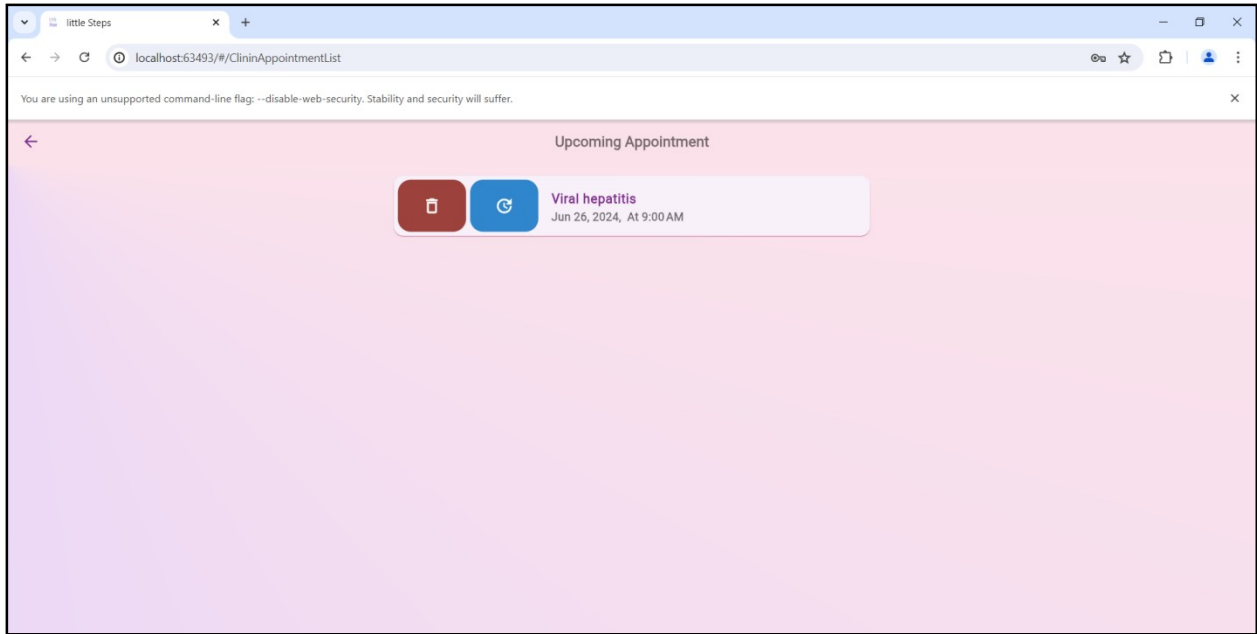


Figure 100:upcoming appointment list-web

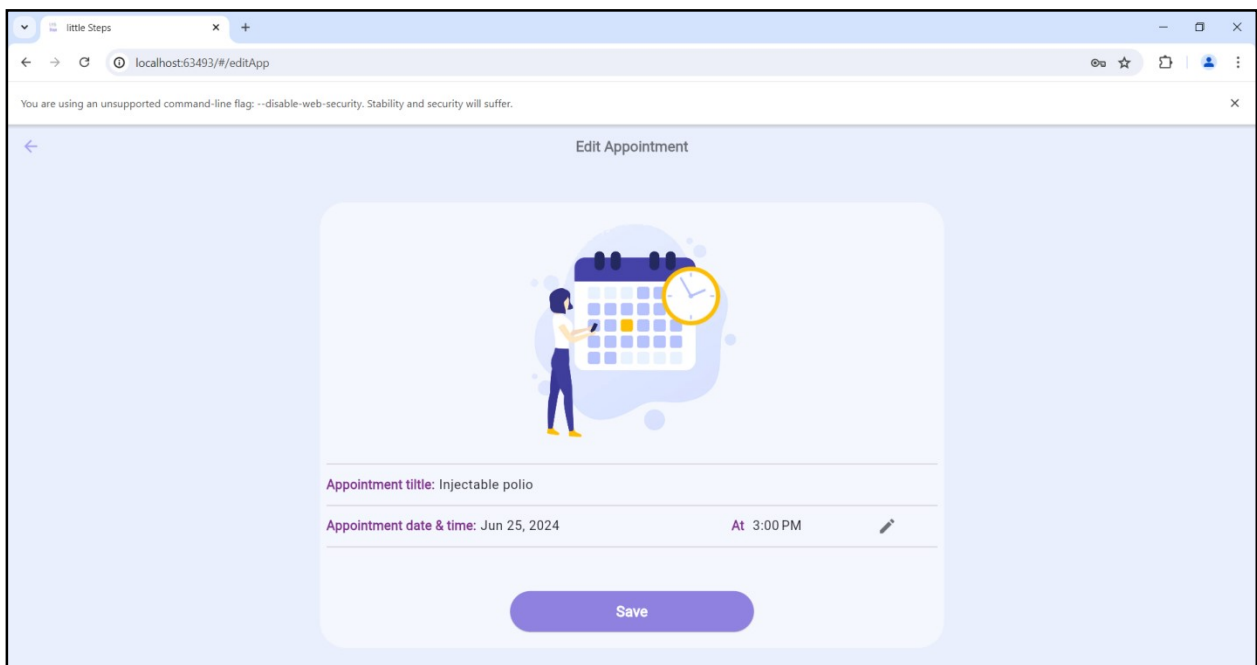


Figure 101:edit appointment -web

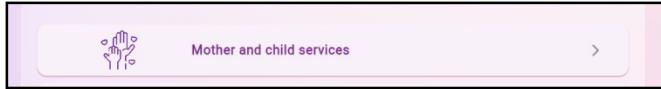


Figure 102:mother and services

Here when clinic pressed Mother and child services, it will be request child record id then navigate to services page:

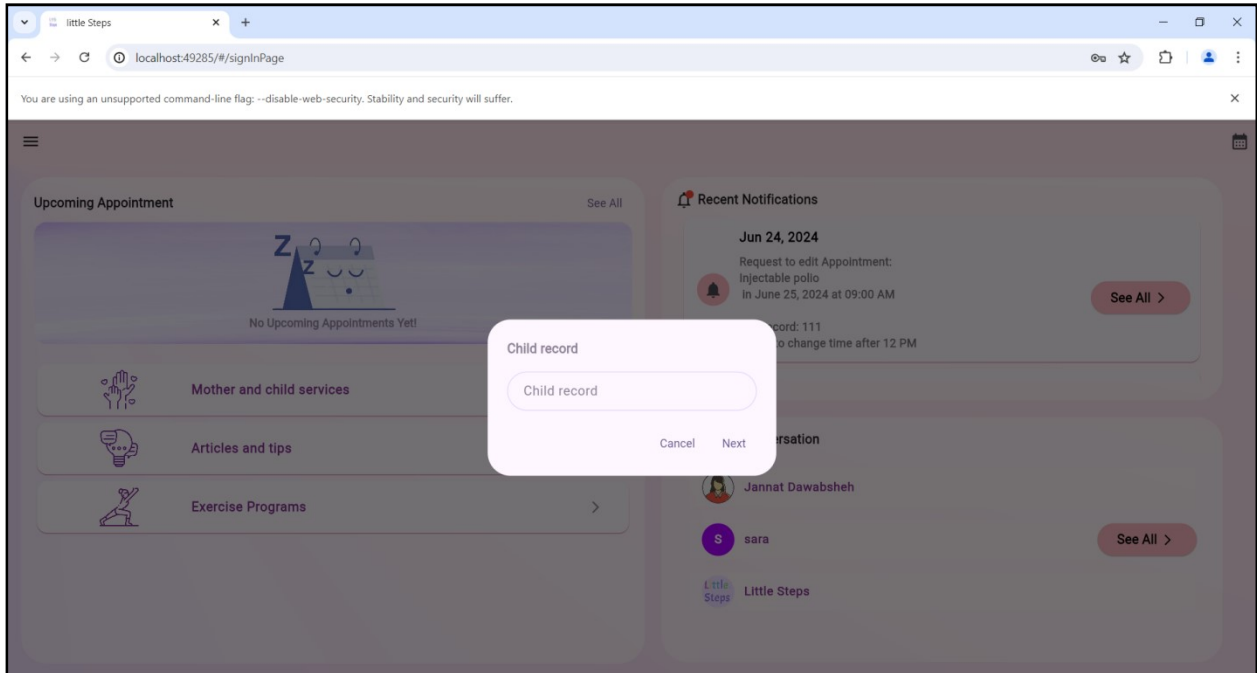


Figure 103:child record

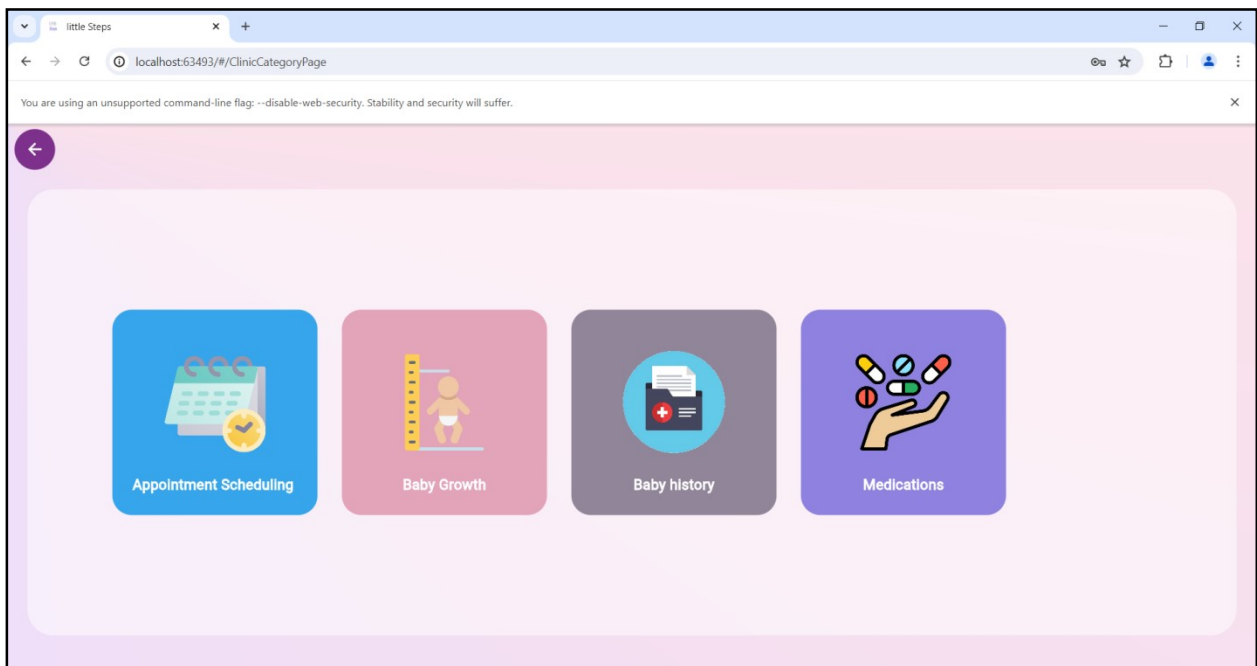
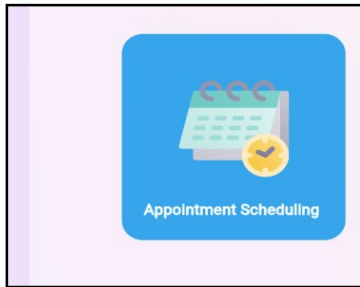


Figure 104:clinic category-web



If Appointment scheduling selected:

Figure 105:Appointment scheduling

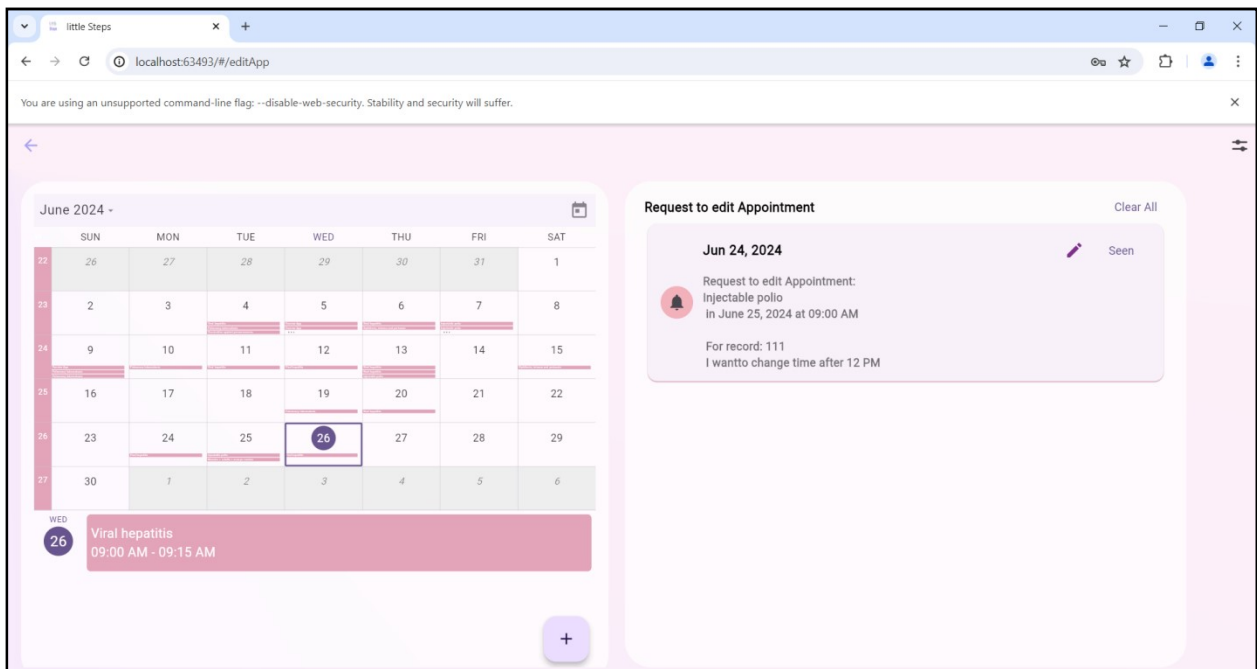


Figure 106: clinic appointment-web

Here clinic see all her appointment in calendar in the left and the appointment edit request from mother in the right, it can view appointment details:

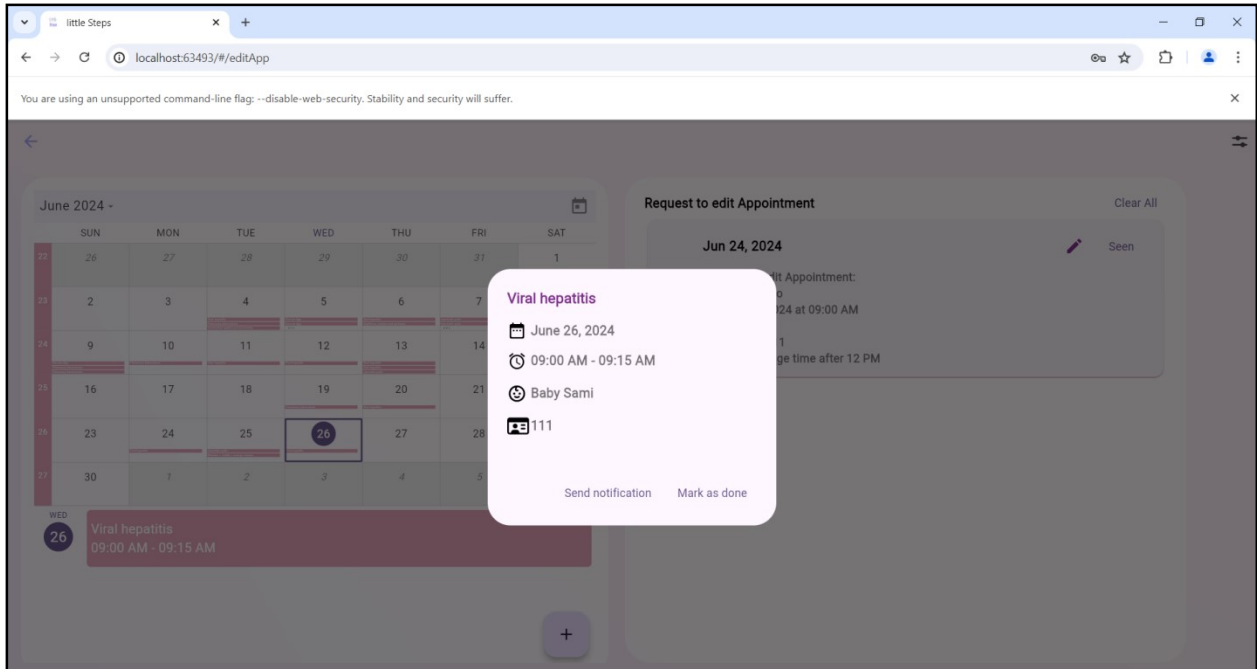


Figure 107:appointment details-web

When clinic pressed add button it will be navigated to add appointment page for that mother and child:

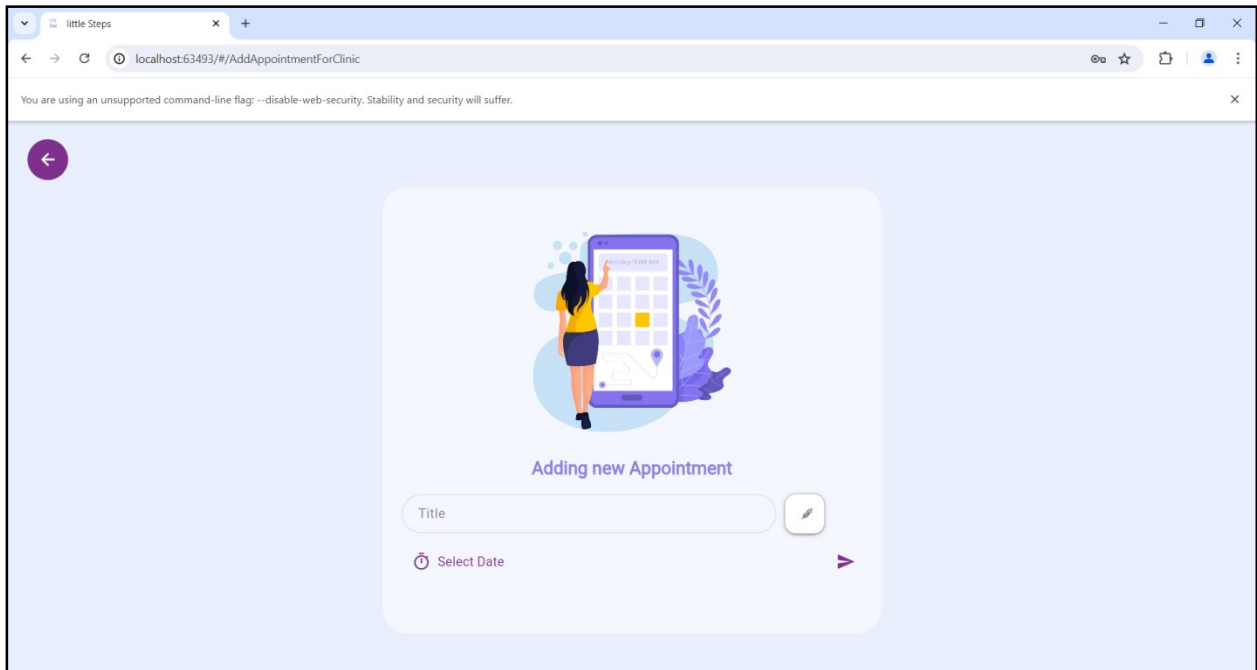


Figure 108:add appointment web

Clinic can either enter appointment name or choose vaccine from list:

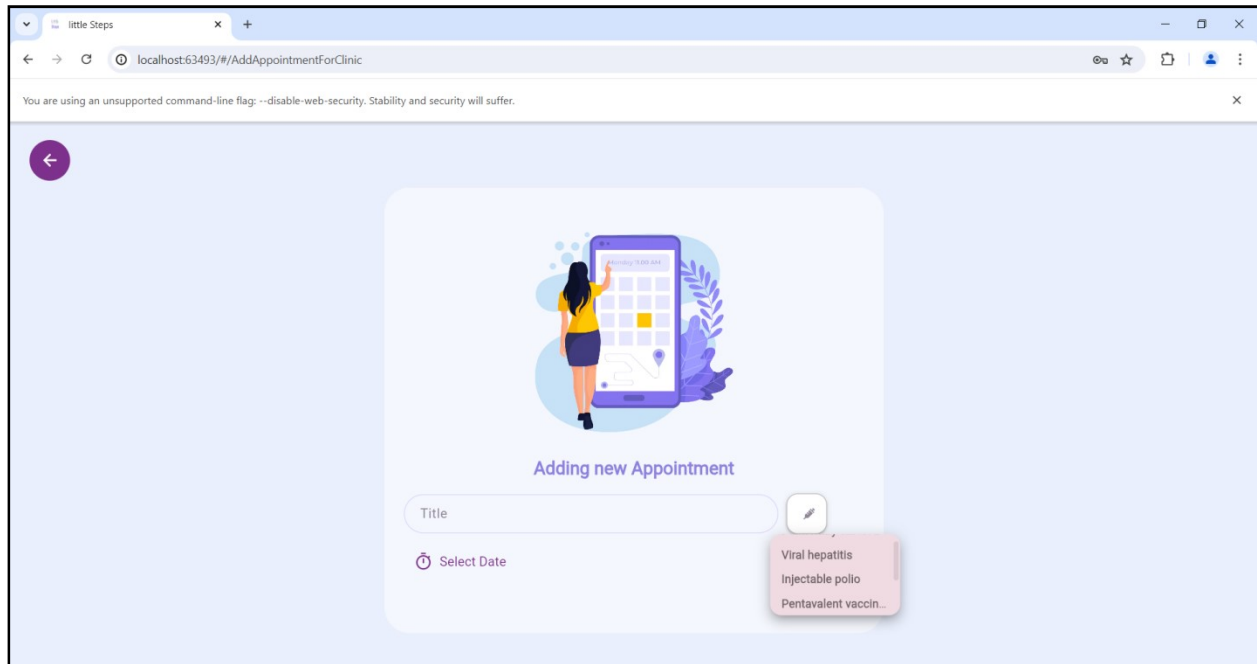


Figure 109: vaccines list-web

Then select appointment date and time :

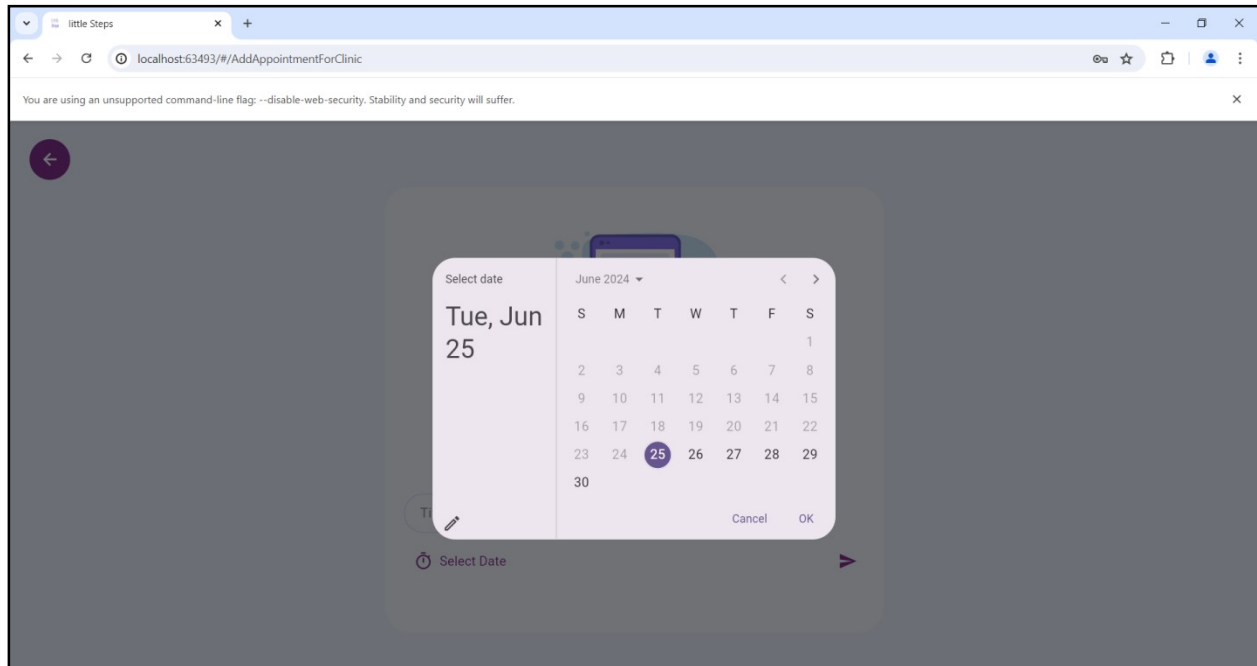


Figure 110:appointment date and time1

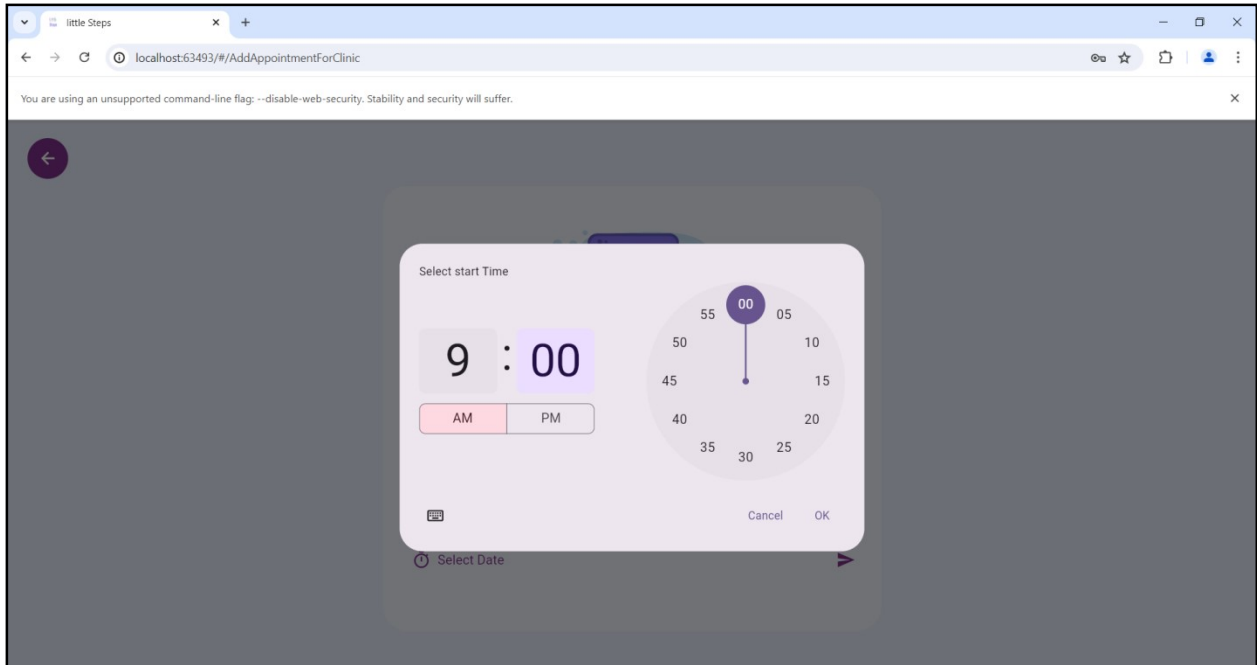


Figure 111:appointment date and time2

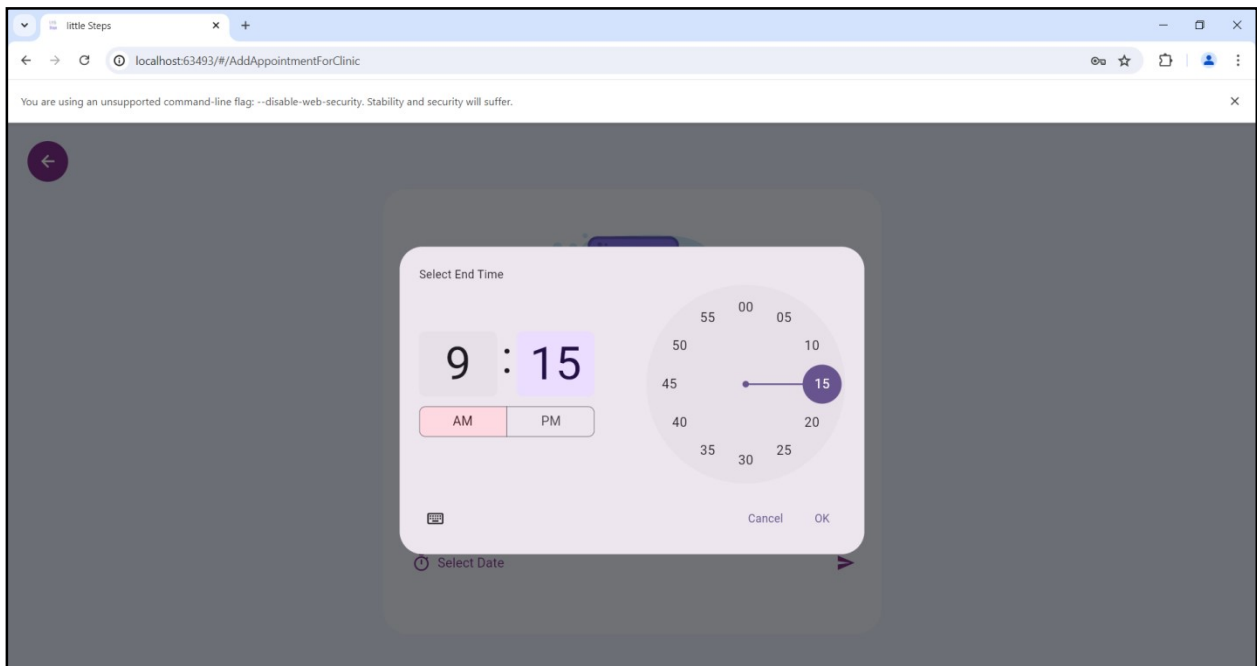
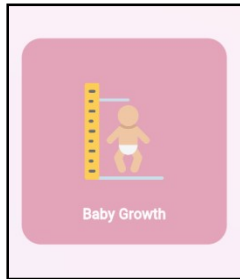


Figure 112:appointment date and time3



If Baby Growth selected:

Figure 113:Baby Growth category

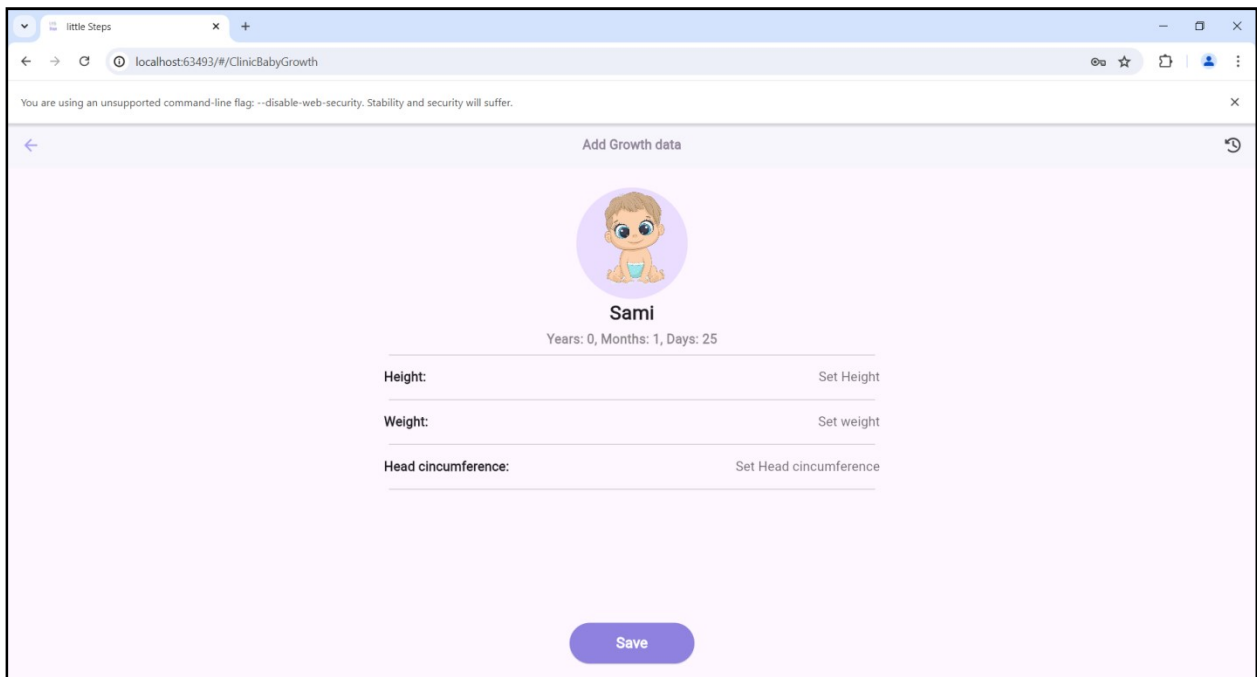


Figure 114:add growth data-web

Clinic can add a growth data for that child or see its history from upper right side icon:

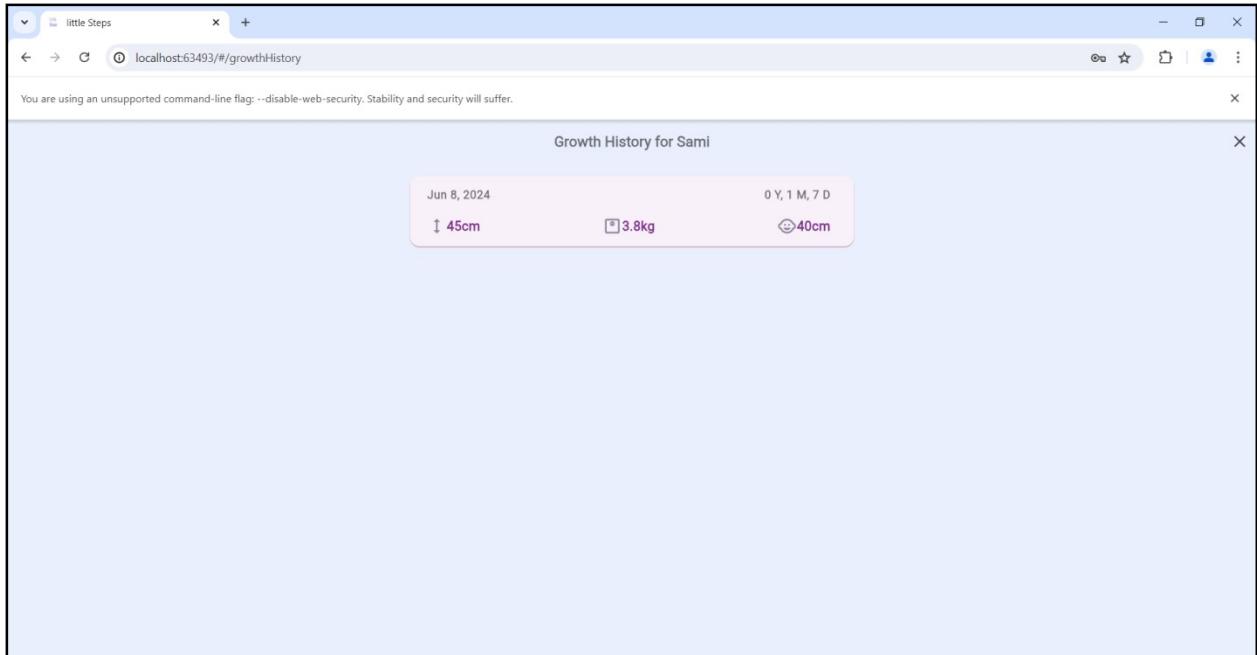
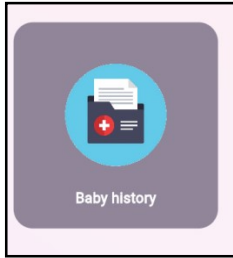


Figure 115: growth history-web



If Baby History selected:

Figure 116:Baby History category

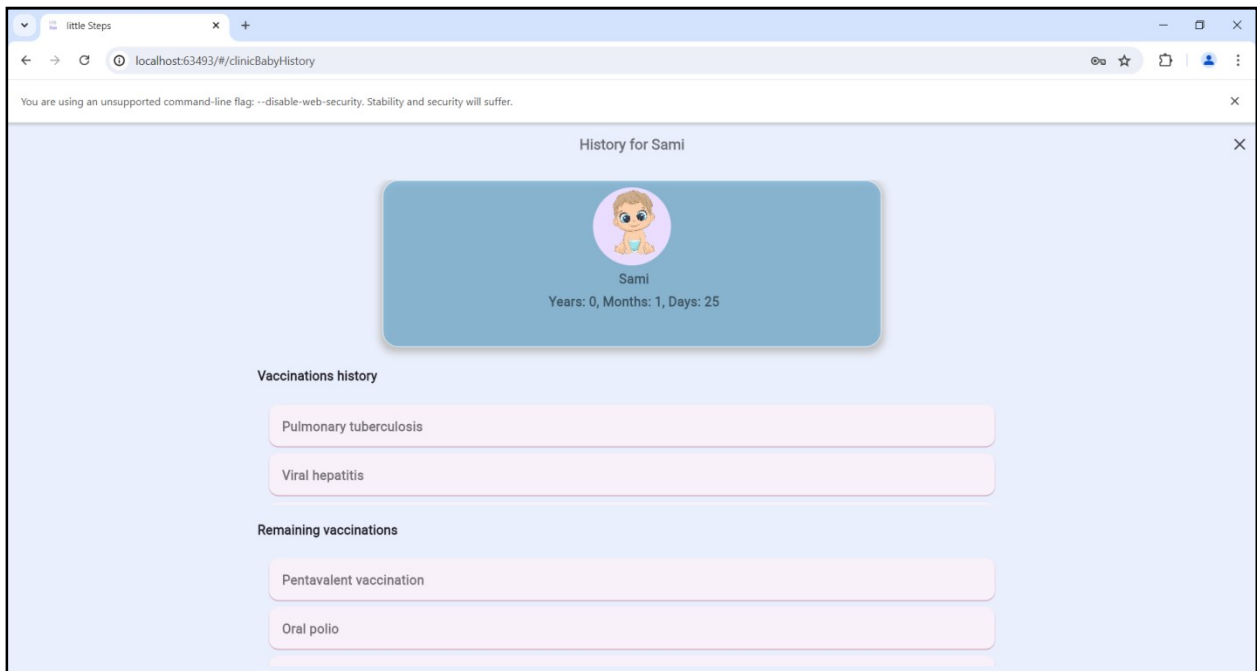
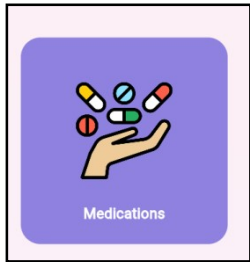


