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BABY SHOT

Students:

Batool Jum'a

(12029229)

Marwa Bani Fadel

(12028153)

Supervisors:

1- Eng. Asma Afeefi

asmaafeefy@najah.edu

2- Eng. Khaled Daud

khalid.dawod@najah.edu

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Abstract

Taking care of children and ensuring they receive their vaccinations are among the most important responsibilities of parents. However, this task often presents significant challenges, such as long waits at medical clinics and forgetting vaccination appointments. Therefore, there is a need for an application to simplify this process.

The importance of the Baby Shot application lies in enhancing parents' ability to effectively manage vaccination schedules, ensuring timely and appropriate care. Additionally, the app reduces the burden of carrying the Mother and Child Health Booklet each time a mother brings her child for vaccination.

This app offers several key features, including the ability for parents to communicate with each other and share experiences. It also provides chat options with health-care professionals and AI-powered chatbots to answer common questions mothers may have. Moreover, the app helps parents find the nearest clinic to their home using GPS and sends automatic notifications as vaccination appointments approach. On the home-page, it provides medical advice and suggestions based on children's ages. After a child receives a vaccine and undergoes measurements such as height, weight, and other health indicators during a general pediatric check-up, this data is displayed as a chart, allowing parents to compare their child's growth with standard growth charts. Special attention has also been given to offering helpful tips and guidance on pregnancy and managing different stages of a child's development, such as teething and other milestones. Furthermore, the app allows parents to review clinics, rate them using stars, and participate in surveys.

The app is being developed using a systematic approach that includes analyzing user needs, designing a simple and user-friendly interface, and implementing technical features with a focus on ease of use and navigation. While there are similar applications focused on vaccinations and scheduling, Baby Shot stands out by offering a more comprehensive solution. It not only provides clinic reviews or records vaccine side effects but also enables parent chats to share experiences and discuss side effects for children of the same age.

In conclusion, Baby Shot offers an integrated, easy-to-use platform with a wide range of features, distinguishing it from other apps in this domain.

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Disclaimer

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Chapter 1

Introduction

1.1 Background, Objectives, and Importance of work

All parents, without exception, find themselves compelled to deal with child vaccination clinics, as these clinics play an essential role in protecting children from infectious and serious diseases by providing the necessary vaccines. However, these clinics face numerous challenges and difficulties that affect the quality of services provided to parents. One of the most prominent challenges is missing the Maternity and Childhood Booklet, which serves as the primary reference for tracking a child's vaccinations. Losing this booklet makes it difficult to determine which vaccines the child has received and which are still required.

Additionally, many parents struggle with forgetting their children's vaccination appointments due to the hustle and bustle of daily life and the absence of an effective reminder system. Weak communication between parents and the clinic is another challenge, as some parents lack a fast and direct means to obtain answers to their inquiries.

The '**Baby Shot**' app offers a comprehensive solution to these challenges by securely storing the child's vaccination data and information electronically, and avoiding the loss or damage of the physical booklet. The app also ensures regular notifications to remind parents of their children's vaccination appointments.

Moreover, the app provides a feature for parents to chat with the clinic, a smart AI-based system for instant and automated responses for inquiries. In addition to that, there is a group chats connecting mothers with children of the same age to share experiences and advice.

Through these innovative features, the '**Baby Shot**' app becomes not just a tool for organizing vaccination appointments, but also a comprehensive platform for communication, learning, and community support. It also ensures a convenient and effective experience for both parents and children alike.

1.2 Organization of the report

This report is divided into chapters, starting with Chapter 1: Introduction, which discusses the work's background, objectives, and importance, followed by an explanation of how the report is organized. The second chapter, Theoretical Background and Previous Work, presents a review of the theoretical foundations and pertinent earlier research. The following chapter, constraints & Earlier Coursework, discusses the limits encountered during the project as well as the previous coursework that helped develop it.

The core of the report lies in Chapter 4: Methodology, which describes the tools, technologies, programming languages, frameworks, and database design employed. It also includes a full explanation of the Baby Shot application's features for parents, doctors or nurses, and administrators. Following that, Chapter 5: Discussion gives an analysis of the data, and Chapter 6: Results and Conclusion summarizes the project's outcomes and main conclusions.

The report continues with Chapter 7: Future Work, which suggests potential improvements, and Chapter 8: Bibliography, which covers all of the references and sources utilized in the study.

Chapter 2

Theoretical Background and Previous Work

There are numerous applications that provide services related to child vaccinations, each with a specific focus that sets it apart from the “Baby Shot” app. For instance, the **'Vaccination - Reminder App'** [1] is primarily designed to remind parents of vaccination appointments, helping them avoid missing important dates. Meanwhile, the **'Child Vaccination Schedule'** app [2] emphasizes simplifying the process of booking and organizing appointments.

The **'Sehhatuna'** [3] app offers features closer to **'Baby Shot'** such as a map and appointment viewing. However, **'Baby Shot'** surpasses it by introducing a chat feature that allows parents to communicate directly with three key parties: the clinic for inquiries, the AI system for instant responses, or mother communities to share experiences and advice.

Additionally, the **'Baby Shot'** app includes a child growth tracking feature, enabling mothers to monitor their child's growth through charts and ensure it aligns with healthy standards. The app also supports feedback collection by sending surveys to parents, allowing them to evaluate clinic services and provide insights for quality improvement.

Finally, **'Baby Shot'** offers flexible appointment scheduling. Mothers are notified if previously booked slots become available, allowing them to select appointments that better suit their needs.

Chapter 3

Constraints & Earlier Coursework

3.1 Constraints

We faced some constraints while working on our app, however we were able to proceed with the work. First, although we used the Google Places API to fetch the coordinates of hospitals and clinics for the map feature, we were unable to find the coordinates of most of the clinics, which led us to manually search them on the maps.

Secondly, at the beginning, we faced a few difficulties with working with React and React Native, as these were new languages that we had not learned before. Finally, this was our first time developing a mobile application.

3.2 Earlier course work

During our studies in Computer Engineering, we gained a wide range of skills and knowledge that contributed to our expertise. For instance, the Database course equipped us with the ability to design and manage databases effectively, ensuring they meet project requirements.

Furthermore, The Web Development course provided us with experience in designing user interfaces and styling elements, making it easier to create and refine the application's front-end components.

Finally, the Advanced Software Engineering course introduced us to creating RESTful APIs for the backend and testing them using tools like Postman, streamlining the backend development process and ensuring accuracy. Methodology

Chapter 4

Methodology

4.1 Development Tools and Technologies

4.1.1 Tools

-**Visual Studio Code** was selected as the primary code editor due to its versatility and extension support.[4]

-**Postman** was utilized to test and debug the backend RESTful APIs effectively.[5]

-**Android Studio Emulator** was used to simulate the Android environment for testing.[6]

An **actual iPhone 11** device was utilized to test the iOS software using Expo Go.[7]

-**GitHub** was utilized for team collaboration and version control.[8]

-**Firebase** was integrated to securely store chat messages.[9]

-**Native Notify** was used to send notifications to users.[10]

-**RapidAPI** was incorporated to enable instant automated responses to parents' inquiries.[11]

-**Clever Cloud** hosted a **MySQL** database to effectively manage and save application data.[12]

-**Google Places API** was used to locate the nearest vaccination clinic and hospital based on the user's location.[13]



4.1.2 Programming Languages and Frameworks

Mobile application: To create the mobile screens and interface with the server, we used JavaScript and React Native.

Website : To create the web screens and interface with the server, we used JavaScript, React and CSS .

Backend: The backend is built using Node.js to handle API requests and manage interactions with the database.



4.1.3 Database Design and Management

I chose **MySQL** for the database because I require a dependable and user-friendly database that can efficiently manage structured data. MySQL provides a solid foundation for managing interrelated data, such as child and appointment information, while maintaining high performance and data security. Its versatility enables the application to expand easily while maintaining performance.

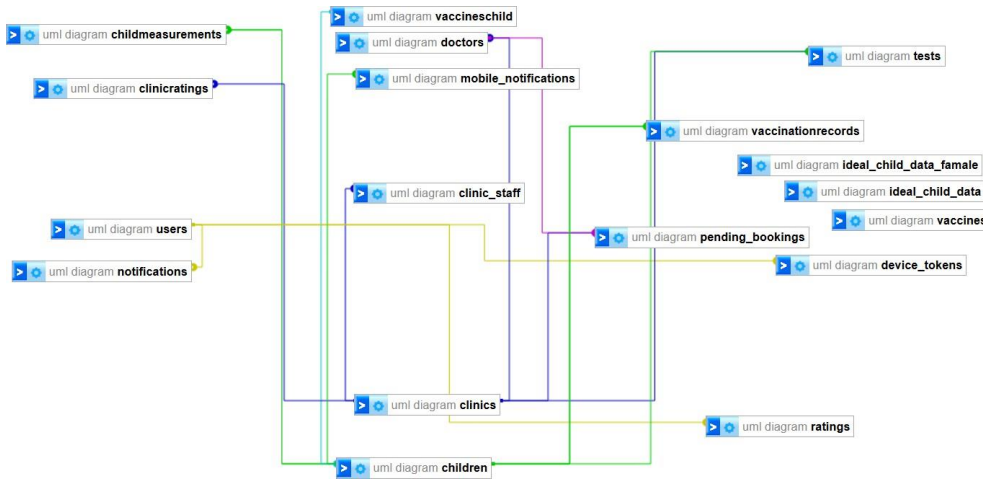


Figure 4.1: Database UML

4.2 Baby Shot Application



Figure 4.2: Welcome Page

In Baby Shot, there are three types of users: parents, doctors or nurses, and the admin, who serves as the clinic manager.

4.2.1 Parents

Signup Screen

The signup procedure involves validation to check that the ID number, email address, and phone number are in the correct formats.

By creating an account, mothers can register in the application and access its features.

Figure 4.3: Signup Page Mobile

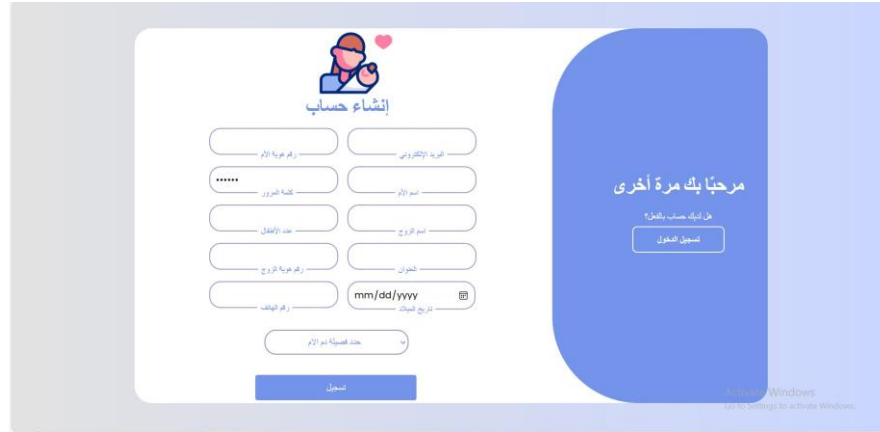


Figure 4.4: Signup Page Website

Login Screen

During the login process, passwords are hashed securely using bcrypt before being saved to the database. Furthermore, a unique JWT token is given to every user for authentication purposes.