Figure 117:Baby History -web



If Medications selected:

Figure 118:Medications category

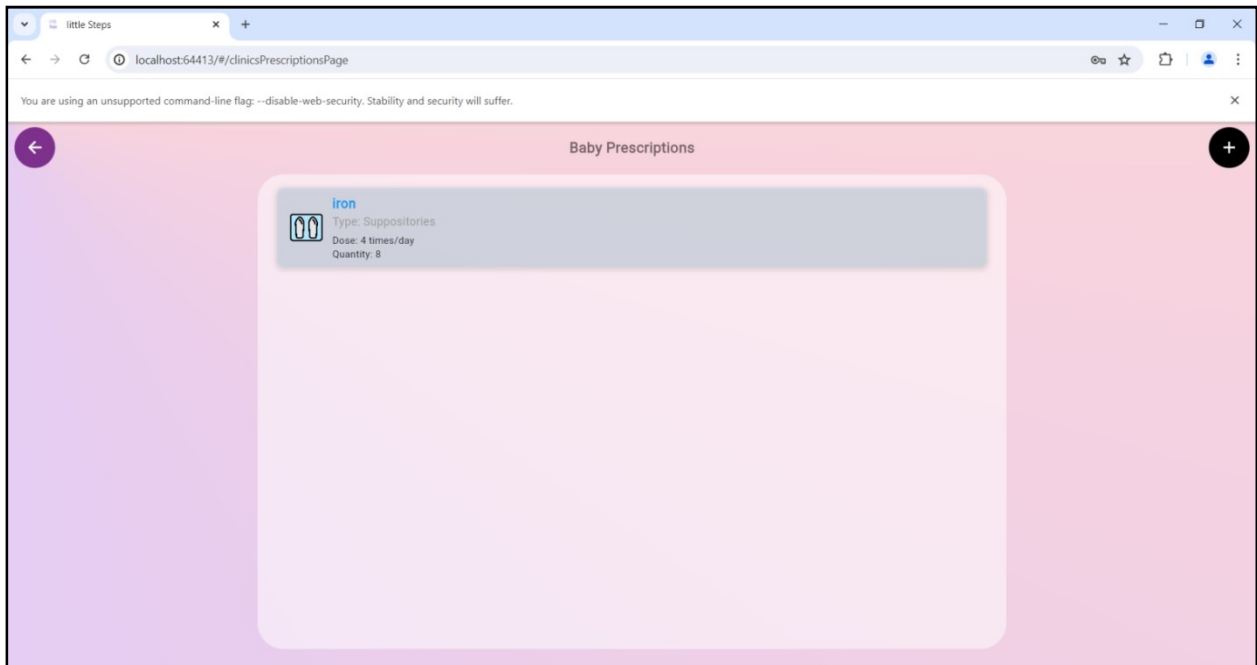


Figure 119:baby prescriptions -web

Clinic can manage baby prescriptions by editing or adding new one:

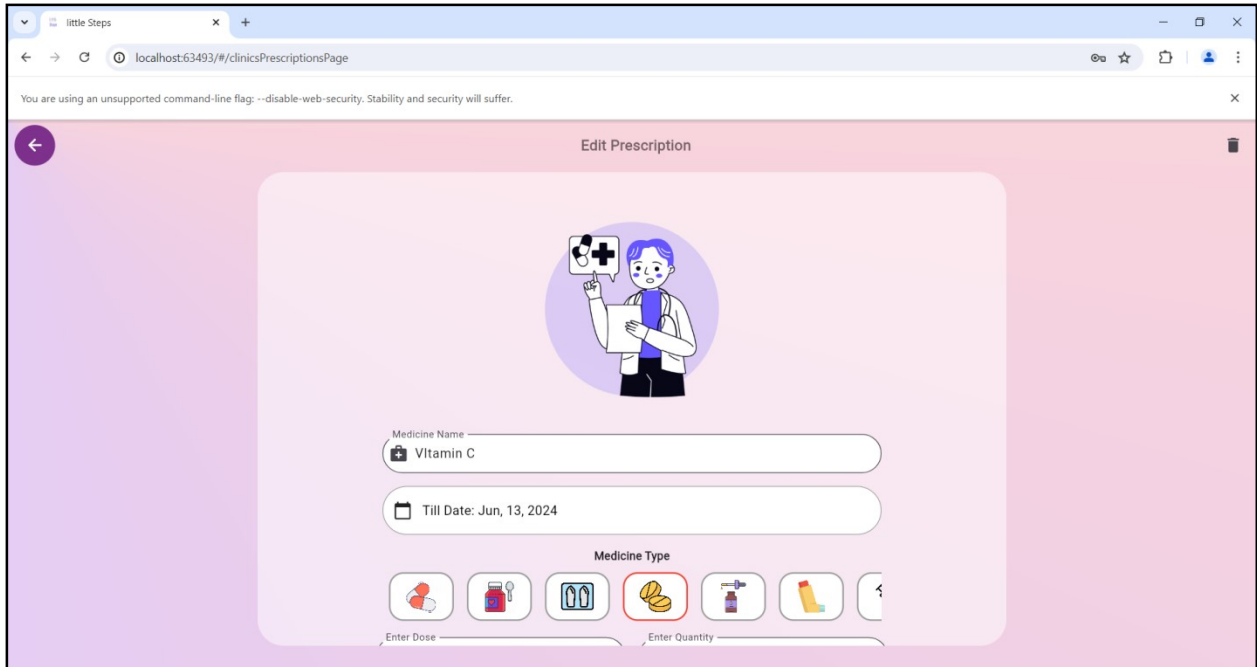


Figure 120:edit baby prescriptions-web

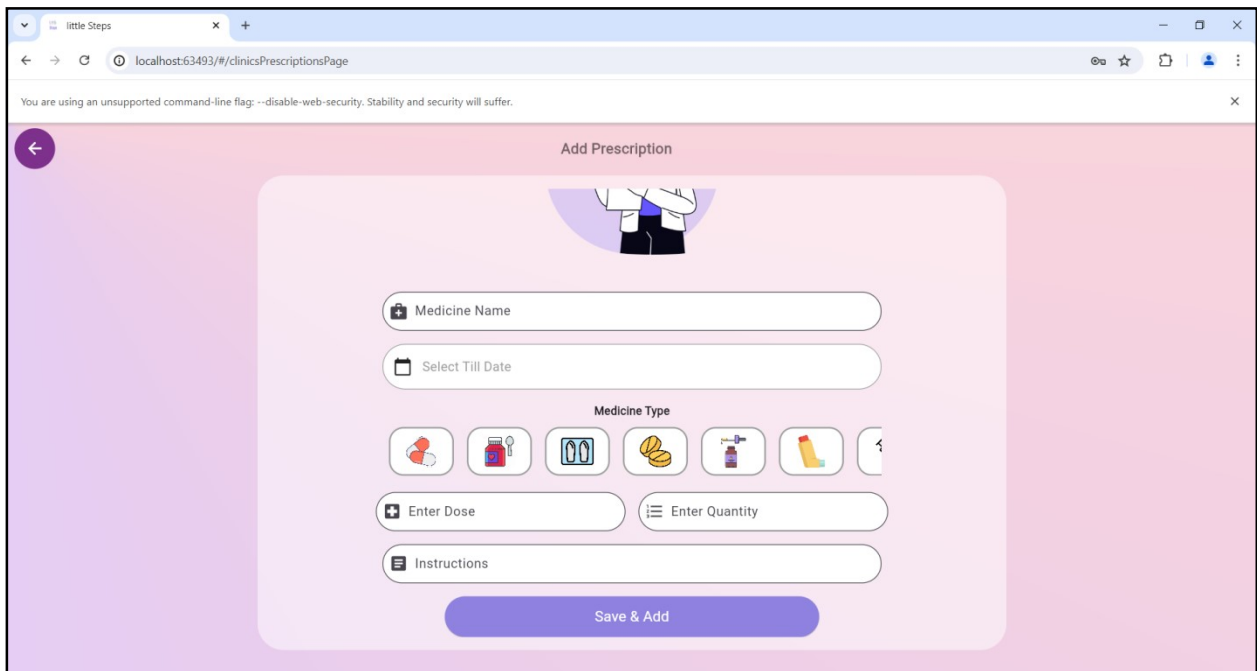


Figure 121:add baby prescriptions -web

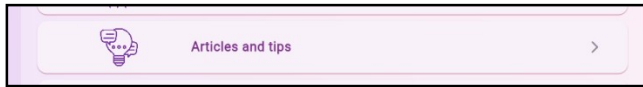


Figure 122:articles and tips

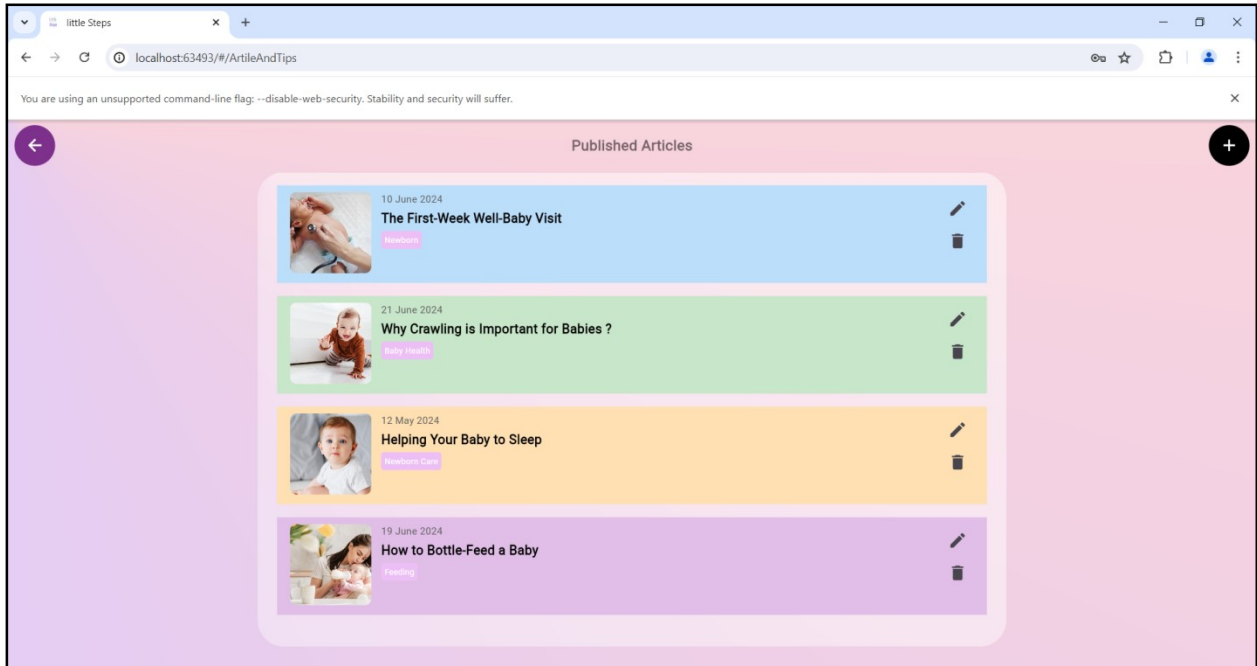


Figure 123:published articles-web

Here clinic can view articles , edit it and add new one:

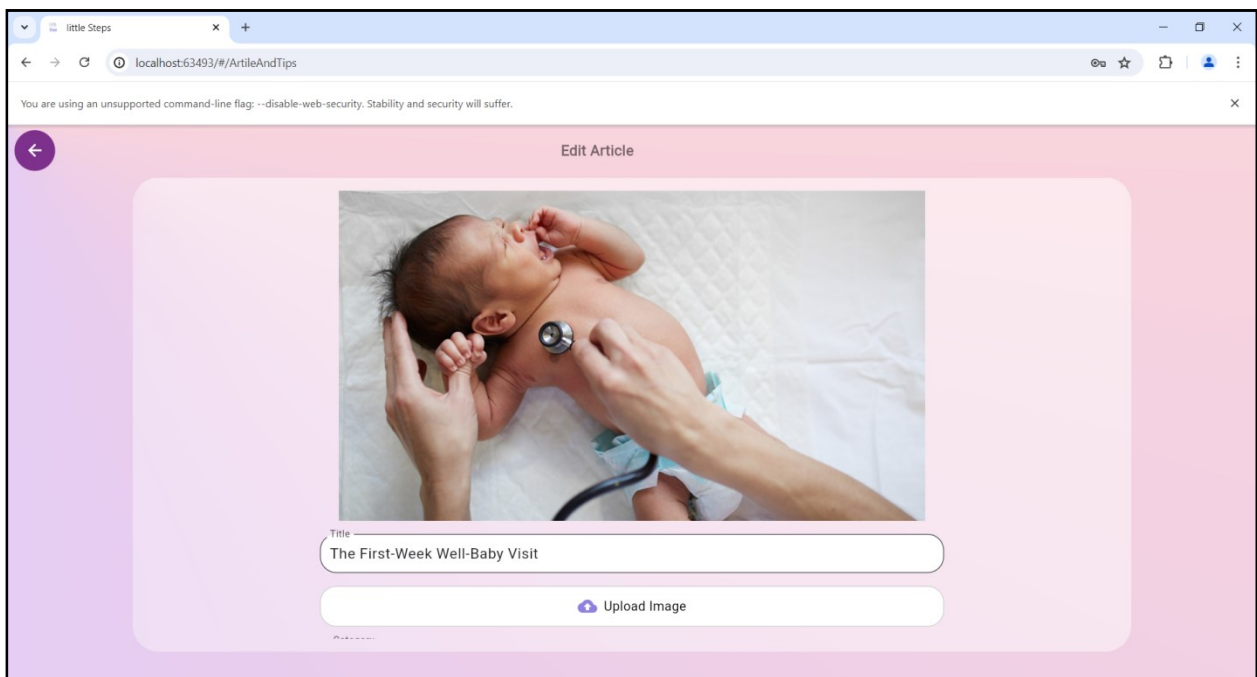


Figure 124:edit article1-web

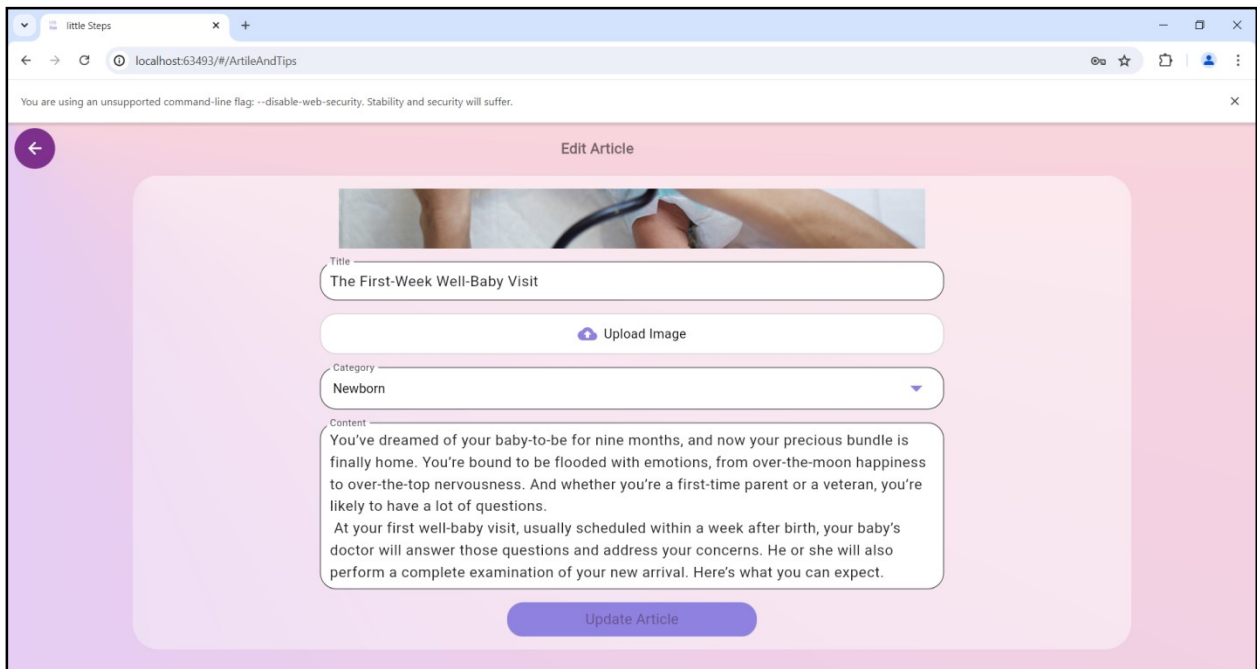


Figure 125:edit article2-web

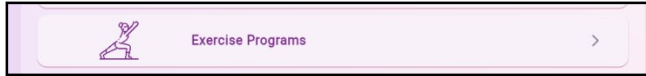


Figure 126:exercise program category

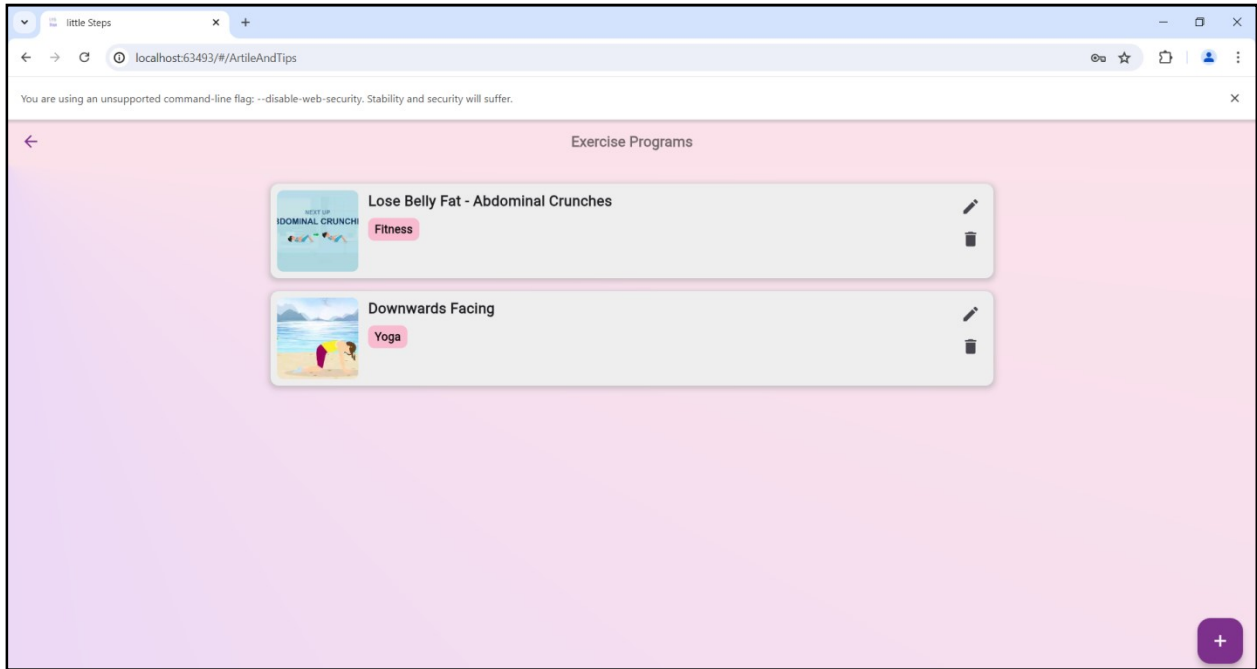


Figure 127:exercise program -web

Here clinic can view Mother exercises , edit it and add new one:

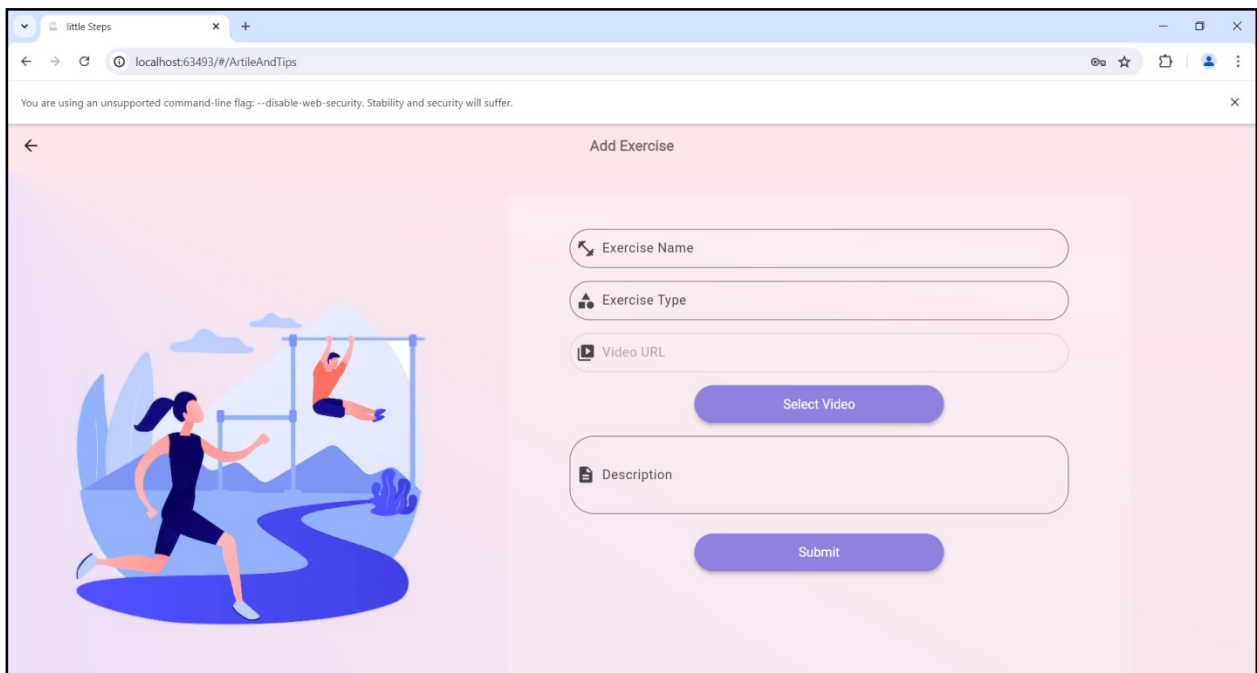


Figure 128:add exercise-web

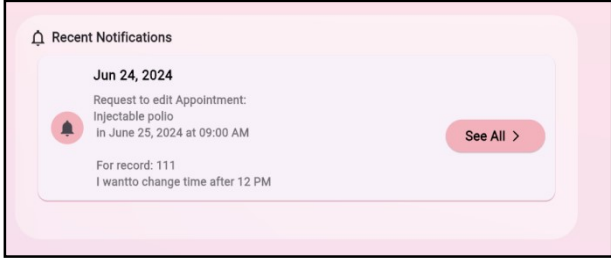


Figure 129:recent notification

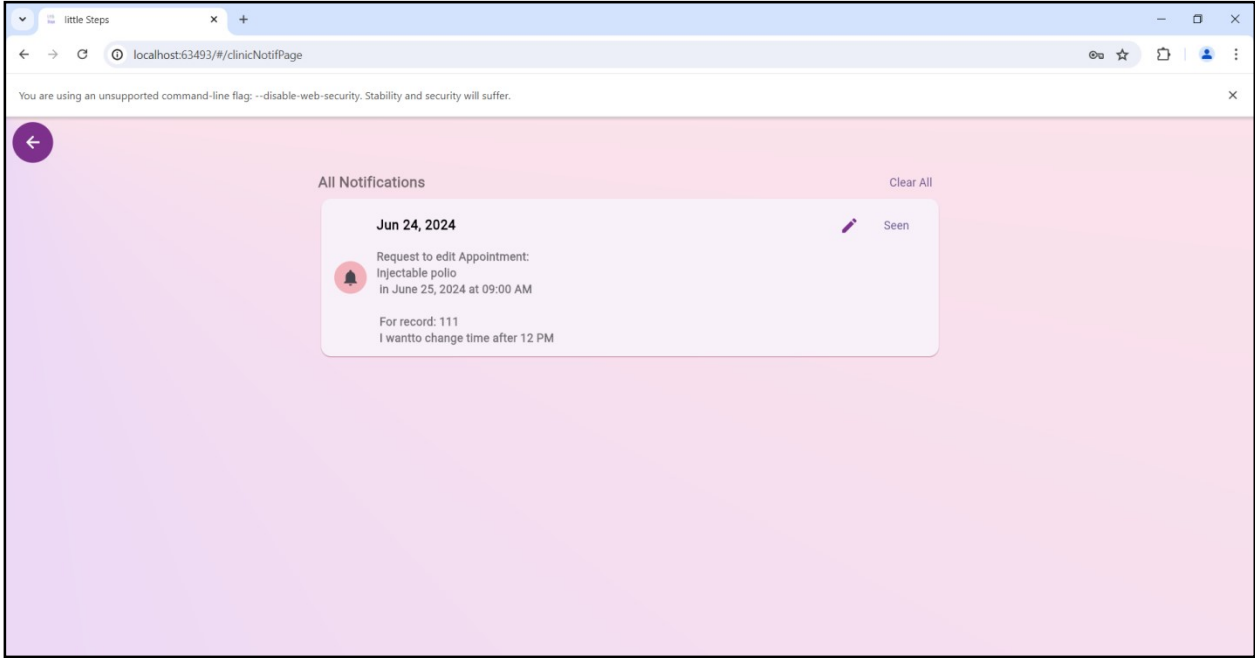


Figure 130:notification list-web

Here where clinic can see all notifications and edit appointment if needed.



Figure 131:recent conversation

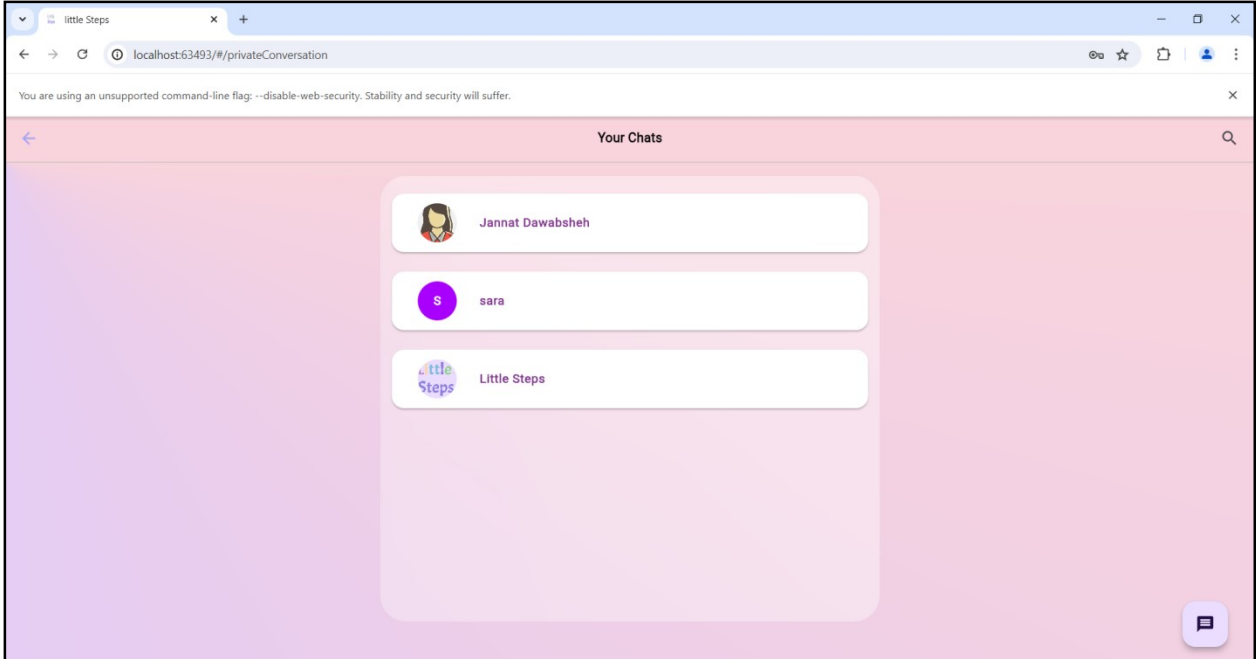


Figure 132:conversation list-web

Here is a list of clinic conversations, which can navigate to chatting with mother or admin:

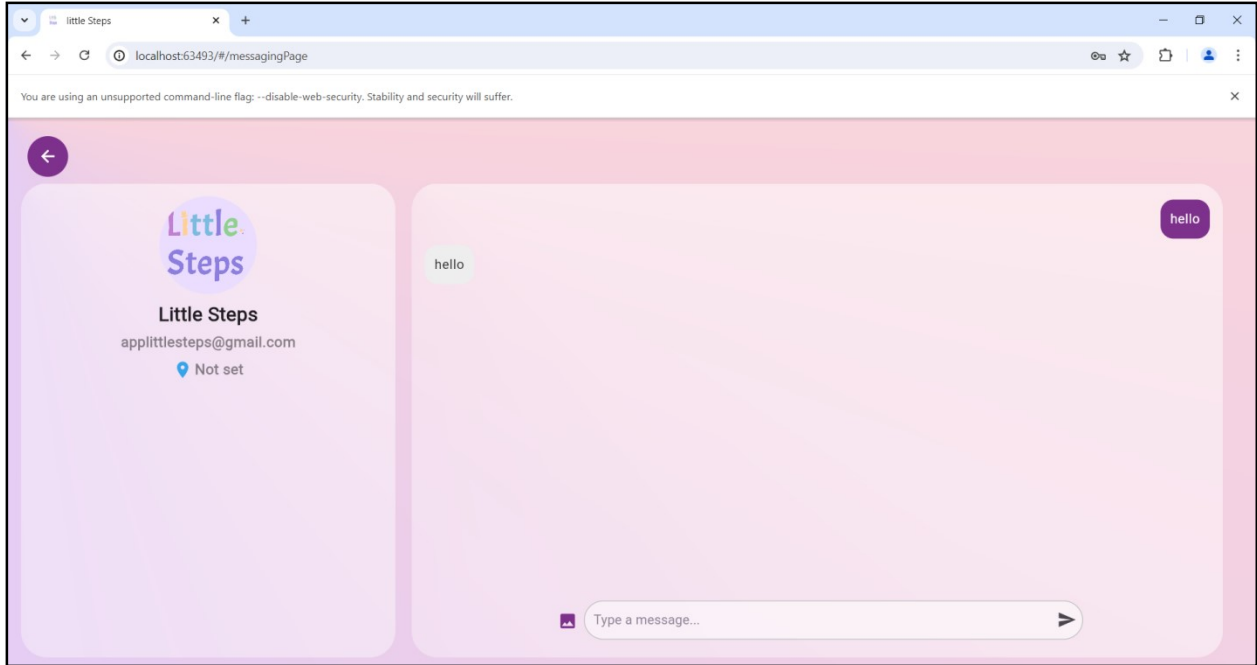
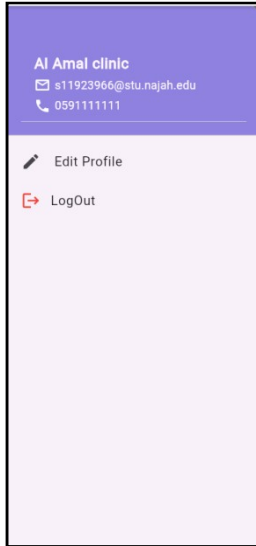


Figure 133:chat-web



From Drawer clinic can either logout or edit profile:

Figure 134:clinic drawer

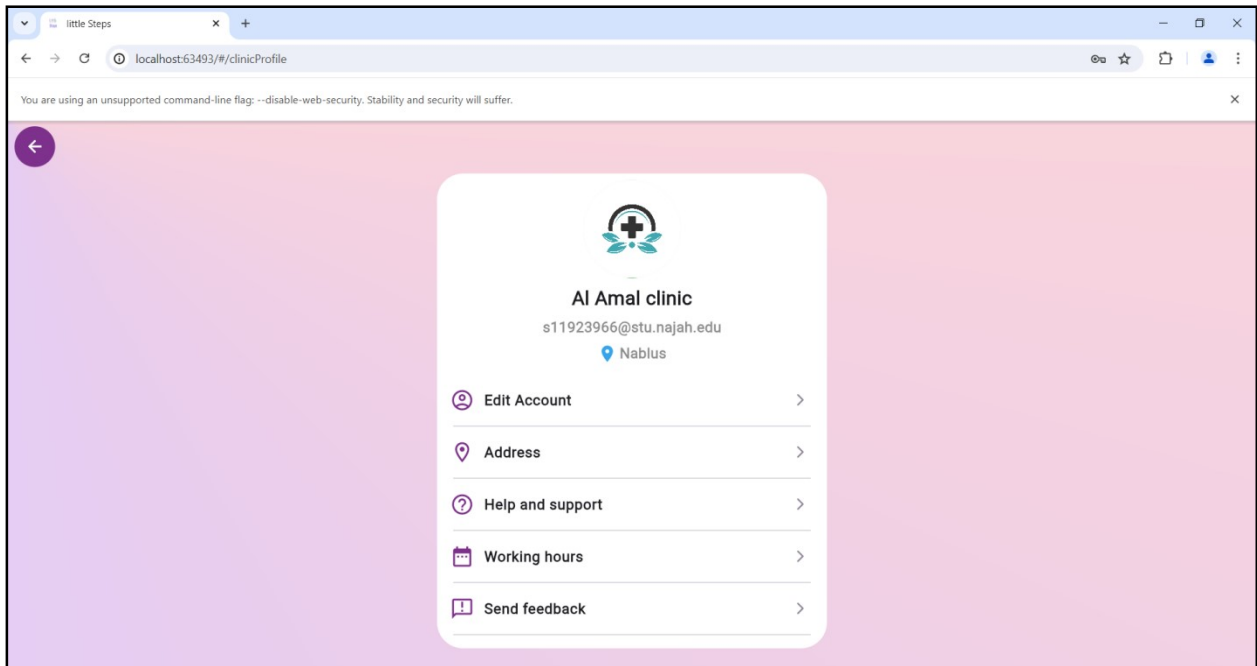


Figure 135:clinic profile -web

From Edit account:

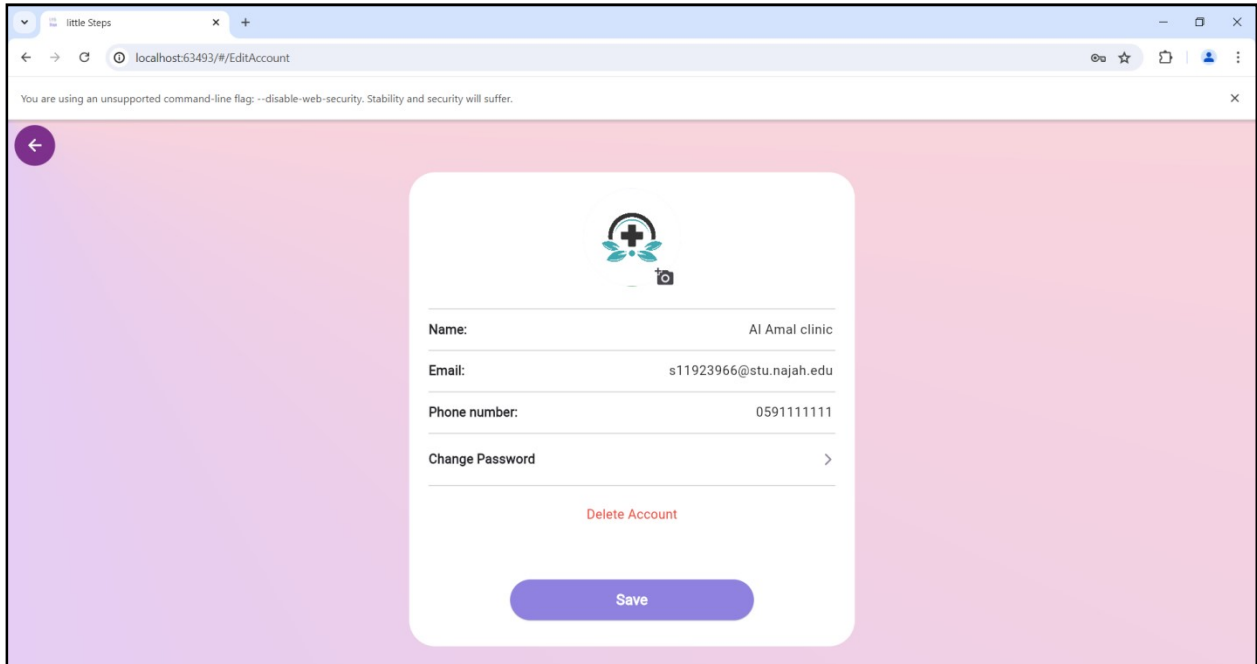


Figure 136:clinic Edit account-web

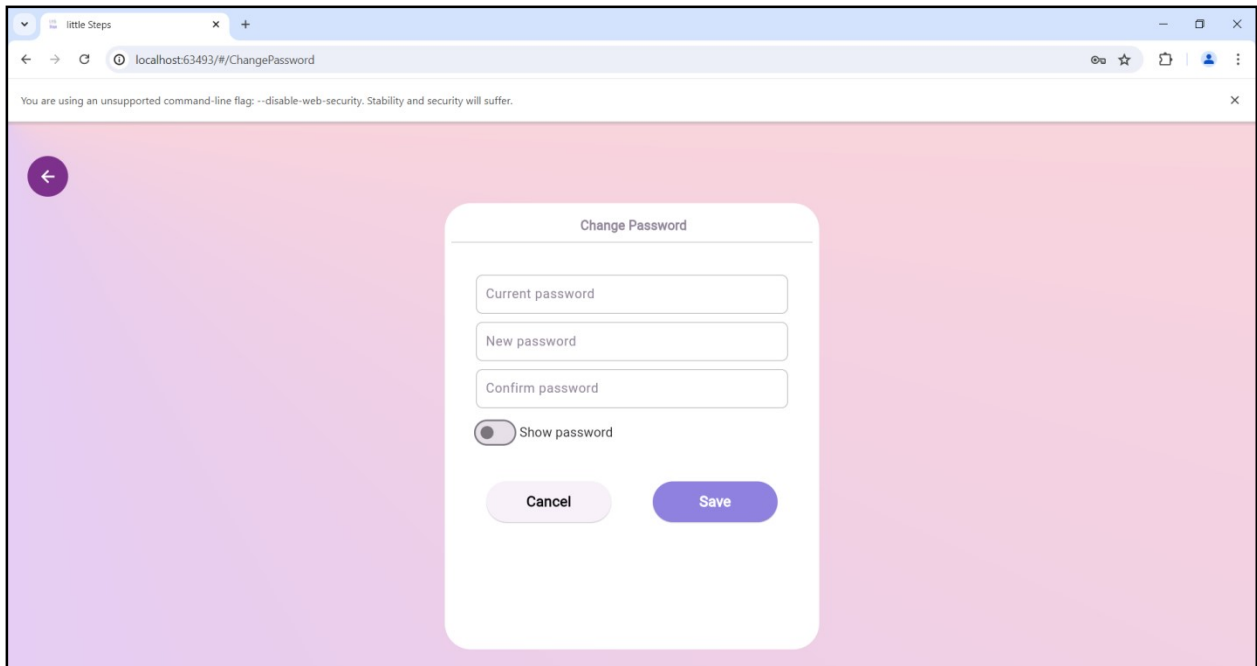


Figure 137:clinic change password-web

Clinic can change here information, profile image and password

From Help and support:

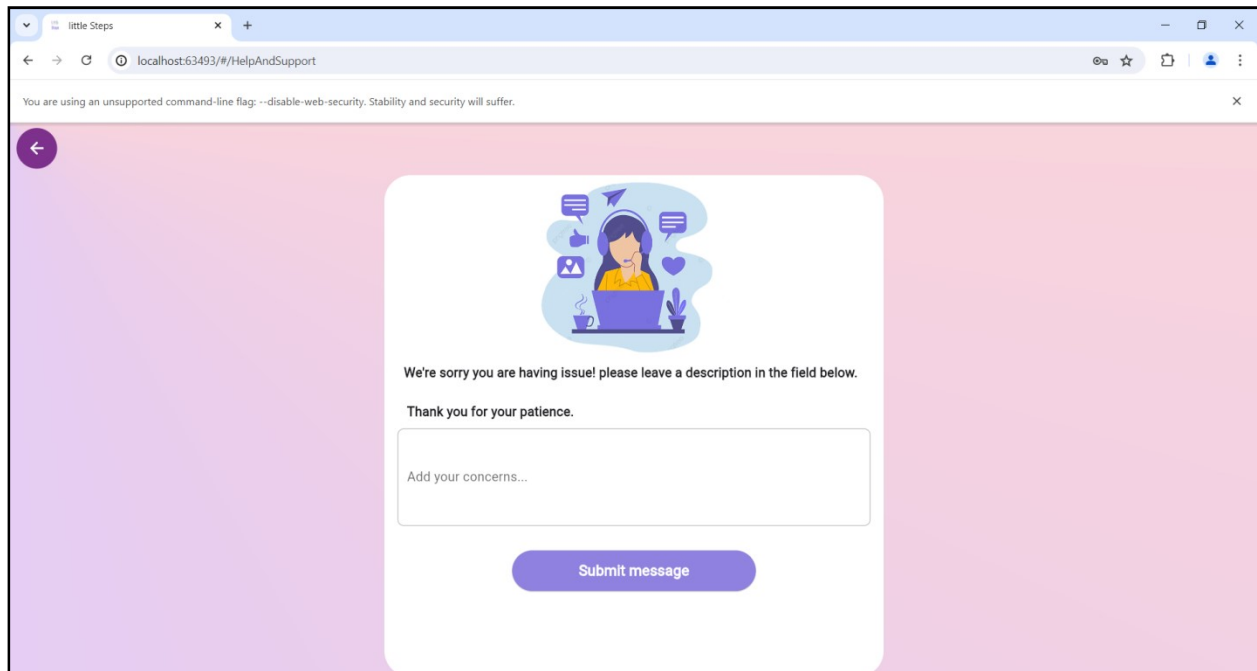


Figure 138:Help and support-web

Clinic can Send a help request to admin

From working hours:

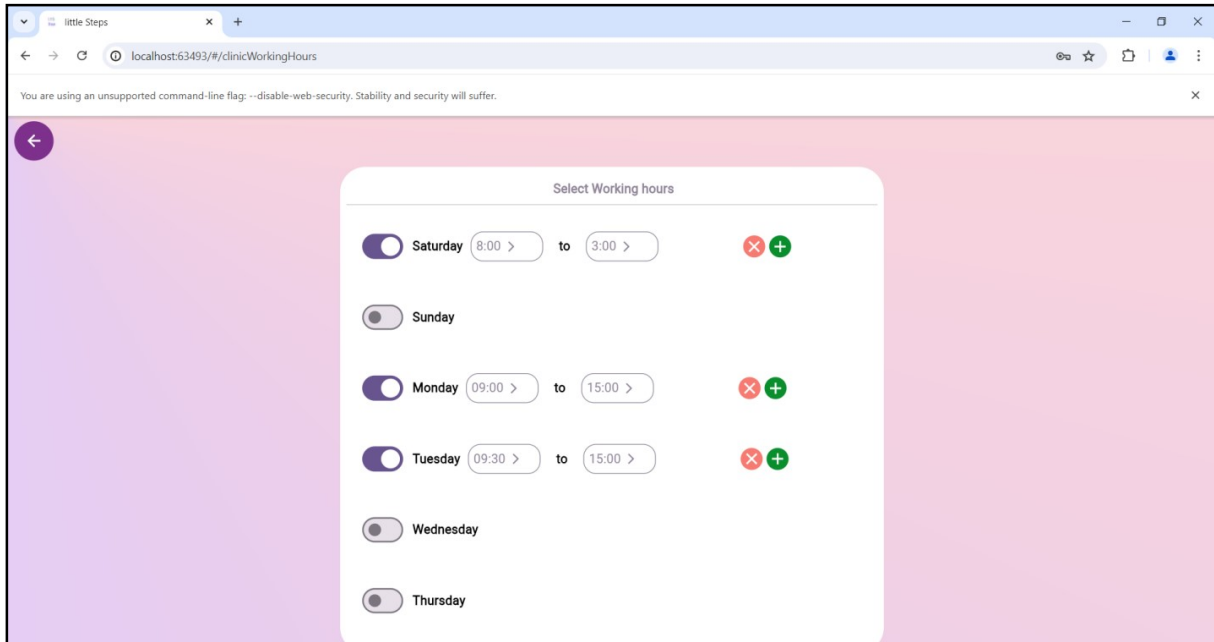


Figure 139:working hours web

Clinic can select its working hours days and times.

From Feedback:

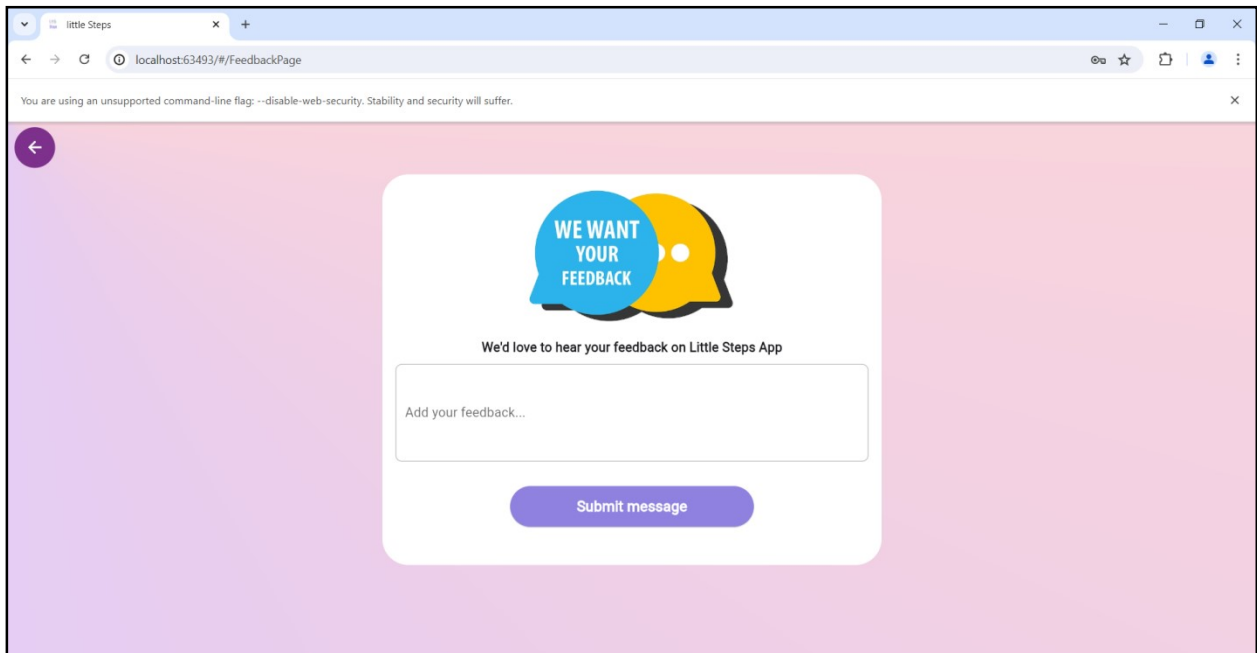


Figure 140:Feedback-web

Clinic can Send a feedback to admin

4.2.2.4.Mother side

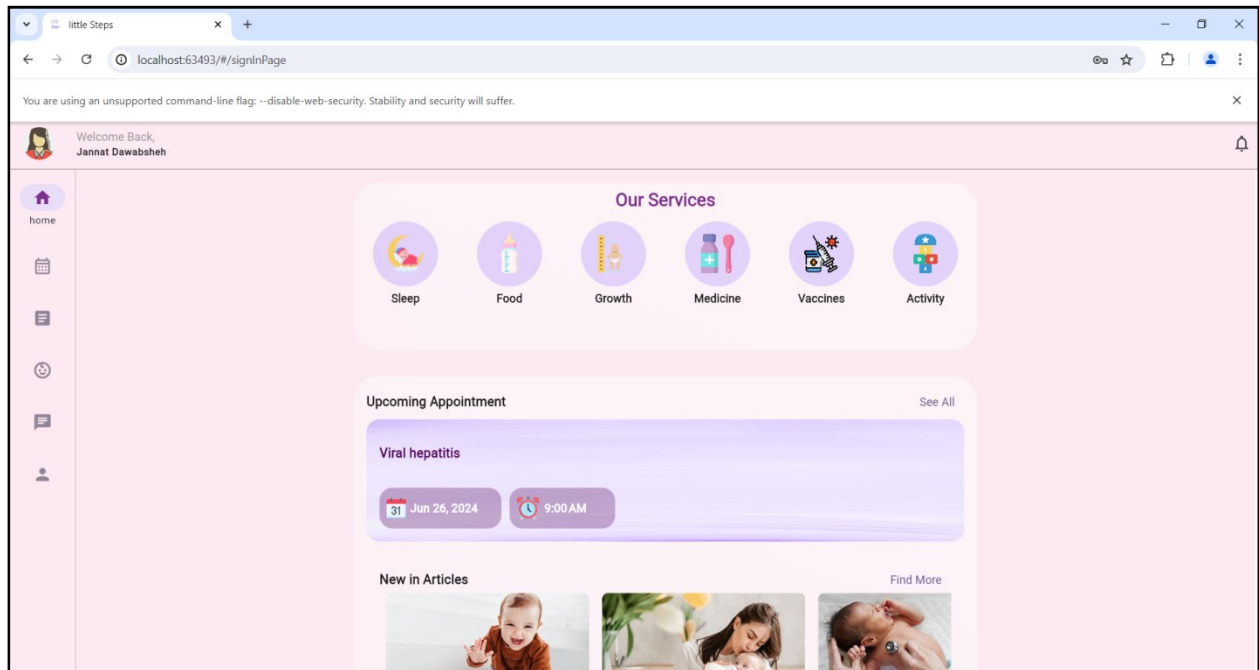


Figure 141:mother home1-web

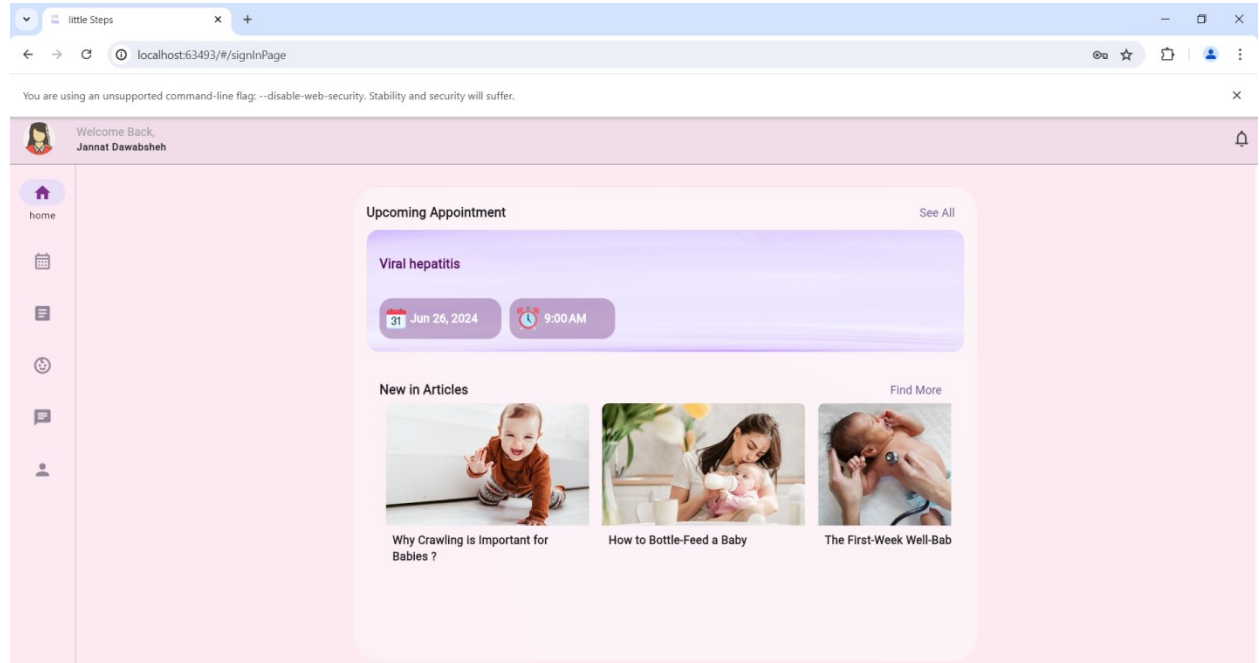


Figure 142:mother home2-web

Here is the mother home page where she can view services and her upcoming appointment and the newest articles.

From sleep service:

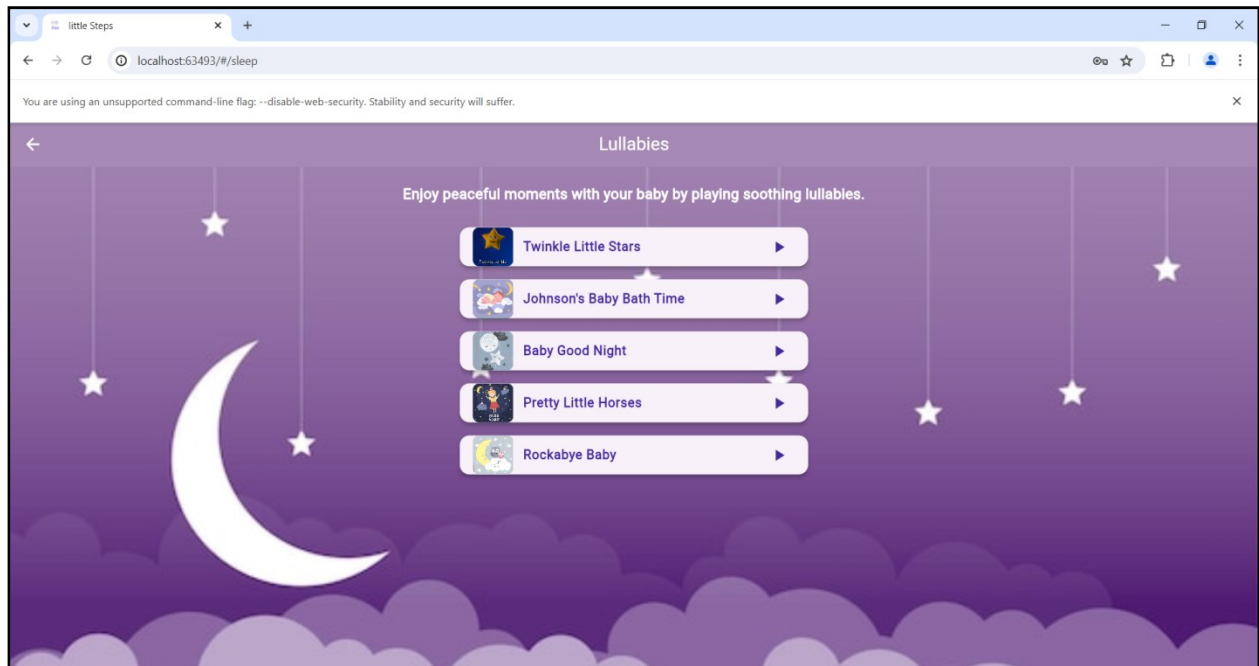


Figure 143:lullabies-web

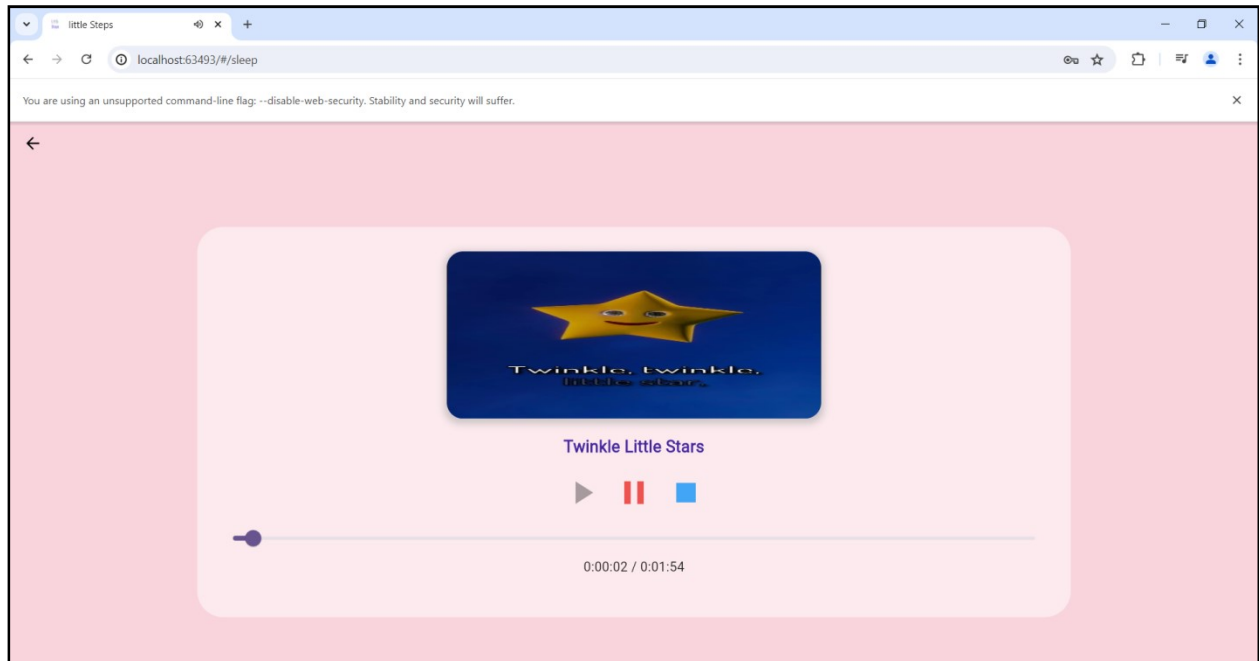


Figure 144:lullaby-web

Here mother and child can hear lullabies to help her child sleep.

From Growth service:

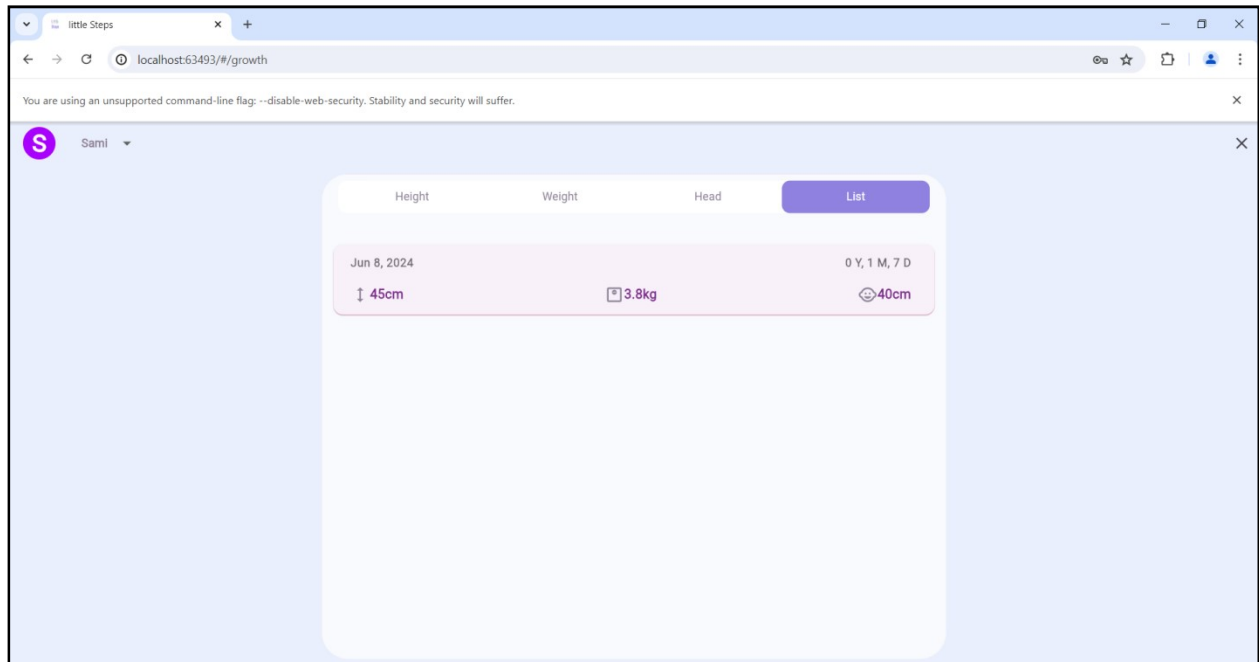


Figure 145:Growth service-web

mother can view list of child growth data

From Medicine service:

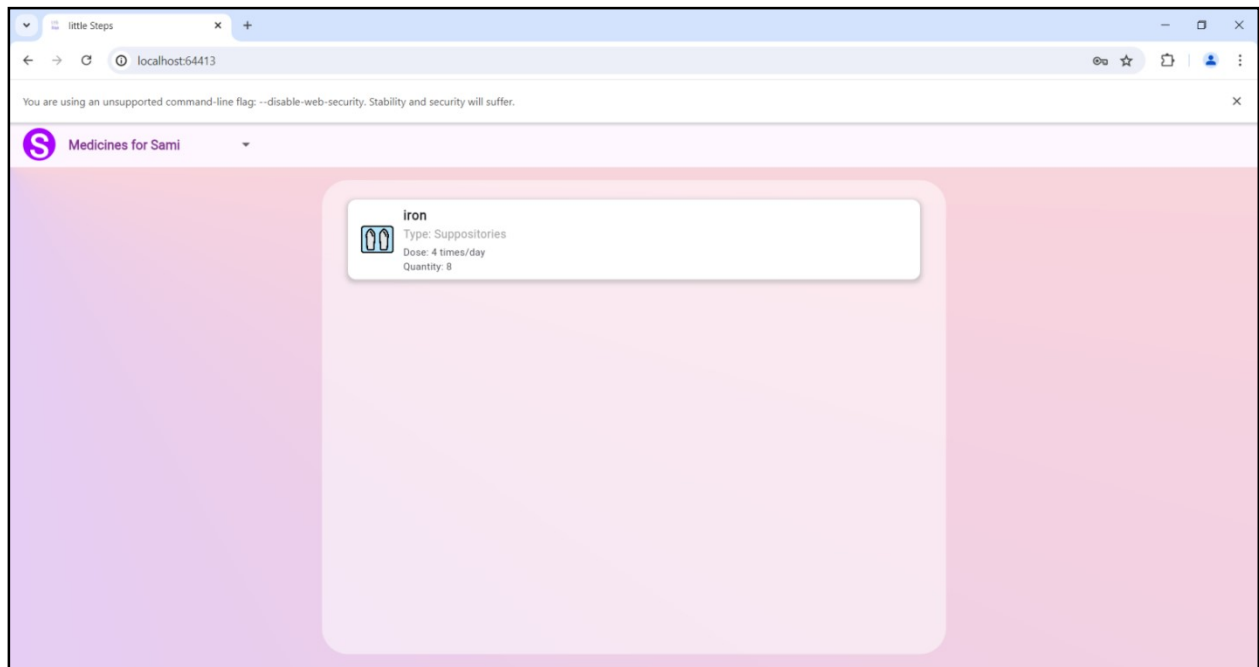


Figure 146:Medicine service-web

mother can view child prescriptions added by clinic

From Exercises service:

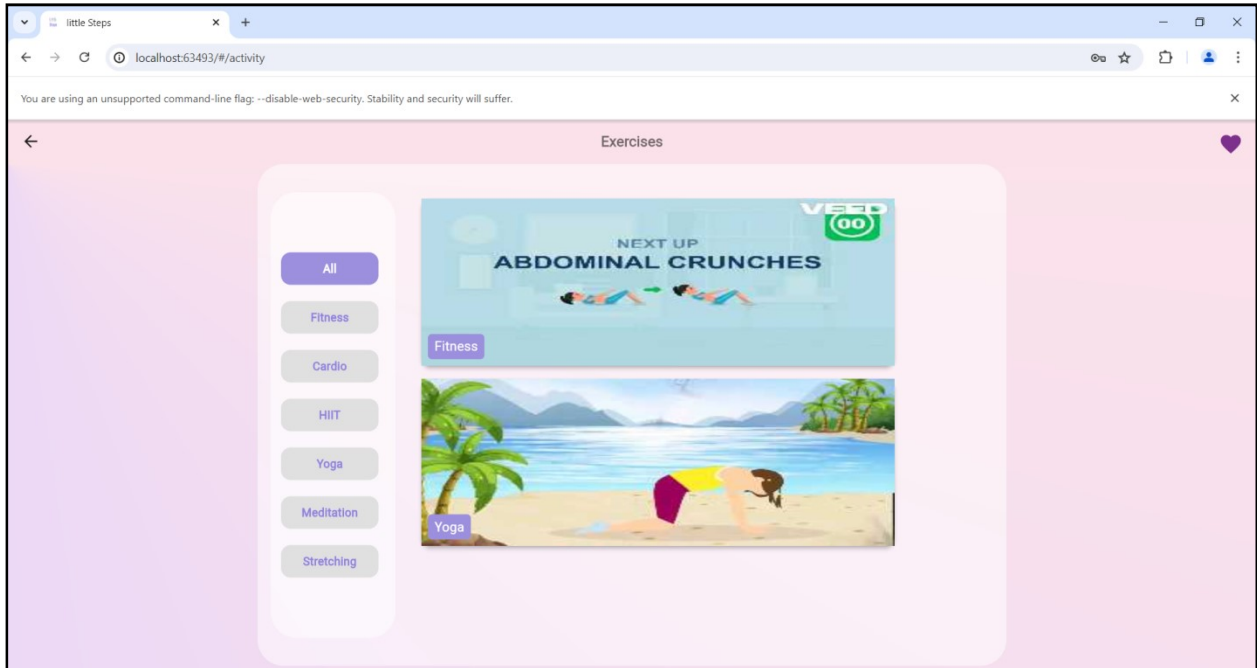


Figure 147:Exercises service-web

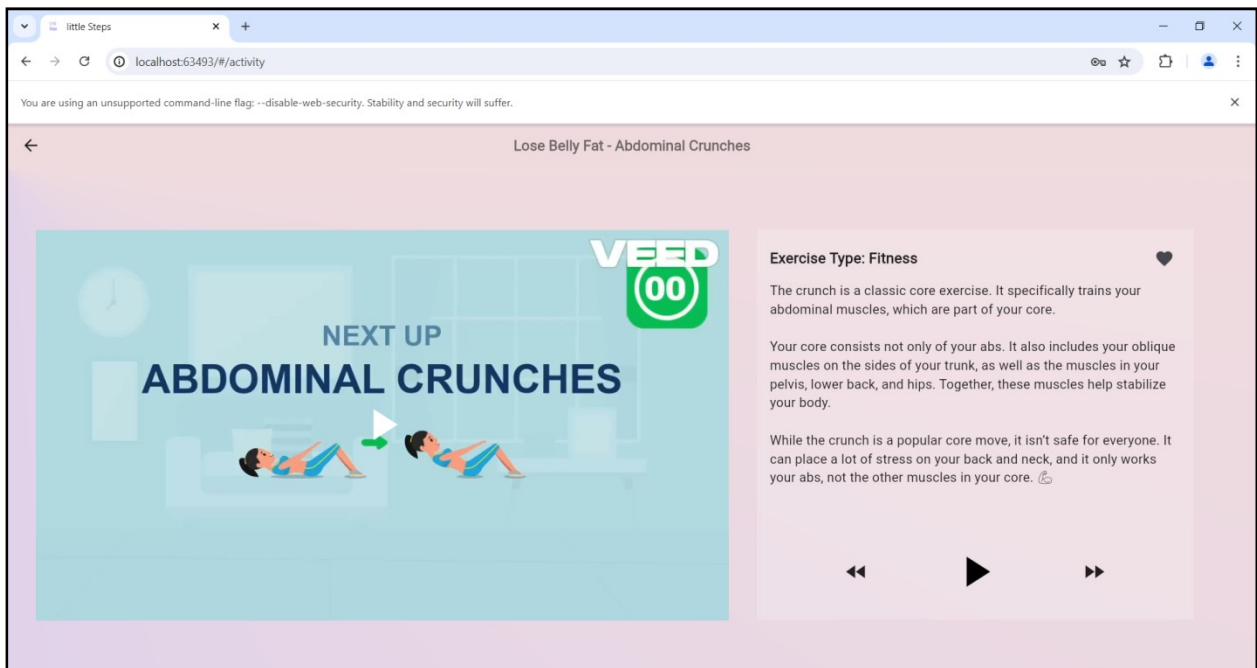


Figure 148:exercise-web

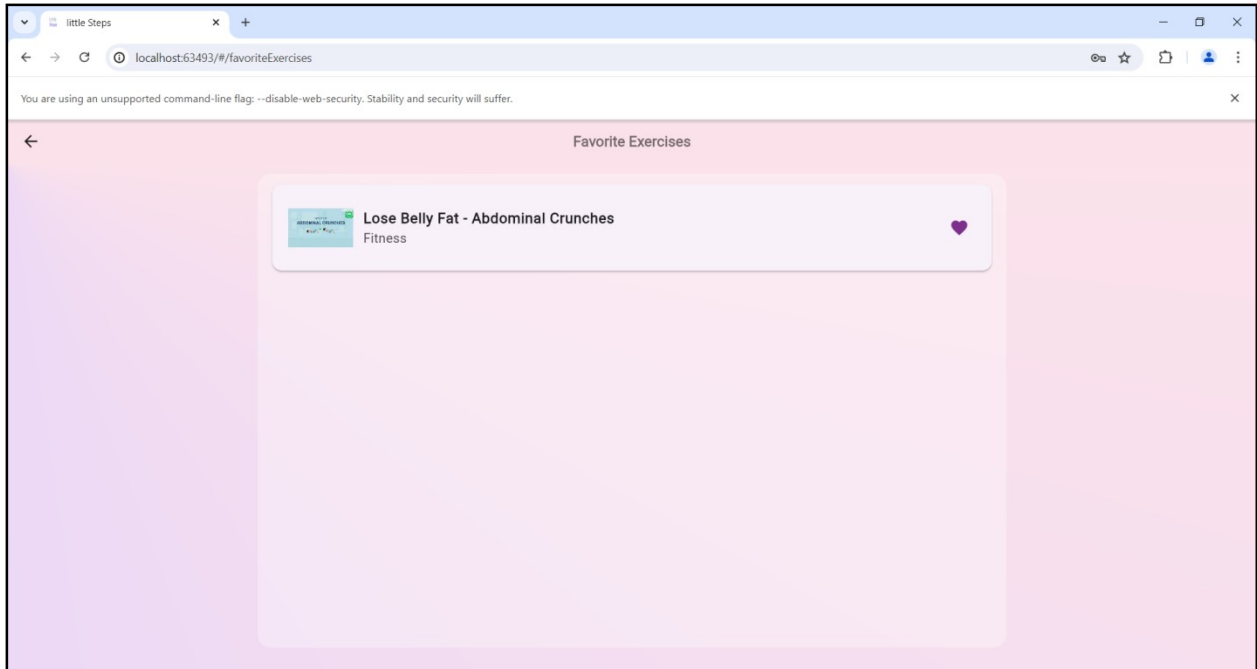


Figure 149:favorite exercises-web

mother can view exercises added by clinic and add them to favourite list

From upcoming appointment:

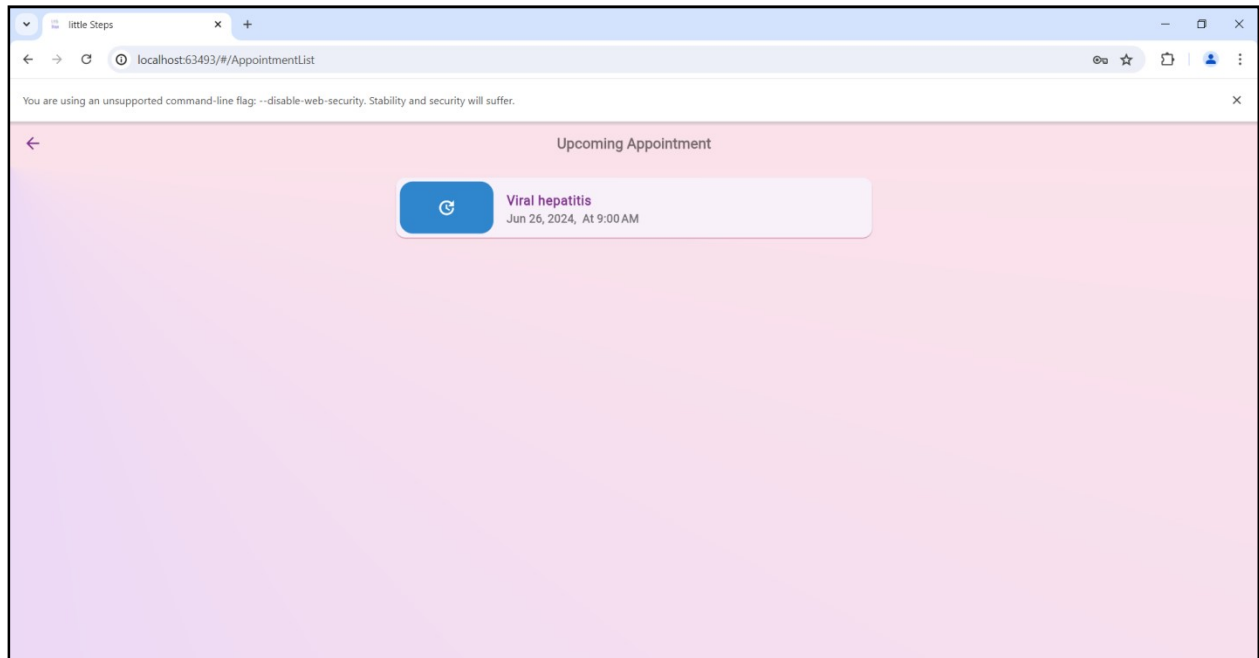


Figure 150:upcoming appointment-web

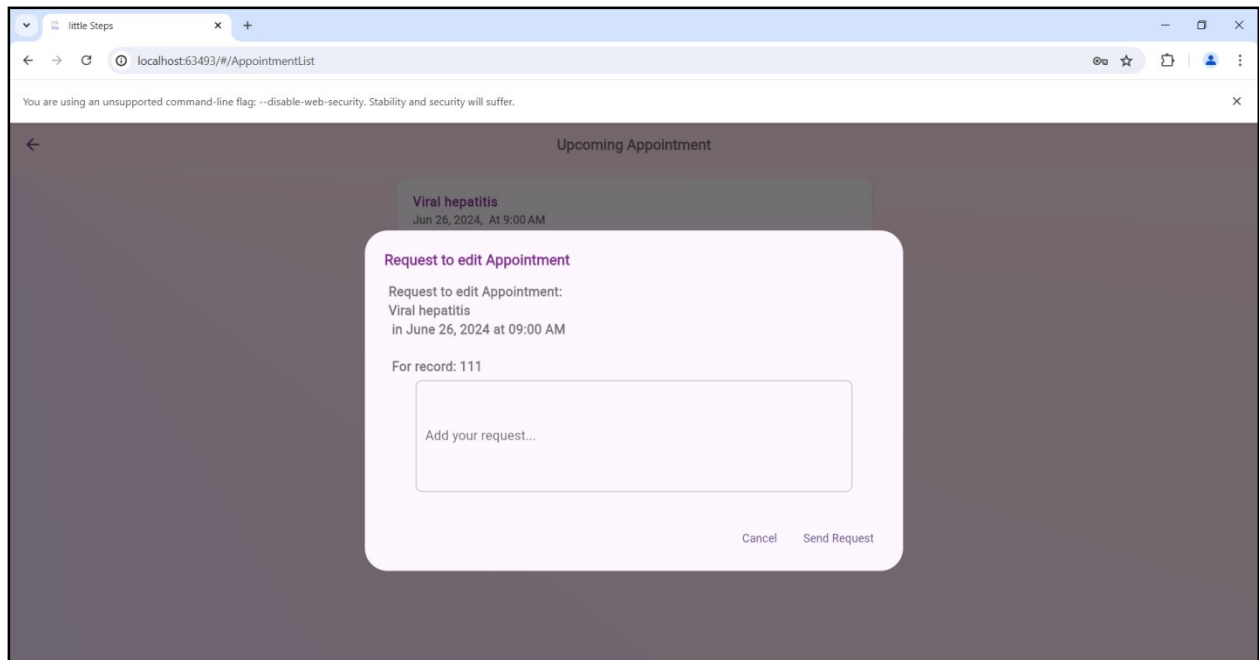


Figure 151:request to edit appointment-web

mother can view her appointment and send request if needed

From appointment tab :