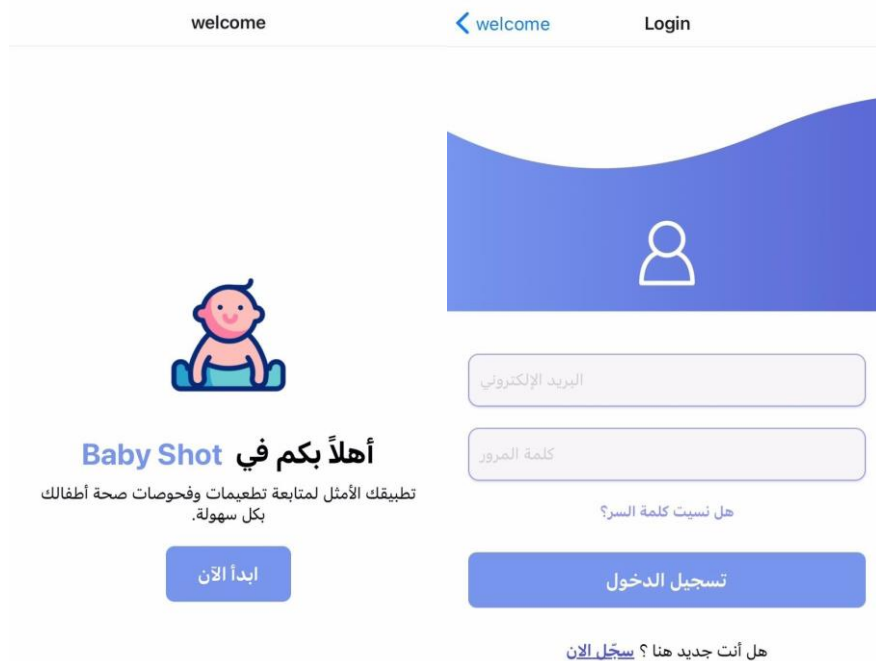


Figure 4.5: Login Page Mobile



Figure 4.6: Login Page Website

Home Page Screen

The home page includes a warm welcome to the user, followed by useful information for mothers, such as breastfeeding, caring for a sick child, vaccinations, and pregnancy tips ,as 4.8.

It also offers personalized advice based on the interests mothers select when they first use the app, along with changing tips tailored to their children's ages,as 4.14.

Additionally, the page highlights natural developmental milestones for children at different stages as 4.15and provides guidance on how to handle household accidents that could occur with children as 4.16.

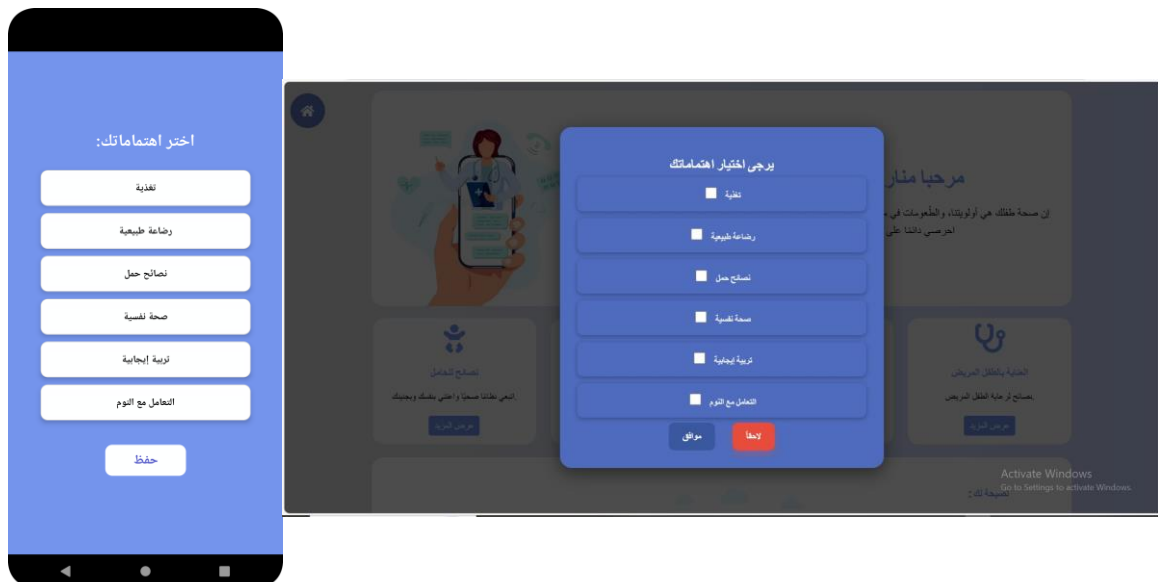


Figure 4.7: interests



Figure 4.8: Welcome User



Figure 4.9: Tips



Figure 4.10: Developmental milestones 1



Figure 4.11: Developmental milestones 2

Figure 4.12: Home Page Mobile



Figure 4.13: Welcome User



Figure 4.14: Advice



Figure 4.15: developmental milestones



Figure 4.16: Home accidents

Figure 4.17: Home Page Website

Map

We used the Google Places API with the Nearby Search feature to display nearby vaccination clinics and hospitals based on the user's location. First, the device's location is determined and shown on the map, which updates as the user's location changes.

There are three buttons in total:

- The first button retrieves nearby vaccination clinics, as 4.19 ordered by proximity, and displays the distance between the user's location and each clinic, calculated using the Haversine formula.
- The second button retrieves hospitals within a 20 km radius as 4.21, sorted from closest to furthest, and shows the distance to each hospital from the user's location.
- The third button allows the user to reset the map view to their current location. as 4.18

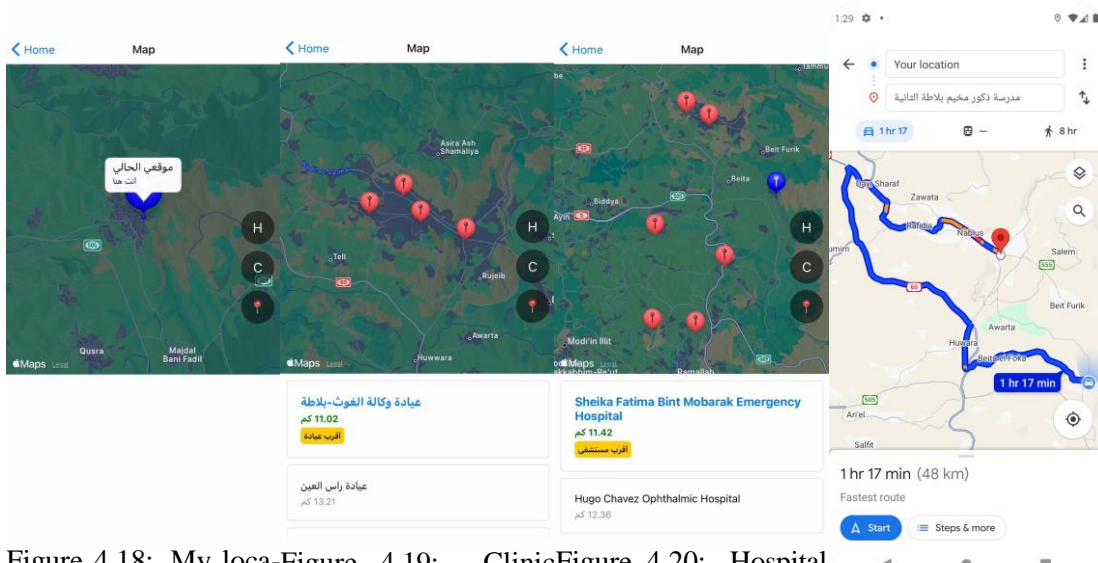


Figure 4.18: My location map
 Figure 4.19: Clinic map
 Figure 4.20: Hospital map
 Figure 4.21: Best road
 Figure 4.22: Map mobile

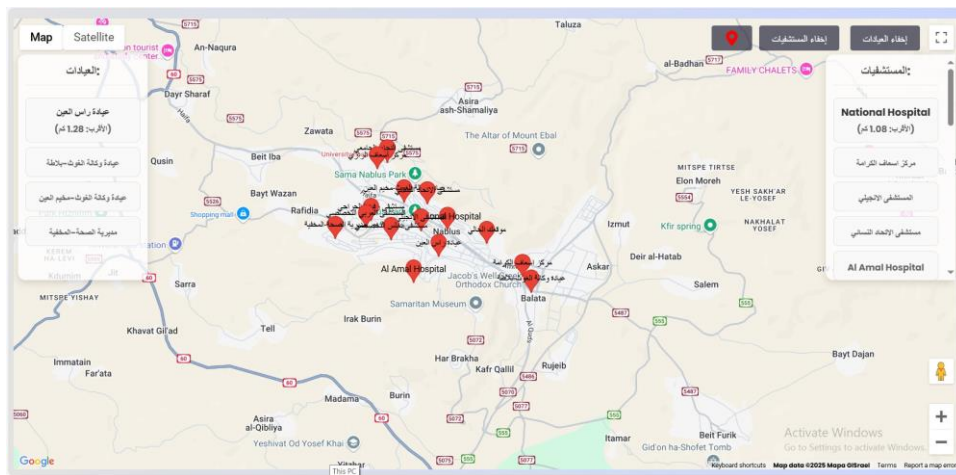


Figure 4.23: Map Website

Children’s screen

There are many features we offer to mothers on the children’s page.

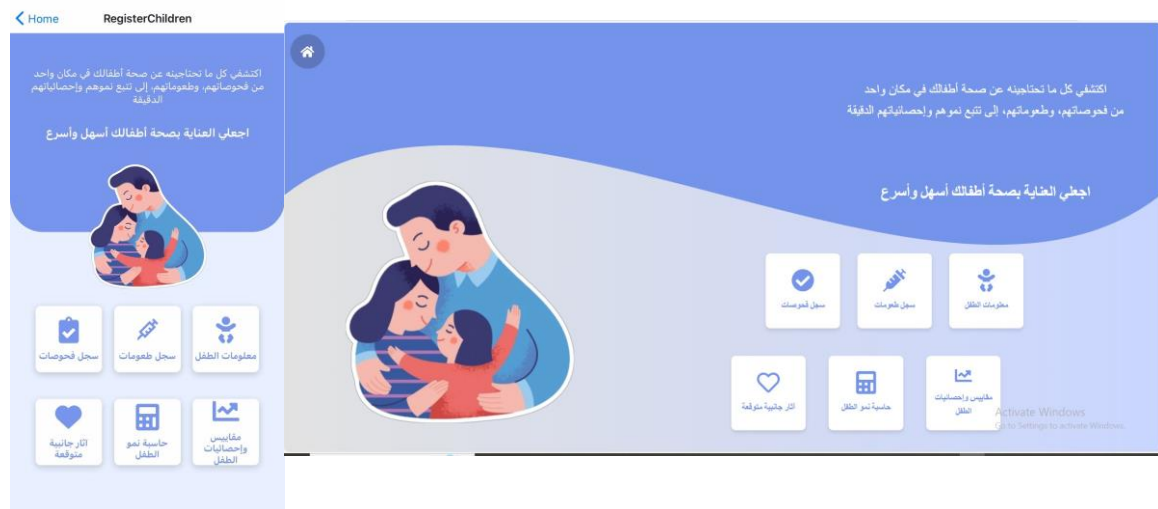


Figure 4.24: Children's screen

- Children's Information Display, This screen displays the child's information, whether about the child's birth, identity, or current measurements of weight, height and head circumference. see 4.25