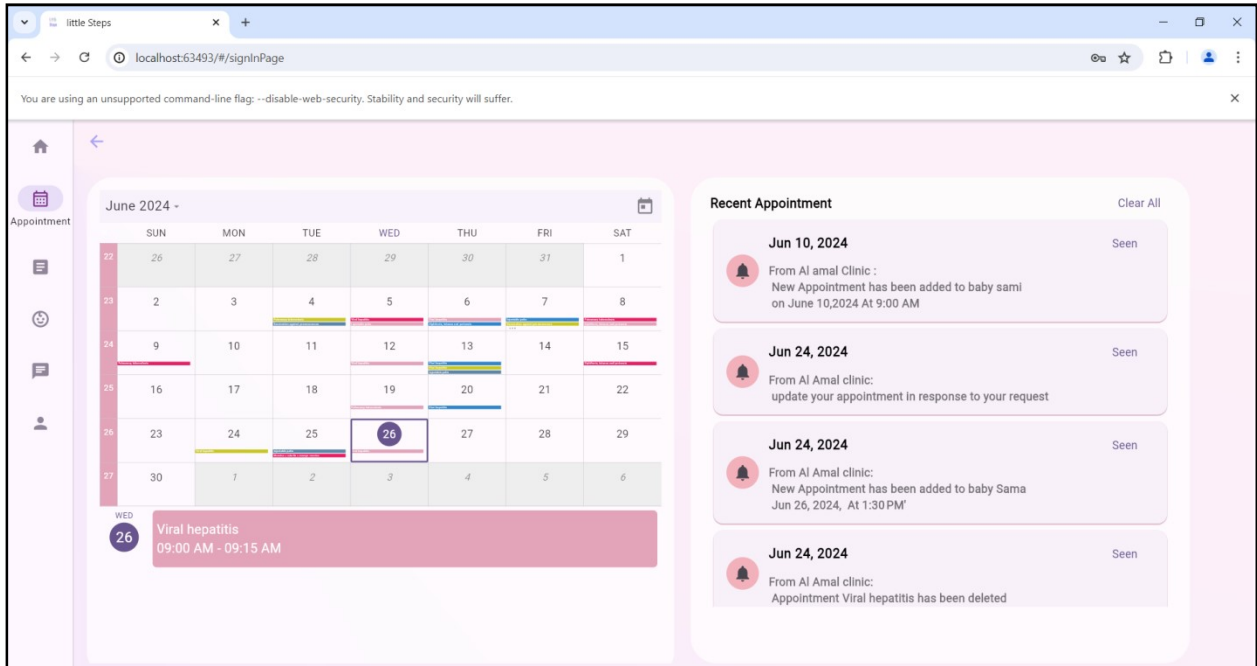


Figure 152:mother appointment-web

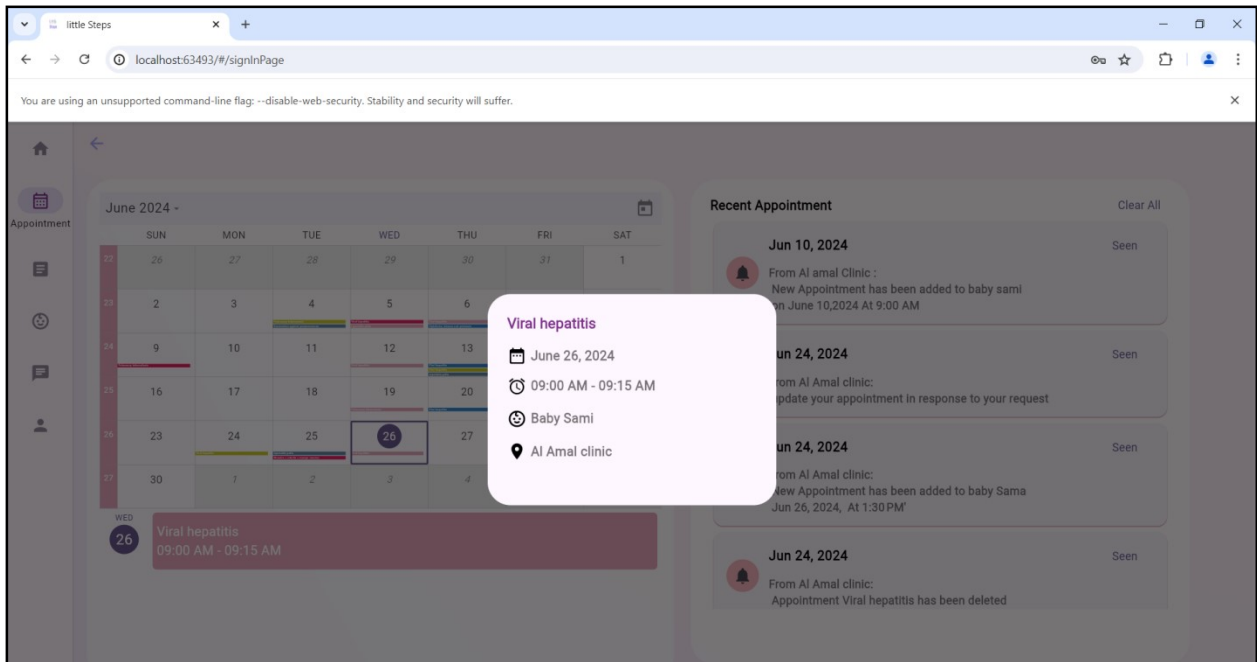


Figure 153:appointment details-web

Here where mother can view her appointment in calendar and its details

From articles tab :

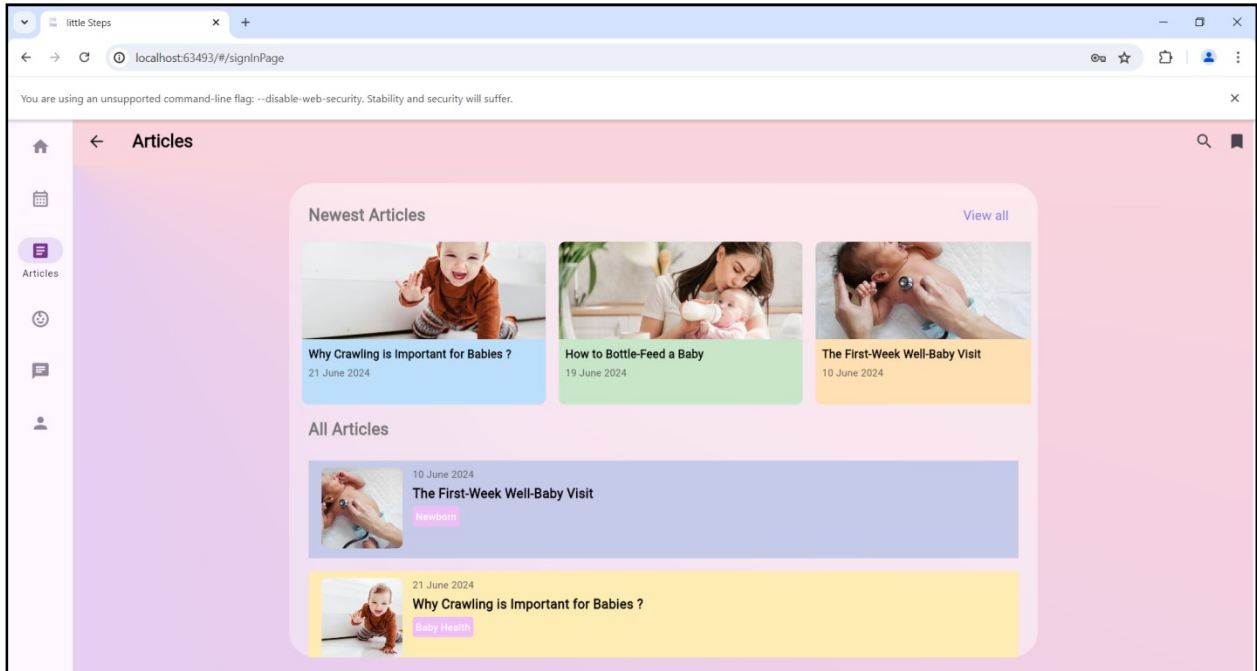


Figure 154:articles tab -web

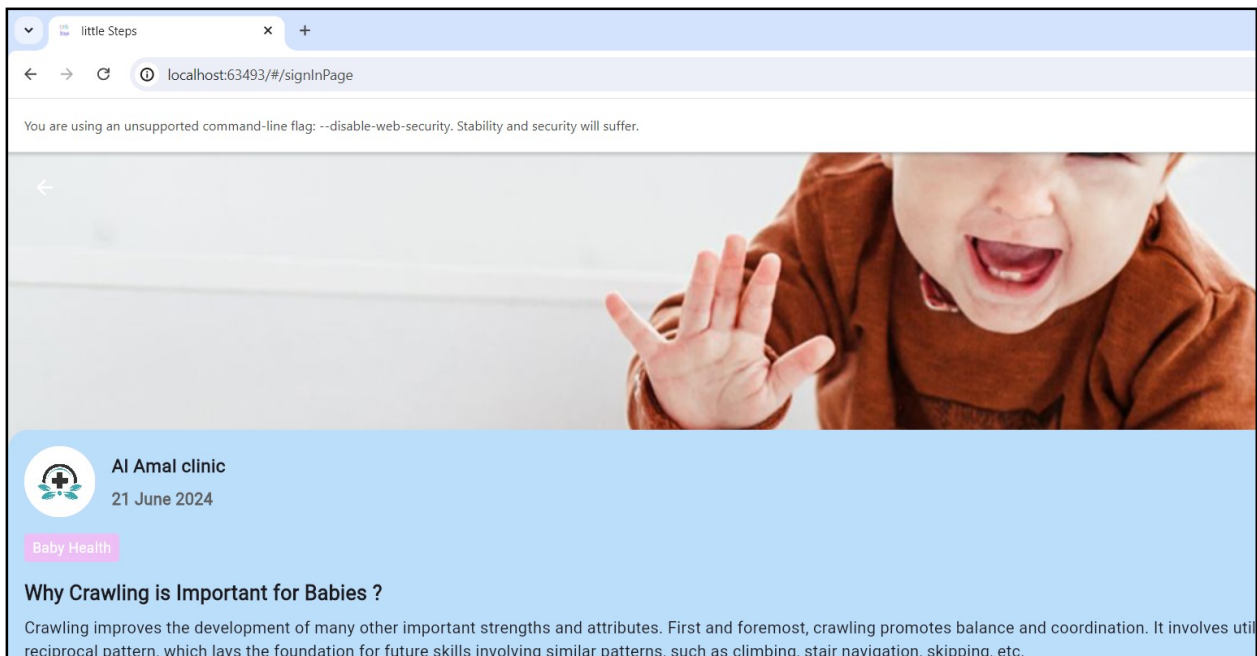


Figure 155:article details-web

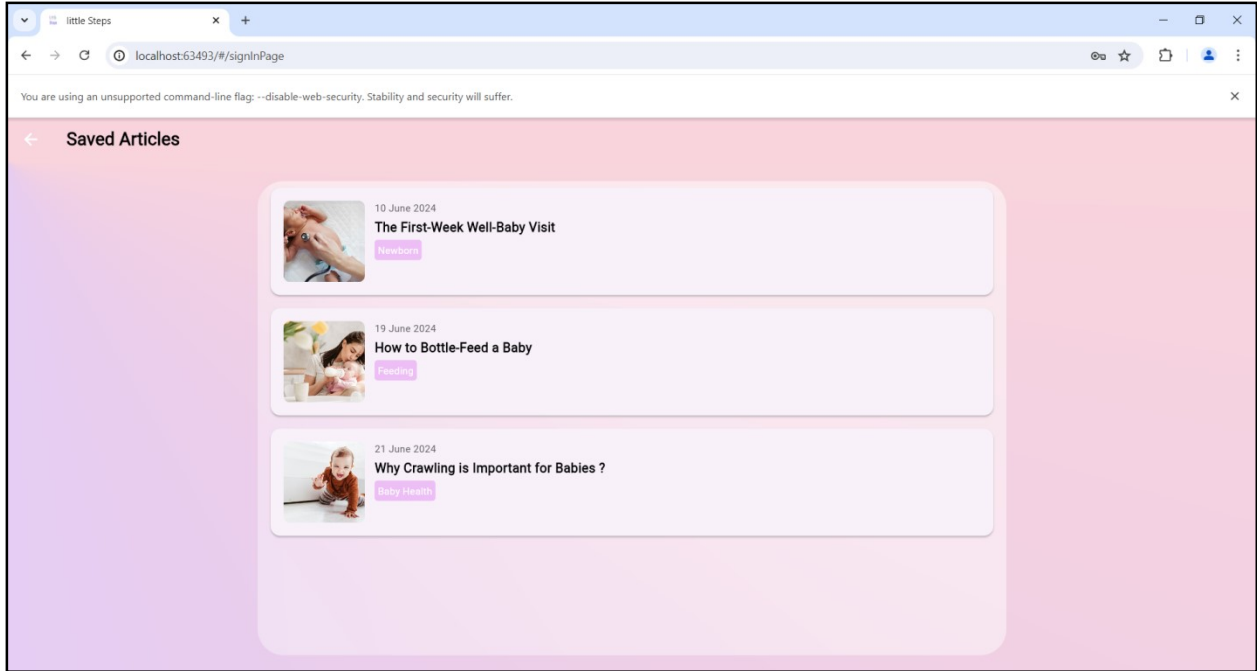


Figure 156:saved article-web

Here where mother can view articles added by admin and saved it to read later

From child profile tab :