Figure 4.25: Children's Information mobile

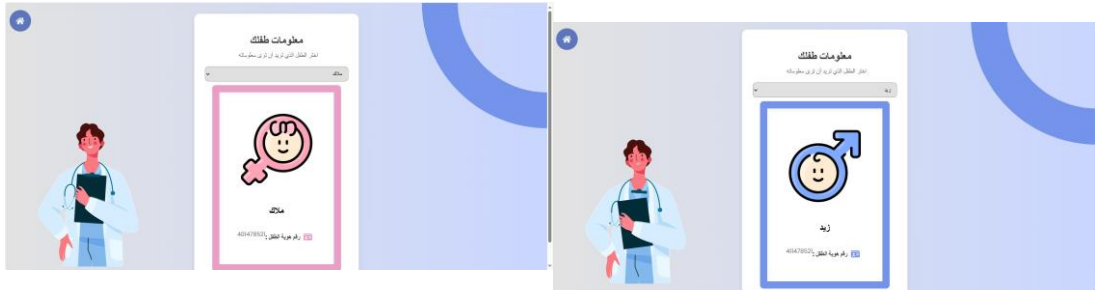


Figure 4.26: Children's Information Website

- The **Vaccination History Screen** allows the mother to select one of her children to view the vaccinations the child has already received, as well as the next vaccination due as 4.46. The application calculates and displays a proposed date for the next vaccination based on the child's age. Additionally, the mother can access information about required vaccinations for each specific age group according to the **Expanded National Vaccination Program in Palestine**. Detailed information about each vaccine, including its description, target age group, method of administration, and potential side effects, is also available. see 4.40

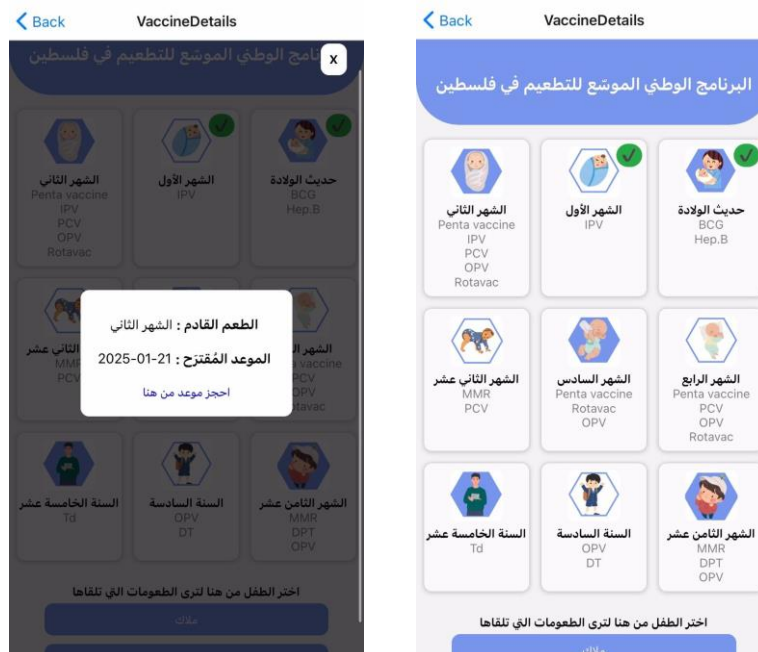


Figure 4.27: Next vaccination mobile



Figure 4.28: Children's Information Website



Figure 4.29: Detailed information about each vaccine

- **Child Checkup Display Screen:** This screen allows the mother to view the results of the child's checkups associated with each vaccination appointment.



Figure 4.30: Child Checkup Display Screen mobile



Figure 4.31: Child Checkup Display Screen Website

- **Child Measurements Display Screen:** Through this screen, the mother can judge the growth of her child and determine whether it is normal or not, through a graph with two curves, one representing the child’s measurements (height, weight, head circumference) and the other representing the ideal measurements.



Figure 4.32: Child Measurements Display Screen mobile

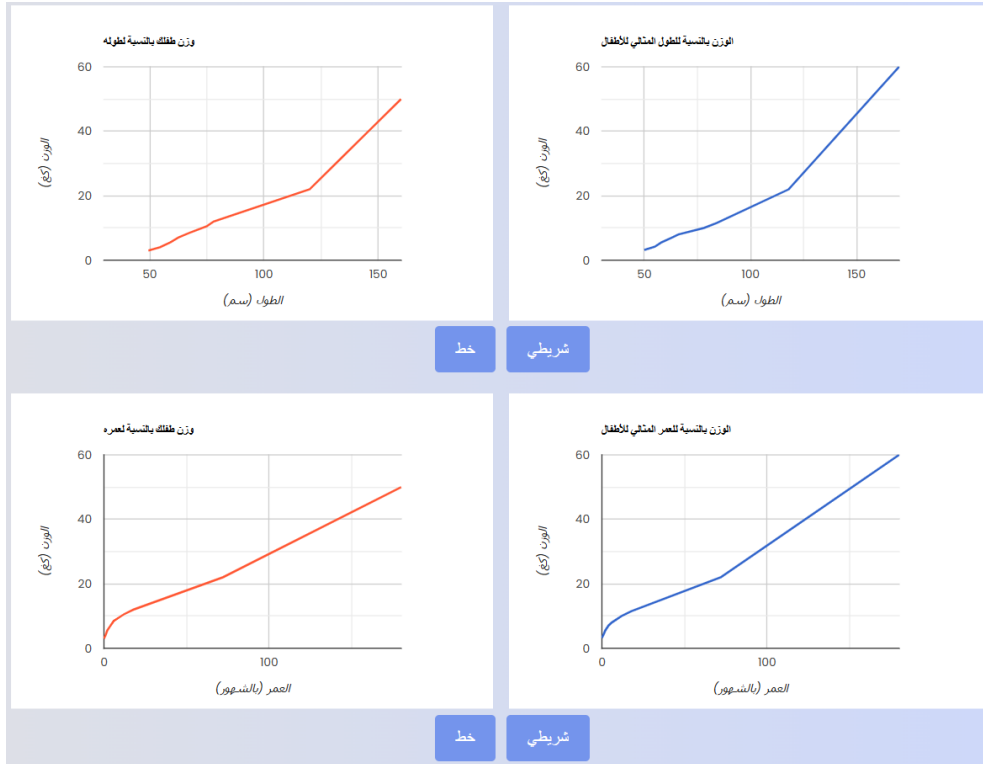


Figure 4.33: Child Measurements Display Screen Website

- **Child growth calculator Screen:** This screen is similar to the previous screen in principle, as the mother can use it to judge whether her child’s growth is normal or not, but the mother must enter her child’s measurements manually.

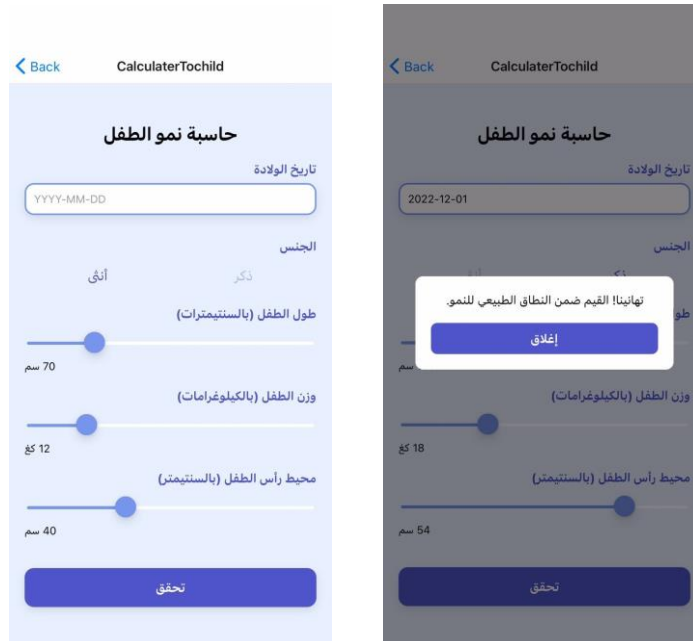


Figure 4.34: Child growth calculator Screen mobile

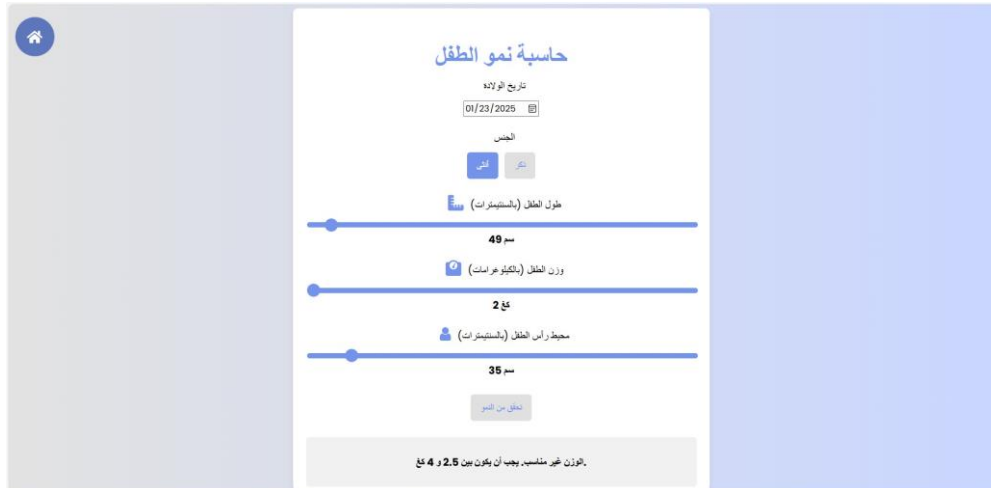


Figure 4.35: Child growth calculator Screen Website

- **Expected Side Effects Screen:** This screen allows the mother to determine whether her sick child can safely receive the upcoming vaccination based on his or her current medical status. The mother can enter the name of the vaccine scheduled for the child as well as the name of the current disease. The system uses Rapid API, which is powered by artificial intelligence, to analyze this data to determine whether it is safe to administer the vaccination in the current circumstances.

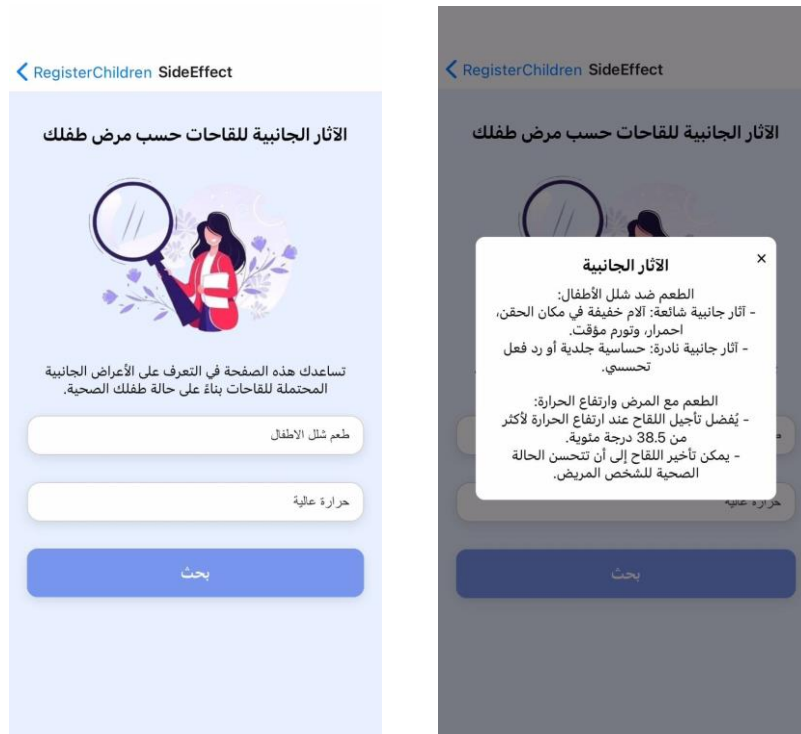


Figure 4.36: Expected Side Effects Screen mobile



Figure 4.37: Expected Side Effects Screen Website

Chatting

We've empowered mothers with three distinct sorts of conversations to ensure they receive the support and assistance they require at every stage of their child's development. The initial chat connects the mother directly to the clinic doctor, who provides individualized medical advice and answers to her unique questions. The second chat employs artificial intelligence, providing immediate, intelligent solutions to broad questions regarding her child's health, vaccines, and developmental milestones. Finally, the third chat is a mothers' group, which brings together moms with children of the same age to exchange experiences, advice, and foster a sense of community and support. These features are designed to deliver a holistic blend of expert counsel, intelligent technology, and emotional connection, making parenthood a bit less intimidating and a lot more empowering.

- Chat with the doctor

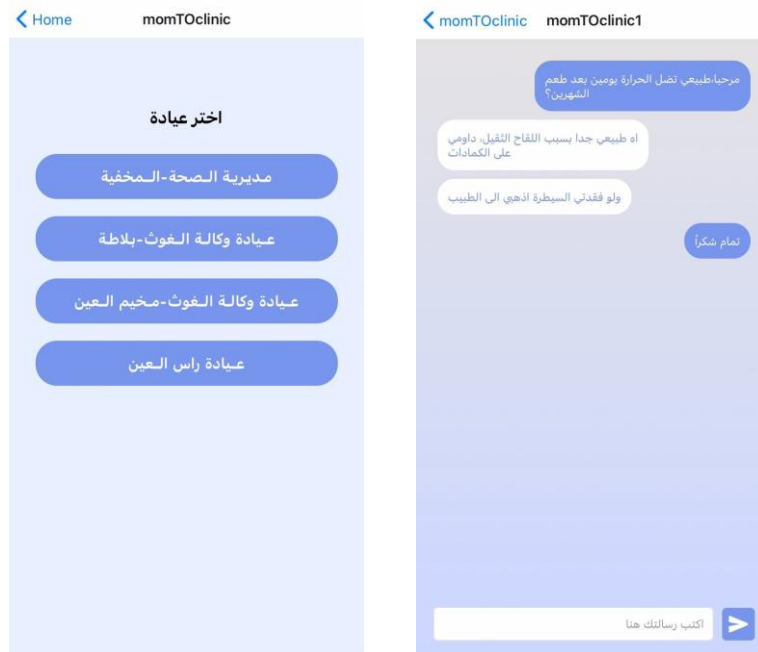


Figure 4.38: Chat with the doctor mobile

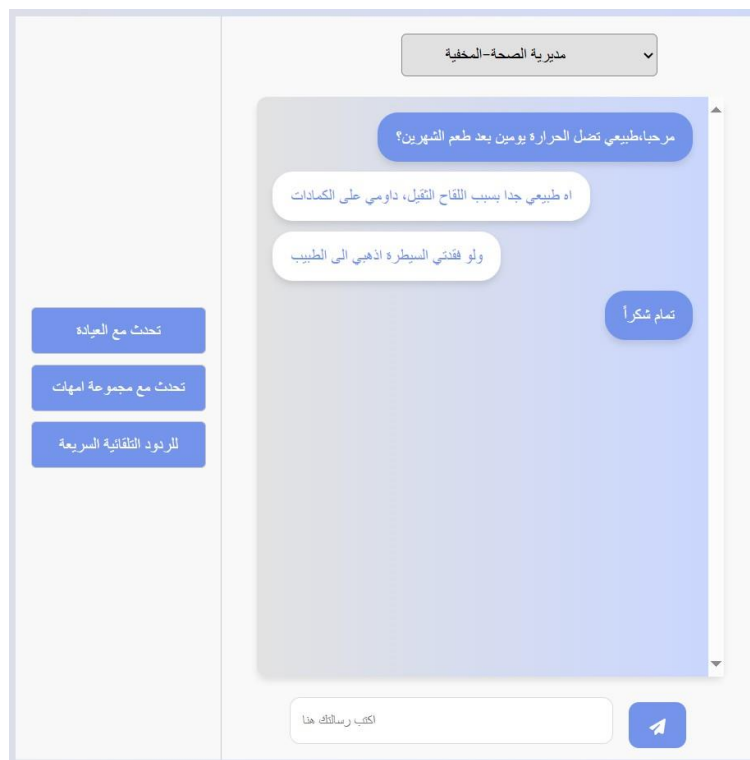


Figure 4.39: Chat with the doctor

- Chat with AI : A pre-stored set of frequently asked questions has been implemented, so that if a mother's question matches one of these, the response is delivered immediately for faster assistance. If the question is not in the pre-

stored set, it is routed to Rapid API, which use artificial intelligence to analyze the query and provide a detailed, accurate response.



Figure 4.40: Chat with AI

- Mothers' Groups

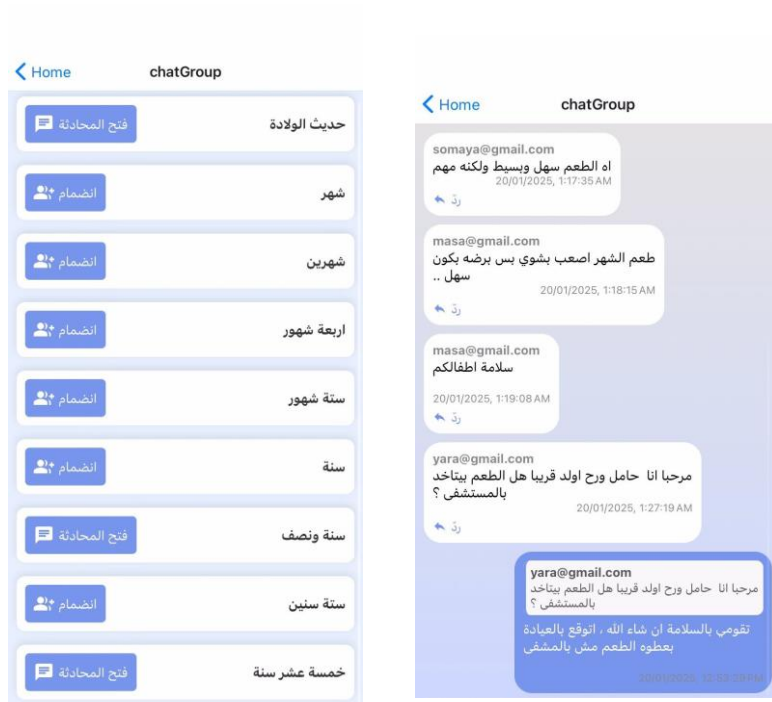


Figure 4.41: Mothers' Groups mobile

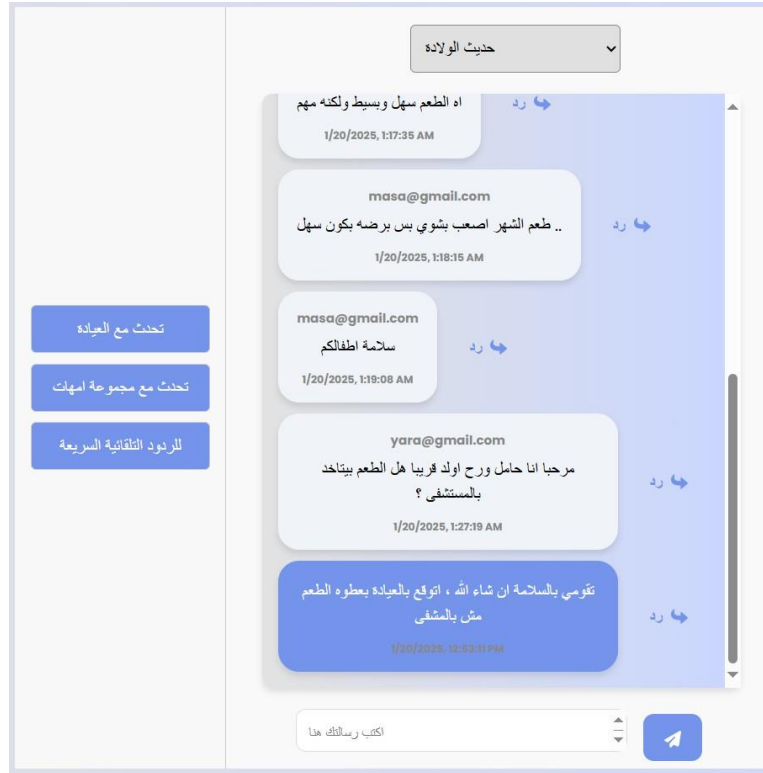


Figure 4.42: Mothers' Groups

Dynamic Appointment Scheduling

We designed the appointment scheduling system to be dynamic and handy for mothers. The mother can check available appointment slots by selecting a clinic and a day. The system highlights available slots while marking booked appointments in red. The mother can easily book her appointment by selecting any available slot.

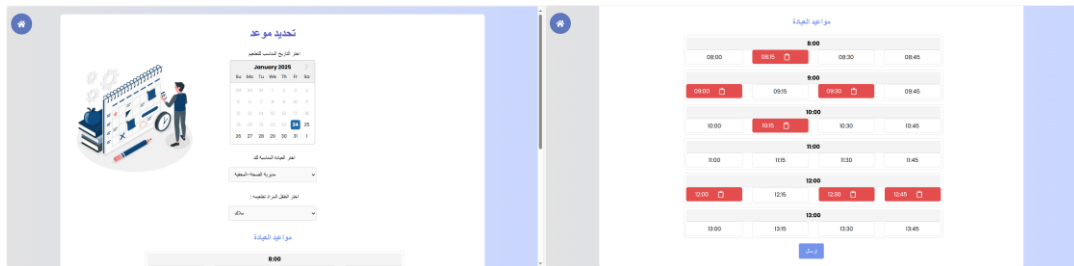


Figure 4.43: Dynamic Appointment Scheduling Website

If her wanted slot is already booked, she can join the waiting list at that time by clicking the **plus (+)** see 4.59 button in the mobile app or the **menu icon** on the website. However, joining the waiting list does not guarantee that the appointment will be scheduled. To guarantee a specific appointment, the mother is advised to book an alternative available session while remaining on the waiting list for her desired time.