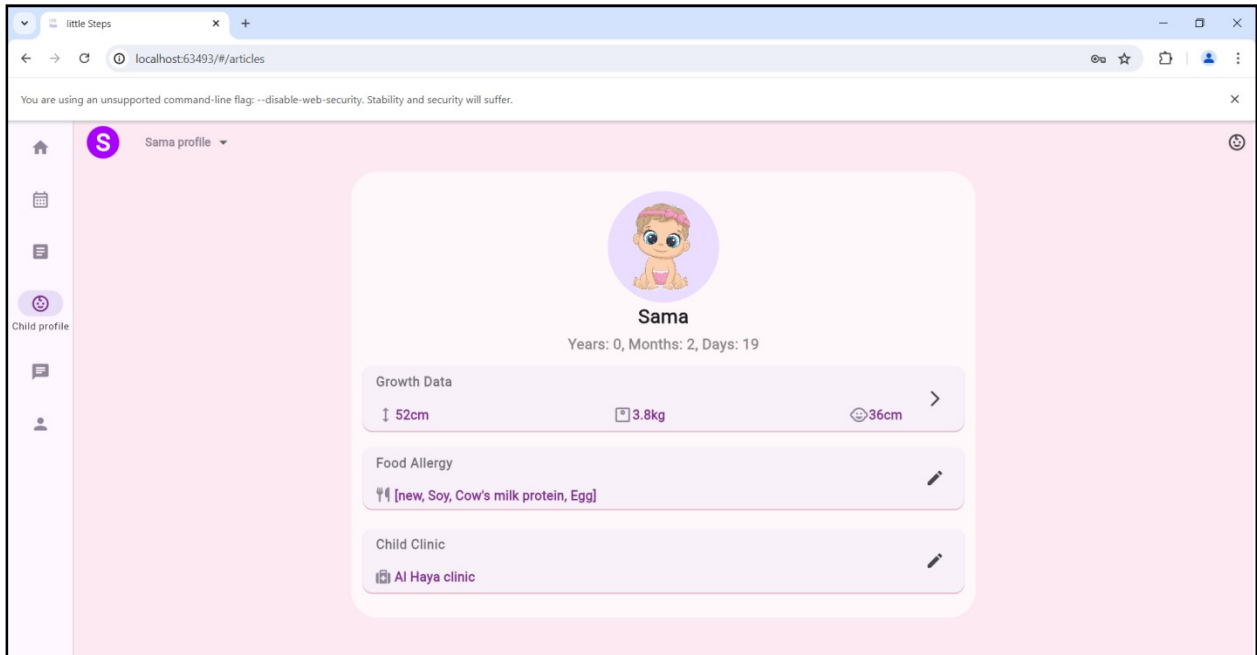


Figure 157:child profile tab -web

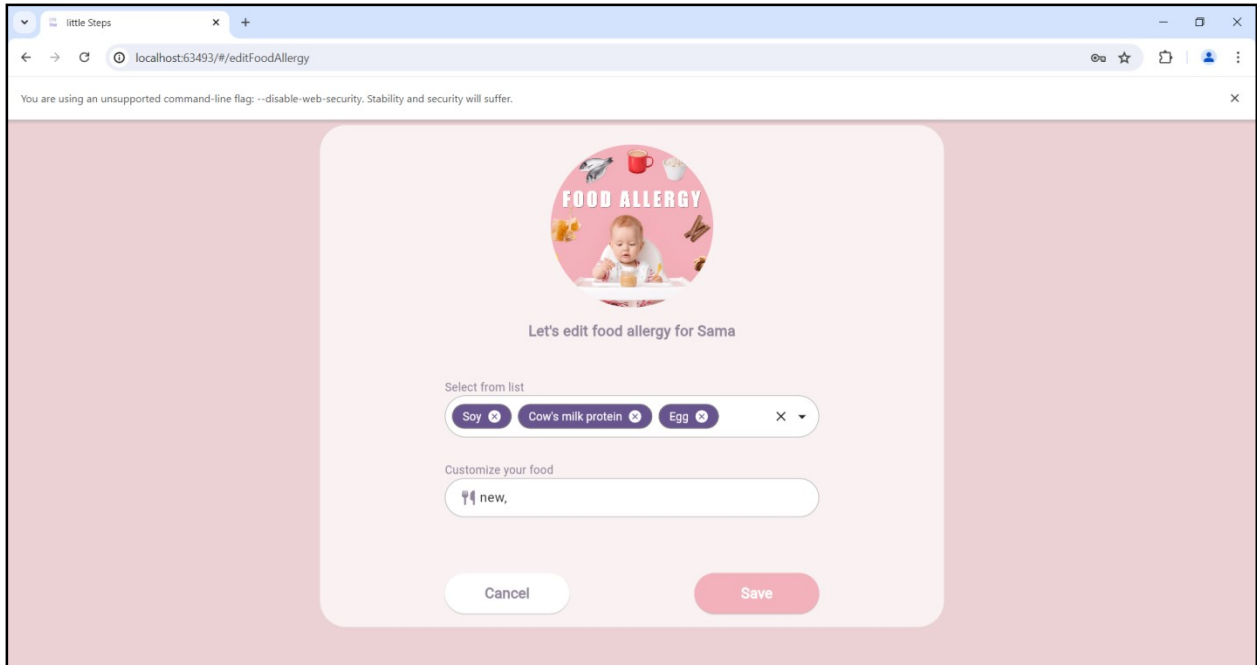


Figure 158:allergy food -web

Here where mother can add allergy food for child

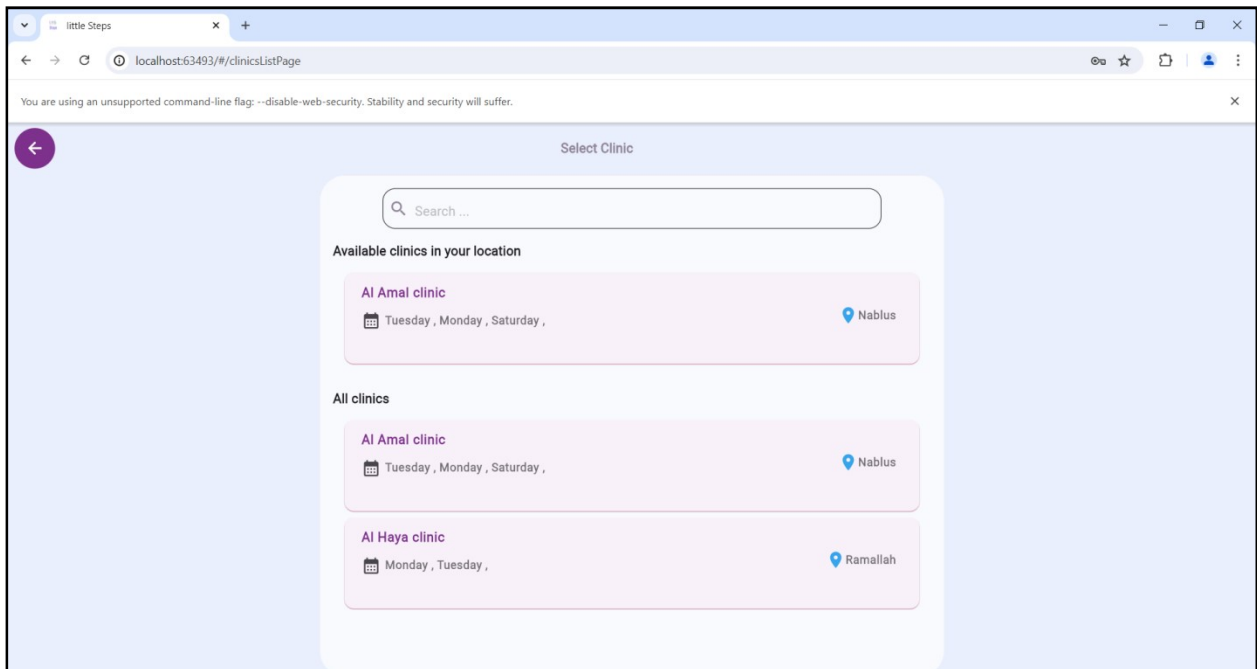


Figure 159:clinics list-web



Figure 160:clinic details-web

Here where mother can choose clinic for her child, or searching by address

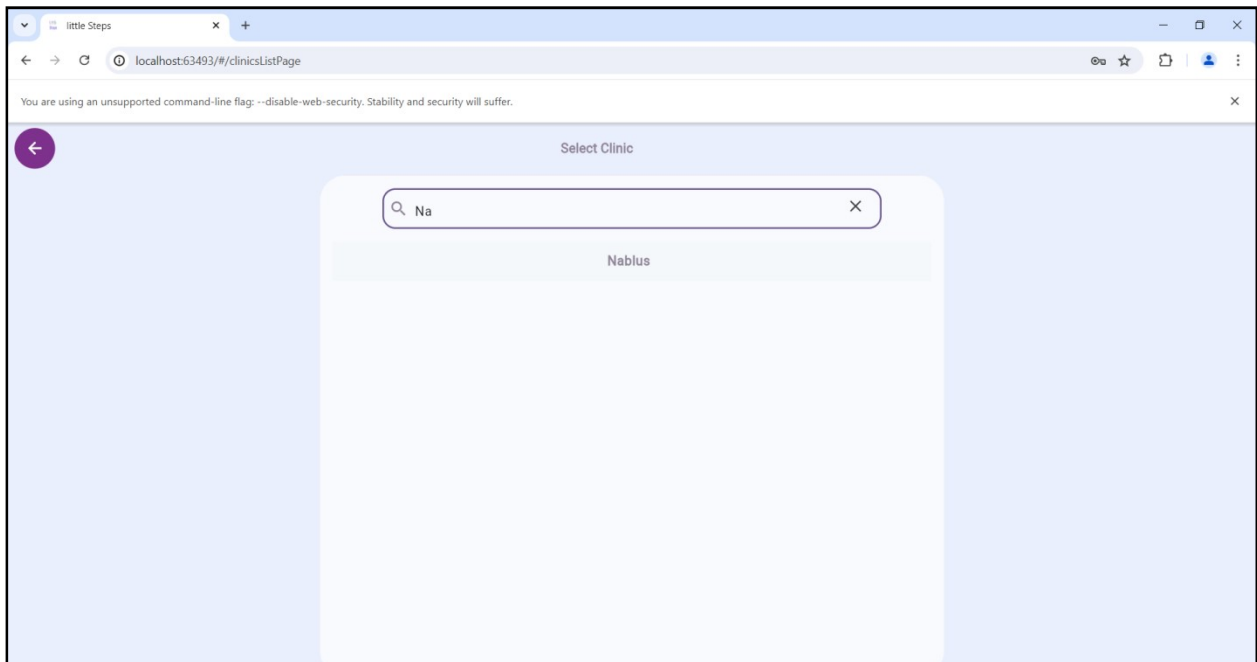


Figure 161:search for clinic-web

Here mother can add a new child

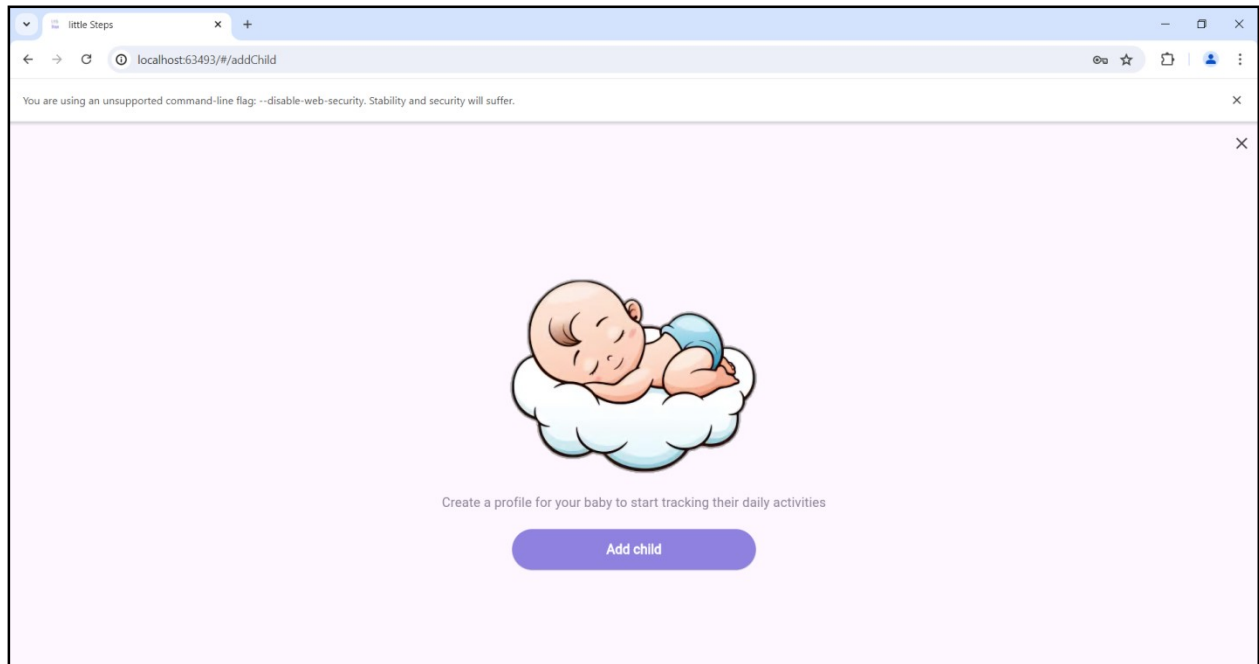


Figure 162:add a new child -web

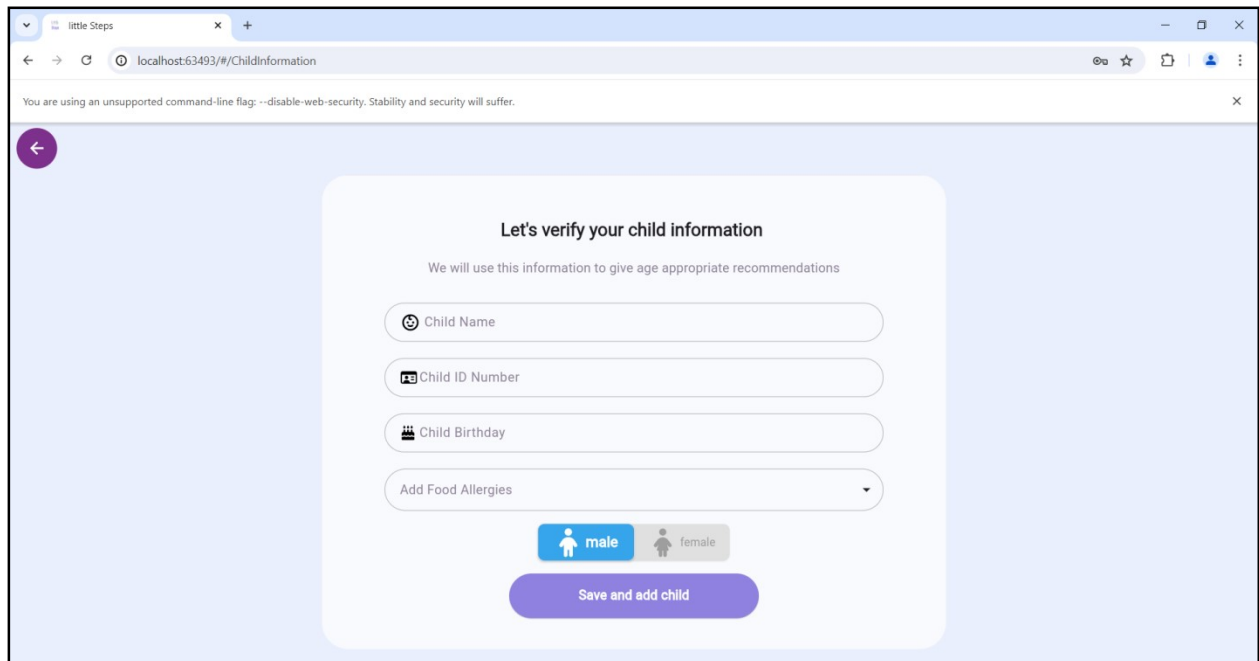


Figure 163:child information-web

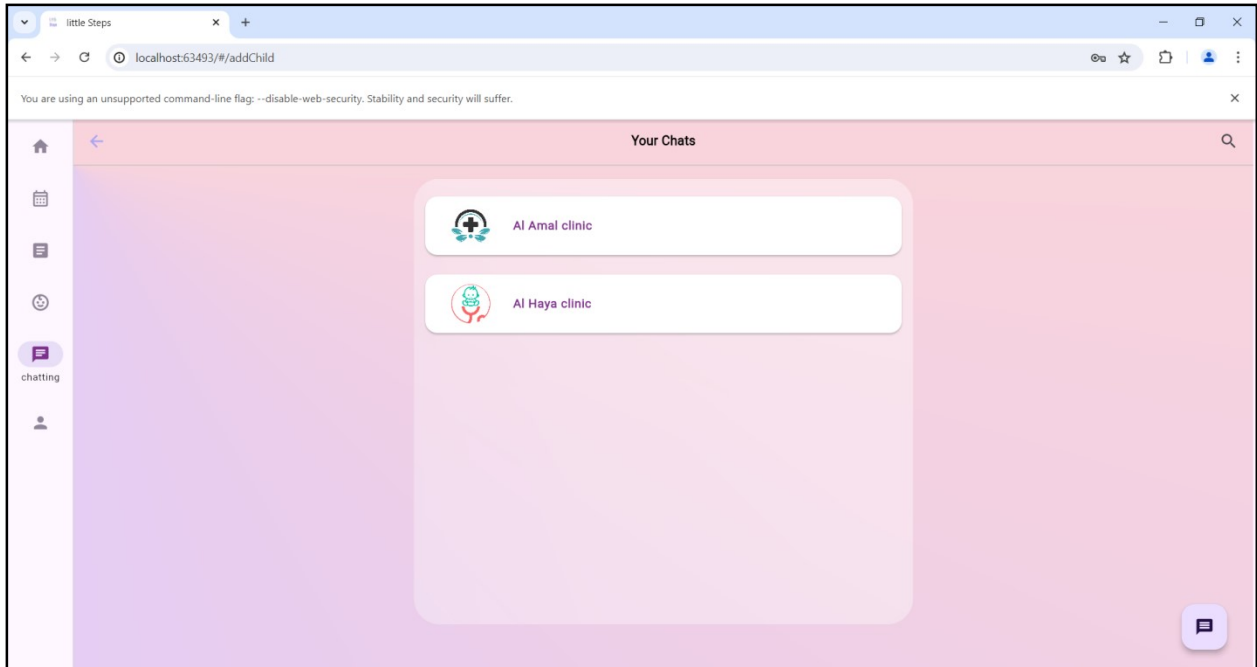


Figure 164:mother conversation-web

Here where mother can start conversations

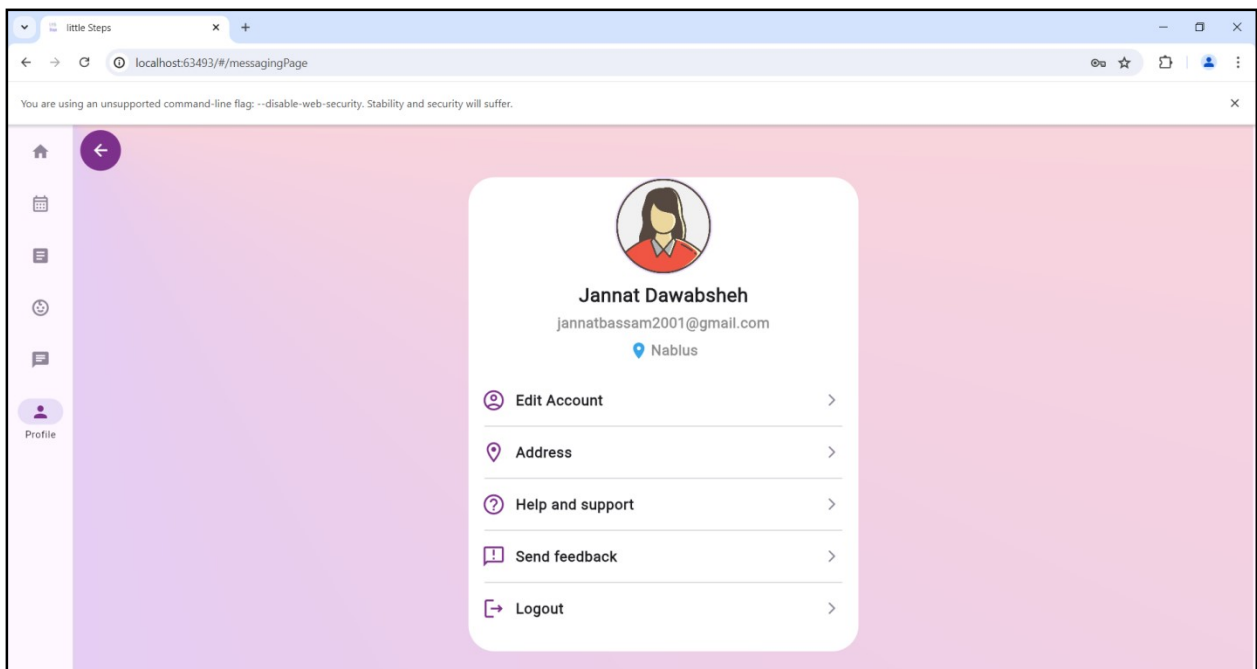


Figure 165:mother profile-web

Here where mother can edit her profile, send help request and feedback in the same way as clinic.

5. Results and Discussion

The preceding pictures demonstrate that the built program has effectively fulfilled its original objective of providing great efficiency and a user-friendly experience. Our emphasis on ease of use and intuitiveness was particularly intended to serve mothers with low levels of technological literacy.

Mobile Application Results:

Flutter and Dart were used in the development of the mobile application to ensure interoperability with both iOS and Android. The application has a number of important features designed to help new mothers take care of their babies:

The section on newborn care offers advice on how to manage general health, including sleeping habits, medication regimes, growth tracking, and more.

Appointment Scheduling: This feature enables moms to easily plan and manage doctor's visits and immunizations using a calendar interface. Reminders are sent out via email and alerts.

Community Engagement: Promotes a helpful community atmosphere by facilitating communication between moms and medical experts via chat features.

Articles and Resources: Provides a searchable and easily categorized library of articles, blogs, and resources on a range of parenting subjects.

The application's usability, security, and functionality were all confirmed during the testing process. The first users' feedback emphasized the features' usefulness, such as push alerts for timely reminders and easy appointment scheduling, and the design's intuitiveness.

Website Development Results:

In order to enhance the functionality and accessibility of the mobile application, the companion website was created:

Admin Management gives administrators the ability to monitor and control the system, which includes the ability to add, edit, and remove clinic resources and information.

User Access: Gives moms and clinics access to features like making appointments, publishing articles, and chatting.

By guaranteeing usability on a range of screens and devices, responsive design improves accessibility for all users.

To verify its responsiveness, security, and compliance with usability guidelines, the website was put through a rigorous testing process. Its performance and user experience were enhanced by iterative changes based on user testing and feedback.

Discussion:

Practical and Technical Difficulties

Ensuring cross-platform compatibility and successfully incorporating real-time features like notifications were major concerns during development. To overcome these obstacles and produce a solid and dependable platform, meticulous planning and iterative testing were needed.

User Feedback and Effects

Positive early user comments emphasize how important it is for the app to help new moms by giving them information and support. Users' trust in handling baby care obligations has grown as a result of the user-friendly interface and extensive resources.

6. Conclusions and Recommendation

6.1. Summary

In conclusion, this project has investigated the vital learning requirements of new moms in the context of newborn care, highlighting the variety of obstacles they encounter and the significance of individualized learning resources. In order to meet these demands, it also looked at how mobile health technology was integrated, as seen by the creation of approachable applications like "Little Steps."

6.2. Recommendation

The recommendations based on the results are to keep improving our project by:

Adding More Content: Including in-depth details on common parenting obstacles, developmental milestones, and newborn health.

User Engagement: To encourage peer support among new mothers, increase interaction and community elements.

Accessibility: Keeping the platform open and welcoming to all users, irrespective of their level of technical expertise or experience.

6.3. What we have learned

With this project, we have discovered:

New Programming skills: we used new techniques and languages in programming and we became more expertized in mobile and web development

Impact of Technology: Mobile applications are essential in offering easily navigable and accessible venues for education on maternal and newborn health.

Continuous Improvement: To fulfill changing customer expectations and demands, iterative development based on user feedback is crucial.

6.4. Future work

- Doing long-term research to evaluate the long-term effects of "Little Steps" on outcomes related to mother and newborn health is known as a longitudinal study.
- Integration with Healthcare Systems: Working together with medical professionals to incorporate "Little Steps" into standard services for mothers' health.
- Global Expansion: "Little Steps" will be translated into other languages and cultural contexts to reach a wider range of new mothers across the globe.

7. References

1. Firebase: Firebase website, Available at: <https://firebase.google.com>
2. MongoDB: MongoDB website, Available at: <https://www.mongodb.com>
3. OneSignal: OneSignal website, Available at: <https://onesignal.com>
4. Huckleberry: Huckleberry app, Available at: <https://play.google.com>
5. Baby Connect: Baby Connect app, Available at: <https://play.google.com>
6. Carvalho, B. M., Furtado, M. C. de C., Chinalia, G. T., Caritá, E. C., & Sanguino, G. Z. (2024). Baby Date: a mobile application for teaching nursing care to newborns in primary care. *Revista Latino-Americana de Enfermagem*, 32. <https://doi.org/10.1590/1518-8345.7022.4164>
7. Kuo, M.-C., Lu, Y.-C., & Chang, P. (2012). A Newborn Baby Care Support App and System for mHealth. *NI 2012 : 11th International Congress on Nursing Informatics, June 23-27, 2012, Montreal, Canada. International Congress in Nursing Informatics (11th : 2012 : Montreal, Quebec), 2012, 228.*