If the booked time slot becomes available—either because the original booking was canceled or the person chose a different time slot—a notification is sent to everyone on the waiting list for that slot. The first person to open the notification and confirm their

transfer will have their appointment changed to the newly available time slot, and their old booking will be instantly cancelled.

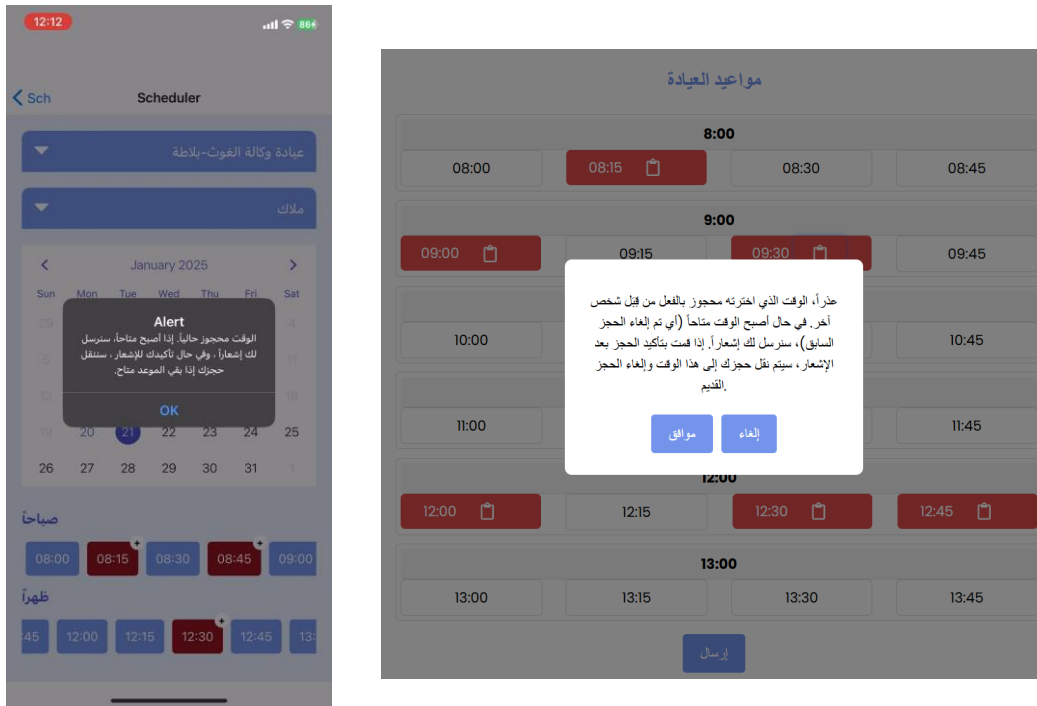


Figure 4.44: Dynamic Appointment Scheduling mobile

When a mother books a vaccination appointment, the system automatically schedules a child checkup 15 minutes afterward to ensure the child's health is thoroughly assessed. This checkup provides an opportunity to identify any concerns and refer the child to a specialist if needed, offering mothers peace of mind and ensuring timely medical care when required.

Furthermore, the mother can view both her child's scheduled appointments and those that have already passed 4.45, helping her to keep track of upcoming and finished visits. see 4.58

This technology provides a seamless experience by quickly managing bookings and ensuring that everyone has equal access to their preferred appointment times.



Figure 4.45: Upcoming visits Website

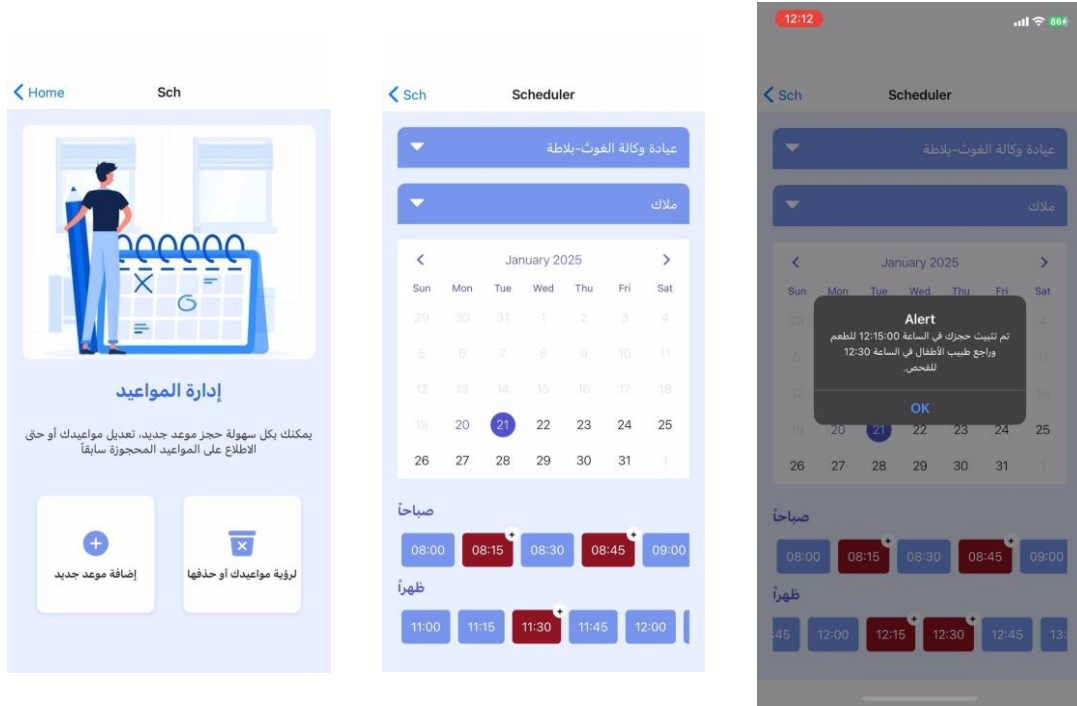


Figure 4.46: Dynamic Appointment Scheduling mobile

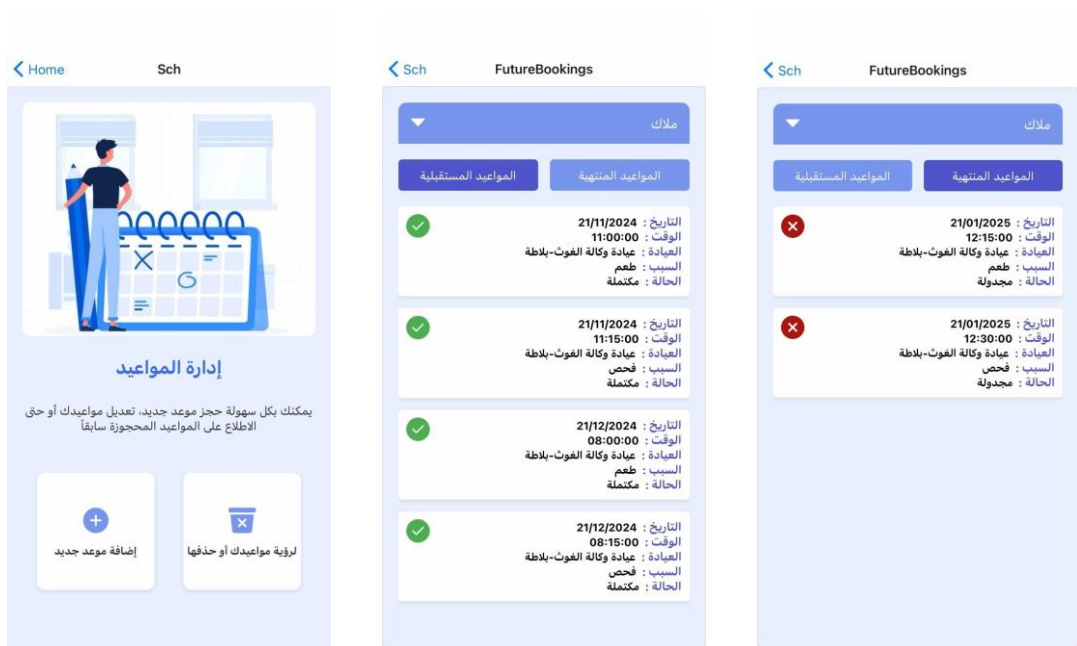


Figure 4.47: Upcoming and finished visits mobile

Notifications

We have five scenarios in which we use notifications, and we use **Native Notify** to send them:

- Confirmation Notification: We notify the mother as soon as her booking is confirmed, including the booking details.

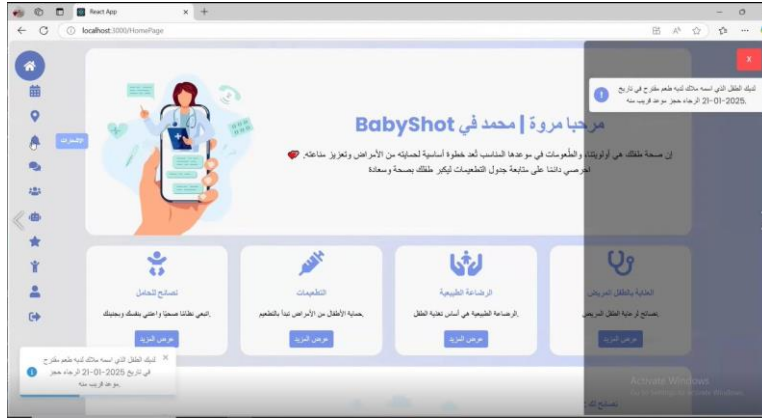


Figure 4.48: Confirmation Notification Website

- **Reminder Notification:** We notify the mother 24 hours before the vaccination appointment to remind her of the scheduled vaccine so that it is not forgotten.

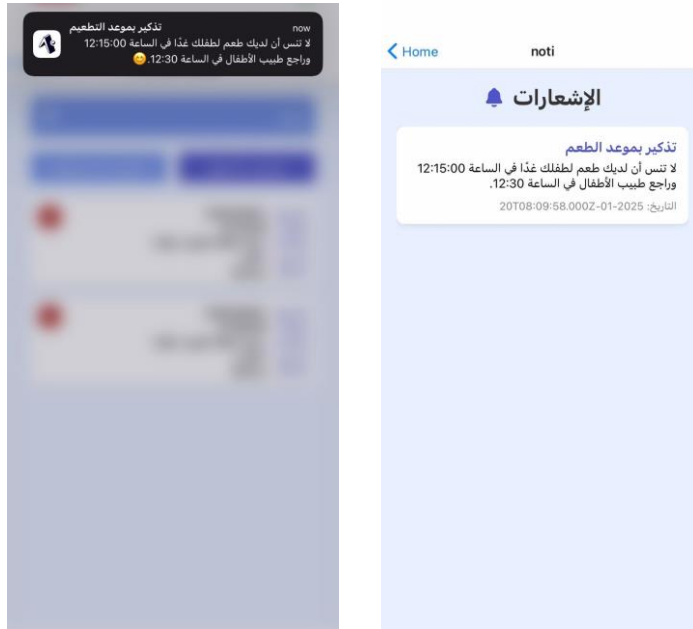


Figure 4.49: Reminder Notification mobile

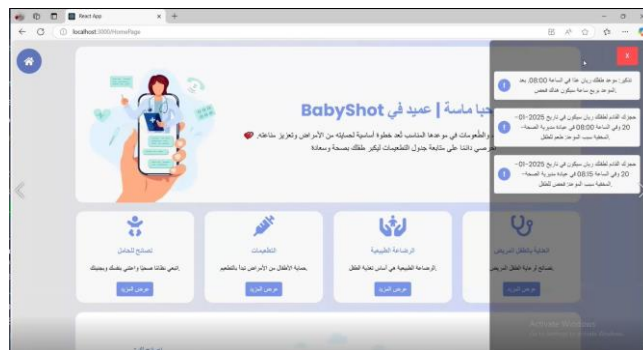


Figure 4.50: Reminder Notification Website

- **Booking Reminder:** If the proposed vaccination time is approaching and the mother has not yet booked her appointment, we send a reminder notification encouraging her to schedule her appointment.

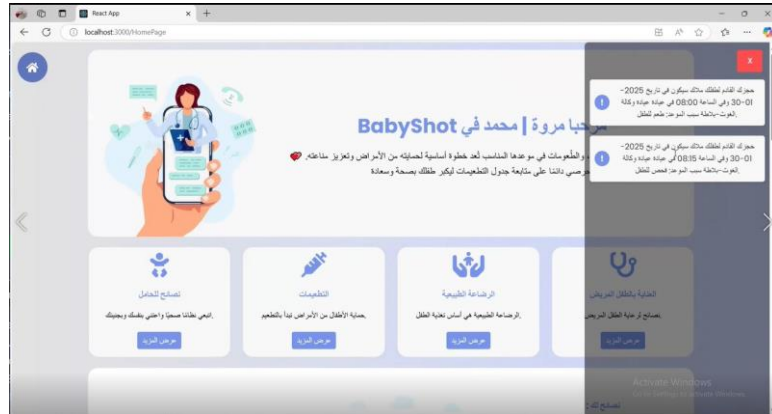


Figure 4.51: Booking Reminder Website

- **Waiting List Notification:** When the original person cancels or reschedules a booking, we notify users on the waiting list.

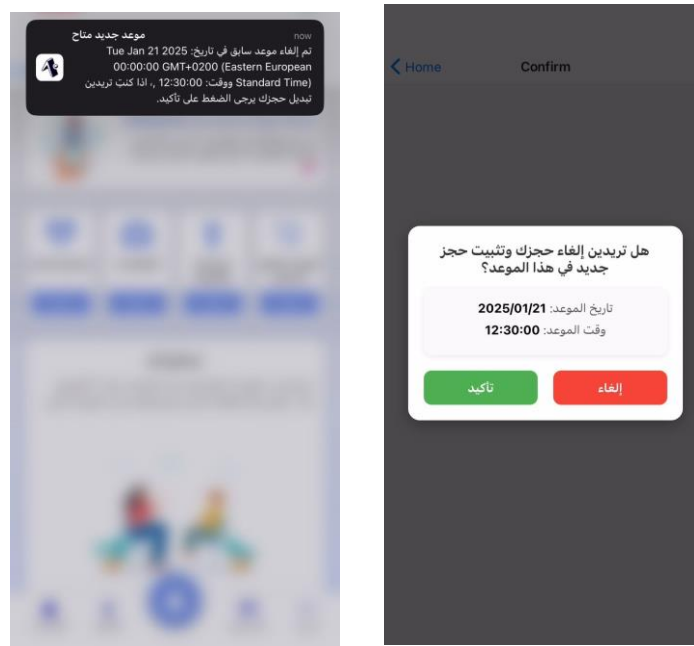


Figure 4.52: Waiting List Notification mobile



Figure 4.53: Waiting List Notification Website

- **Admin Notification:** A notification from the admin (clinic manager) is sent to all users with appointments on a specific day, informing them that their booking has been canceled due to the clinic's closure that day for reasons like a medical strike or other circumstances

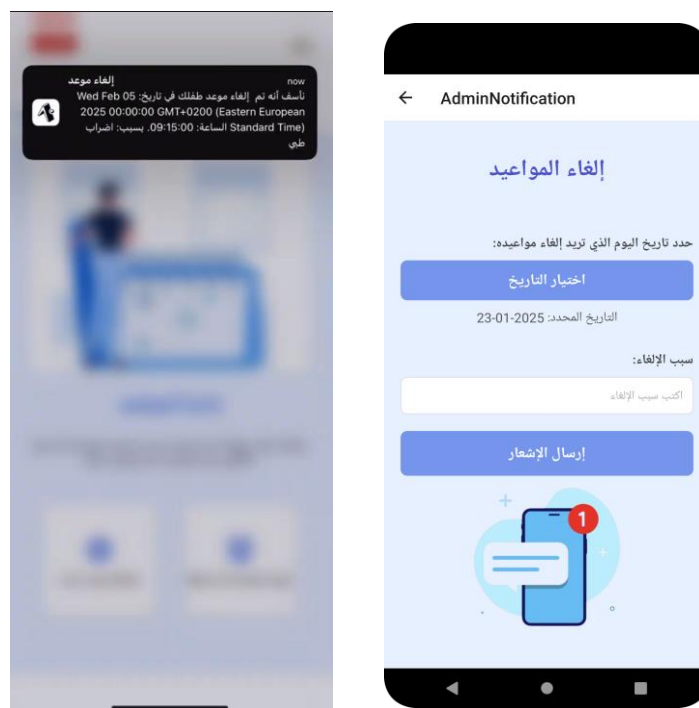


Figure 4.54: Admin Notification mobile

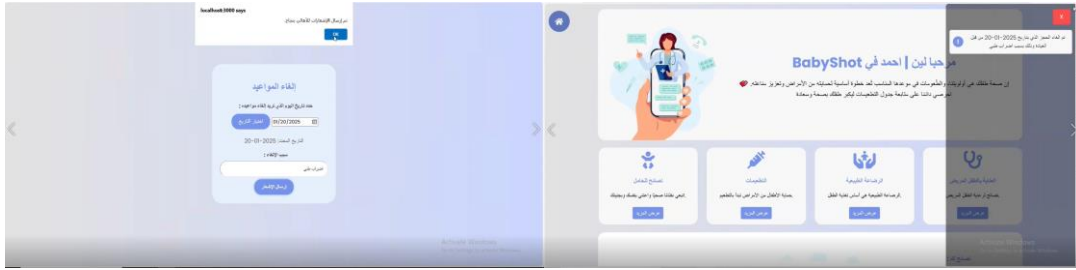


Figure 4.55: Admin Notification mobile Website

Rating

After her visit, the mother can rate the clinic by selecting a star and writing a comment. This feedback allows the clinic to better understand the quality of its services and improve its offers. Furthermore, the mother can complete a survey created using **Google Forms**, with a series of questions aimed to provide vital insights to the clinic. The answers to these questions will help the clinic gain a better understanding of the mother’s experience, allowing them to address any concerns and improve services.

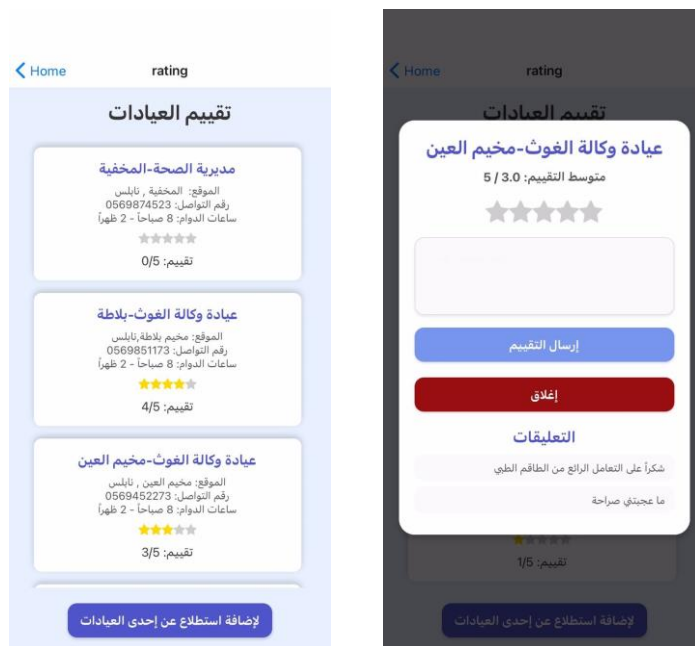


Figure 4.56: Rating mobile



Figure 4.57: Rating Website

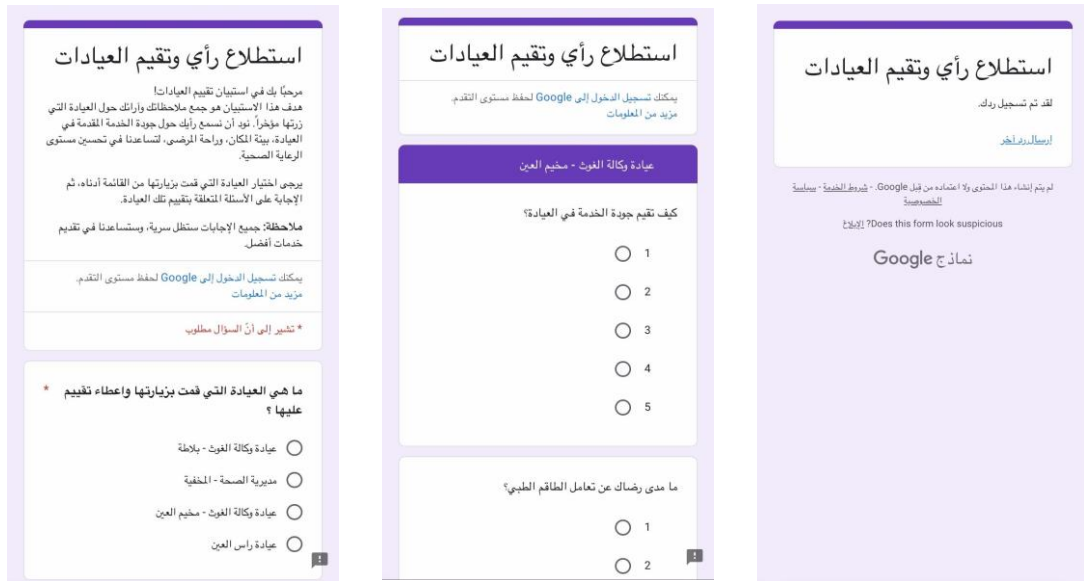


Figure 4.58: Google Form

Mother's Profile

The mother's profile displays her personal information, allowing her to access and manage it easily. Her profile allows her to select and upload a profile photo, update some of her information, and change her password as needed. This tool allows the mother to quickly keep her account up to date and customize it according to her preferences.

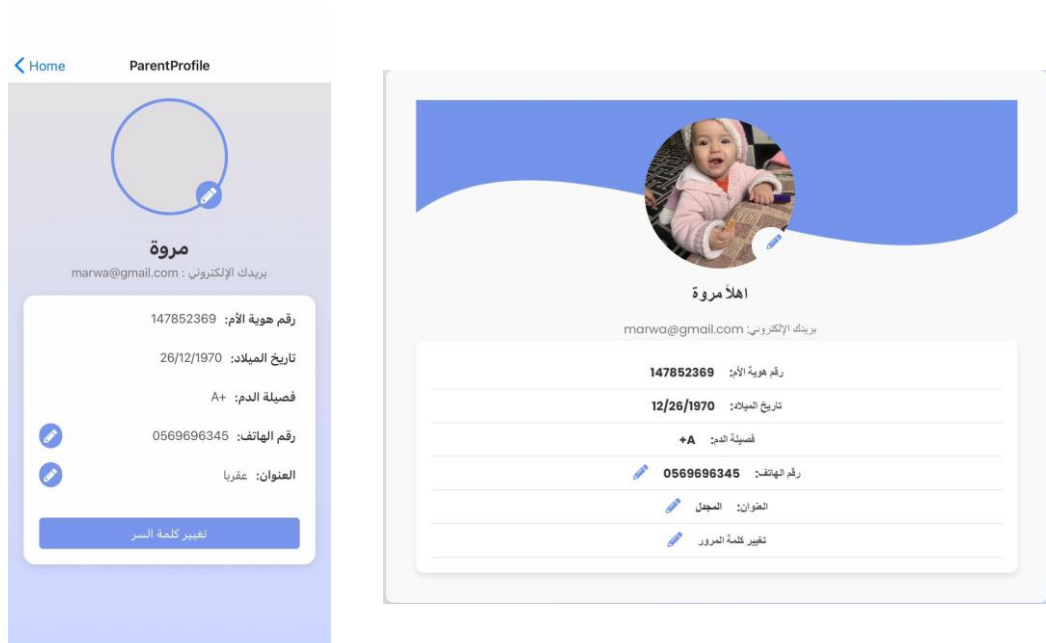


Figure 4.59: Mother's Profile

4.2.2 Doctors or Nurses

In *Baby Shot*, we have two different types of doctors and nurses. The first type is in charge of giving vaccinations to children, while the second type performs full health checks to ensure the child's well-being. The doctor can access many screens in the app:



Figure 4.60: Doctor page

- Child Information Screen: The doctor can search for any child's information using their ID number or by applying filters based on gender, age, city, and type of birth.

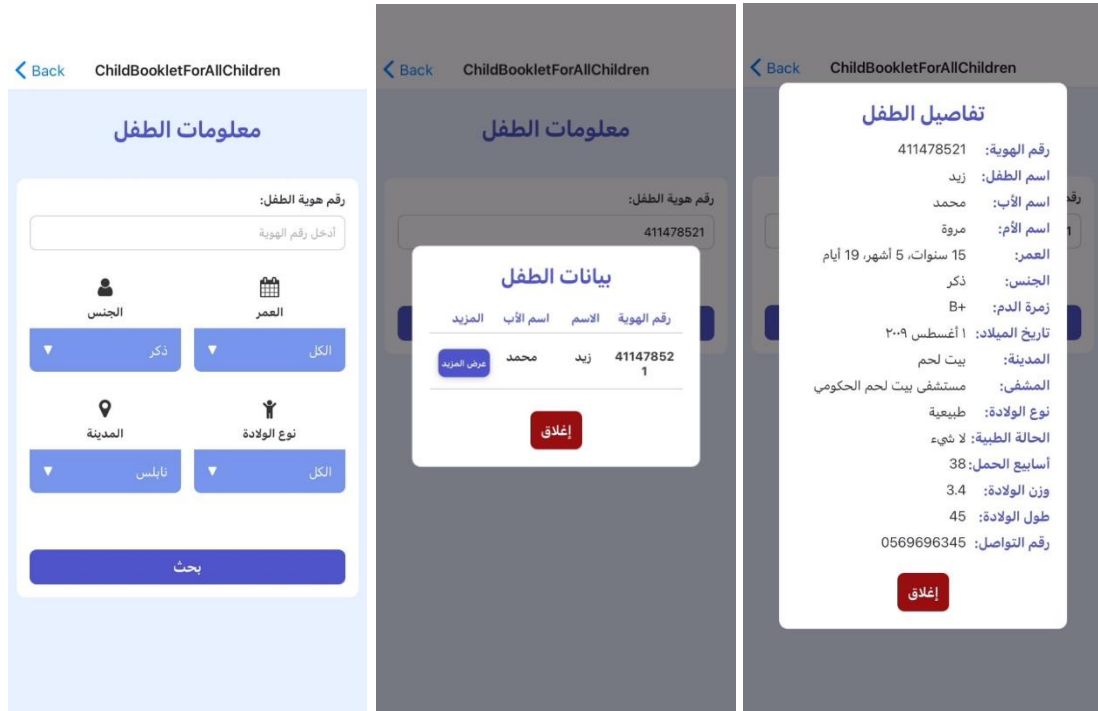


Figure 4.61: Child Information Screen mobile

معلومات الأطفال

رقم الطفل: الجنس: العمر: المدينة: نوع الولادة:

تطبيق الفلترة

نتائج الفترة:

الإسم	العمر	الجنس	المدينة	نوع الولادة	اسم الأب	اسم الأم	رقم الاتصال	رقم الطفل	تاريخ الولادة	حالة طبية	نوع الاسم	وزن الولادة	مكان الولادة	مستشفى الولادة	أسابيع الحمل	طول الولادة
عنى	7 سنه، 0 شهر، 6 يوم	ذكر	نايلس	طبيعية	سعيد	ابنسام	0512121212	321478521	19-06-2024	لا شيء	-O	3.1	نايلس	مستشفى النجاج الجامعي	39	49
هبة	1 سنه، 1 شهر، 24 يوم	انثى	نايلس	طبيعية	سامي	هلا	0591111112	341478521	01-12-2023	لا شيء	-O	3.1	نايلس	مستشفى النجاج الجامعي	39	49
رامي	0 سنه، 23 شهر، 23 يوم	ذكر	نايلس	عصية	سامي	هلا	0591111112	351478521	02-12-2024	حساسية من بعض الاطعمة	+A	3.6	نايلس	مستشفى النجاج الجامعي	40	50
لين	24 شهر، 24 يوم	انثى	الخليل	عصية	رامي	لارا	0599114477	361478521	01-12-2022	كان هناك فحلت بالقلب عند الولادة	-B	3.3	الخليل	مستشفى الخليل الحكومي	40	50

Figure 4.62: Child Information Screen website

- Child Vaccination Details Screen: This screen allows the doctor to search for any child and view the vaccinations they have already received, as well as their next vaccination and its scheduled date.



Figure 4.63: Child Vaccination Details Screen website

تفاصيل تطعيمات الأطفال											
											أدخل اسم الطفل أو الأب:
											بحث
الإسم	حدث الولادة	الشهر الأول	الشهر الثاني	الشهر الرابع	الشهر السادس	السنة الأولى	السنة والنصف	السنة ست سنوات	الخمسة عشرة سنة	التاريخ القادم	تاريخ الطعم المقدم
علي سعيد	✓	✓	✓	✓	✓	✗	✗	✗	✗	19 يونيو 2020	طعم السنة الأولى
هبة سامي	✓	✓	✓	✓	✓	✓	✗	✗	✗	1 يونيو 2020	طعم السنة والنصف
رامي سامي	✓	✓	✓	✓	✓	✗	✗	✗	✗	2 فبراير 2020	طعم السنة الأولى
لين رامي	✓	✓	✓	✓	✓	✓	✓	✗	✗	1 ديسمبر 2028	طعم السنة السادسة
آدم سعيد	✓	✓	✓	✓	✓	✓	✓	✗	✗	1 يناير 2026	طعم السنة السادسة
سارة رامي	✓	✓	✓	✓	✓	✓	✓	✓	✗	1 يوليو 2033	طعم السنة الخامسة عشرة
كريم احمد	✓	✓	✓	✓	✓	✓	✓	✓	✗	1 مارس 2033	طعم السنة الخامسة عشرة
ملاك محمد	✓	✓	✗	✗	✗	✗	✗	✗	✗	28 يناير 2020	طعم الشهر الرابع
زيد محمد	✓	✓	✓	✓	✓	✓	✓	✓	✓	لا يوجد	لا يوجد
Activate V Go to Setting	✓	✓	✓	✓	✓	✓	✓	✓	✗	1 نوفمبر 2029	طعم السنة الخامسة عشرة
منى سعيد	✓	✓	✓	✓	✓	✓	✓	✓	✗	1 يونيو 2028	طعم السنة الخامسة عشرة

Figure 4.64: Child Vaccination Details Screen mobile

- Appointment Booking Screen: moms can arrange appointments by visiting the clinic, and doctors can book appointments for children using the same booking system as moms. This function is very useful for mothers who are unfamiliar with utilizing technology.

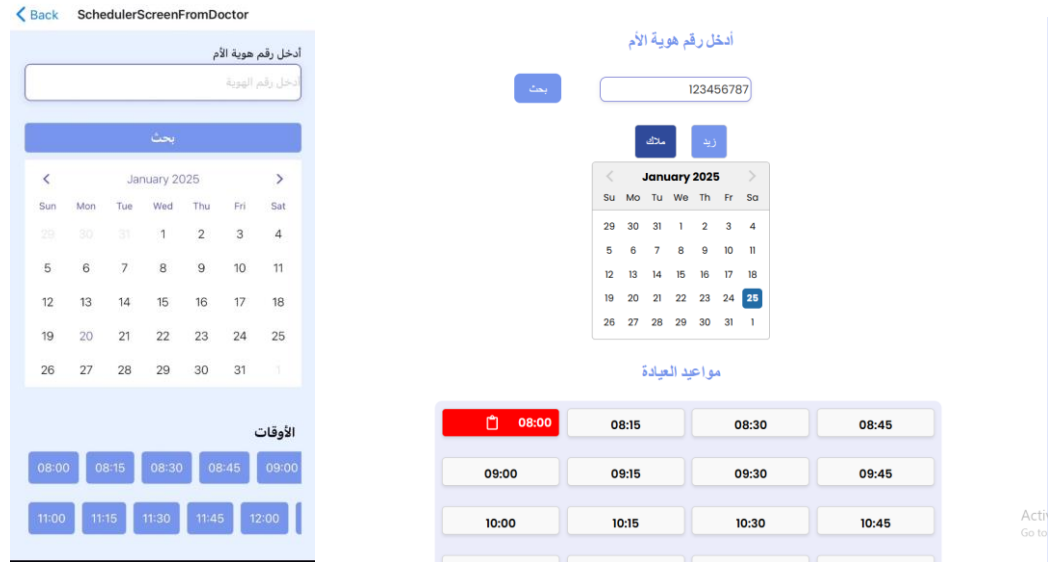


Figure 4.65: Appointment Booking Screen

- vaccinations Overview Screen: This screen allows the doctor to see all of the necessary vaccinations for children at various ages and read detailed information about each one.



Figure 4.66: vaccinations Overview Screen

- Chat Screen: This allows doctors to communicate with parents and answer their questions.

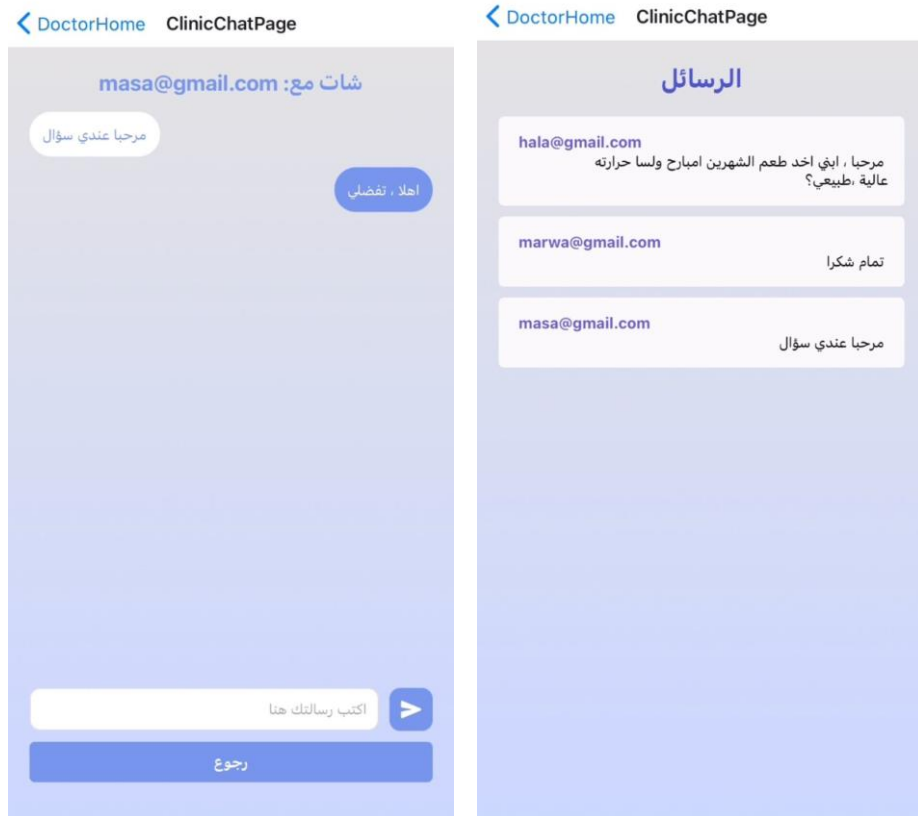


Figure 4.67: Chat Screen mobile

- The scheduled Appointments Screen allows the doctor to select a specific date and view all appointments scheduled for that day. After giving the child a vaccination, the doctor changes the appointment status from "scheduled" to "completed."



Figure 4.68: The scheduled Appointments Screen mobile



Figure 4.69: The scheduled Appointments Screen website 1



Figure 4.70: The scheduled Appointments Screen website 2

- Child checkup Records Screen: This screen displays the child's previous health check-ups and allows the doctor to add a new checkup after the vaccine. After the vaccination, the kid is evaluated by a health check-up doctor, who adds the examination information and measurements (weight, height, and head circumference) in the records



Figure 4.71: Child checkup Records Screen

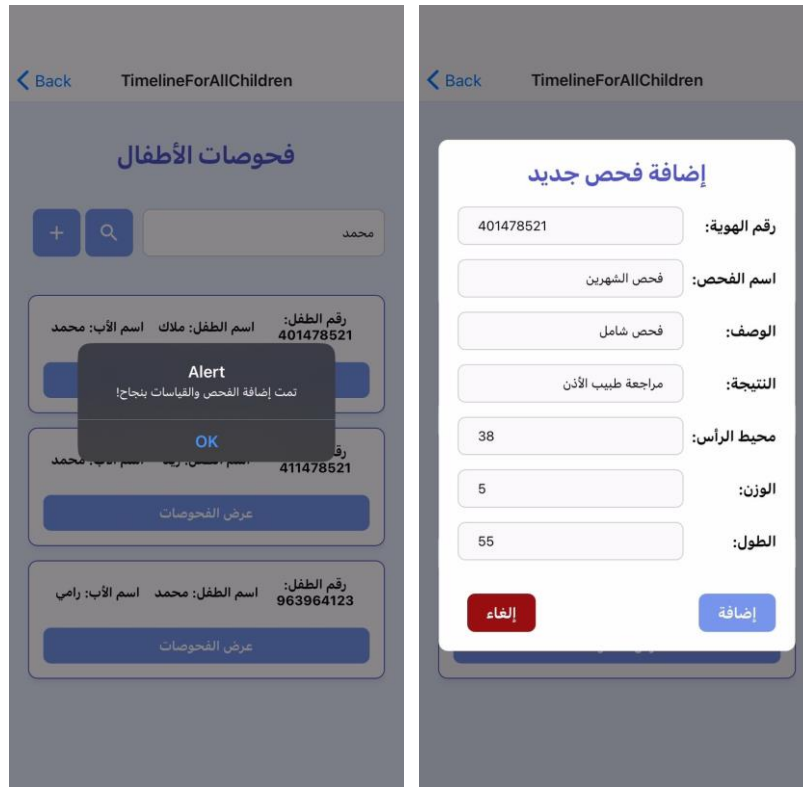


Figure 4.72: add checkup Records Screen

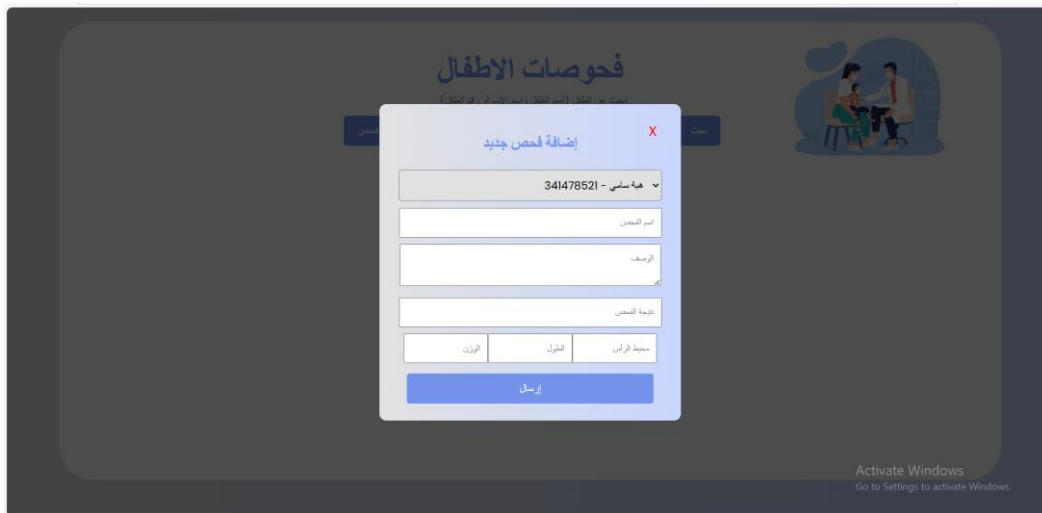


Figure 4.73: add checkup Records Screen website

4.2.3 Admin

The administrator is in charge of administering the clinic, including doctors, nurses, children, and overall operations. The administrator has access to several key screens.



Figure 4.74: Admin page

- **Doctors Management Screen:** Doctors Management Screen: This screen allows the administrator to view all doctors and nurses in the clinic, organized by role. The administrator may also add a new doctor or nurse to the system. once add a new doctor, the application provides a unique email address and a one-time random password for the doctor to use when they log in for the first time. If the doctor forgets their password, they must contact the administrator and obtain a new one. The administrator can also remove a doctor or nurse from the system if they leave their position at the clinic.



Figure 4.75: Doctors Management Screen website

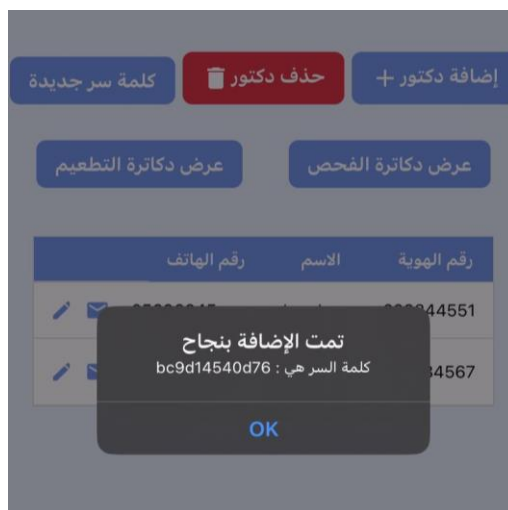
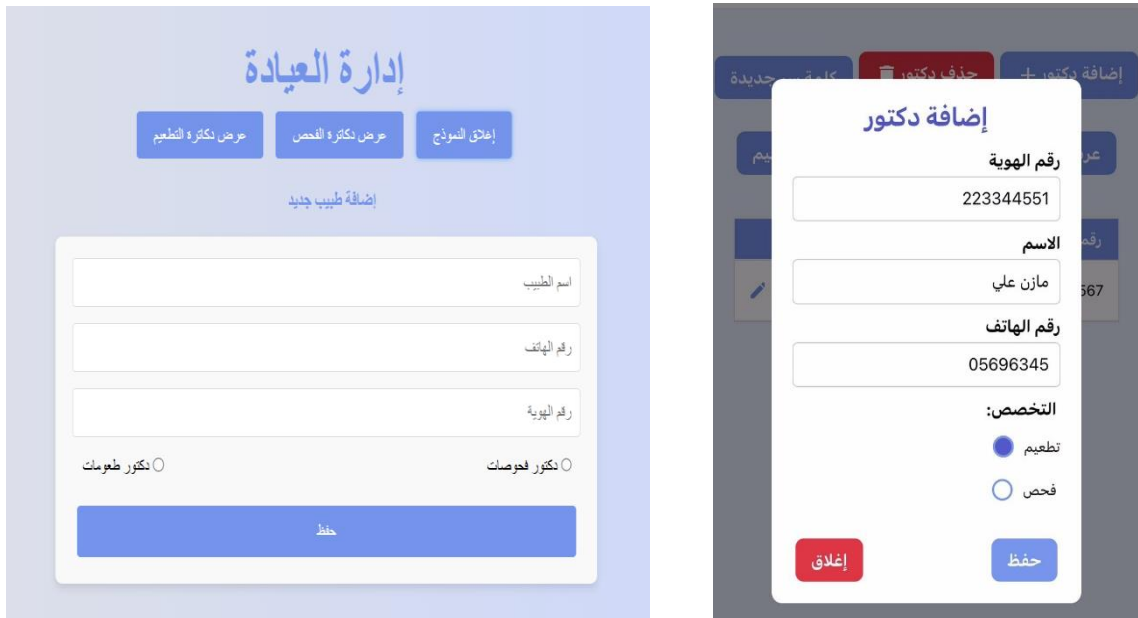


Figure 4.76: Add doctor



Figure 4.77: Delete doctor

تعديل بيانات الدكتور

أدخل رقم الهوية الجديد:

أدخل الاسم الجديد:

أدخل رقم الهاتف الجديد:

إغلاق تعديل

إنشاء كلمة سر جديدة

أدخل الإيميل

إغلاق تغيير

Figure 4.78: new password to doctor and update in doctor information

- Children Management Screen: This page allows the administrator to handle all children's information in the clinic. The administrator can access detailed information about any child, change their information if necessary, add a new child to the system, or delete a child's record if needed.

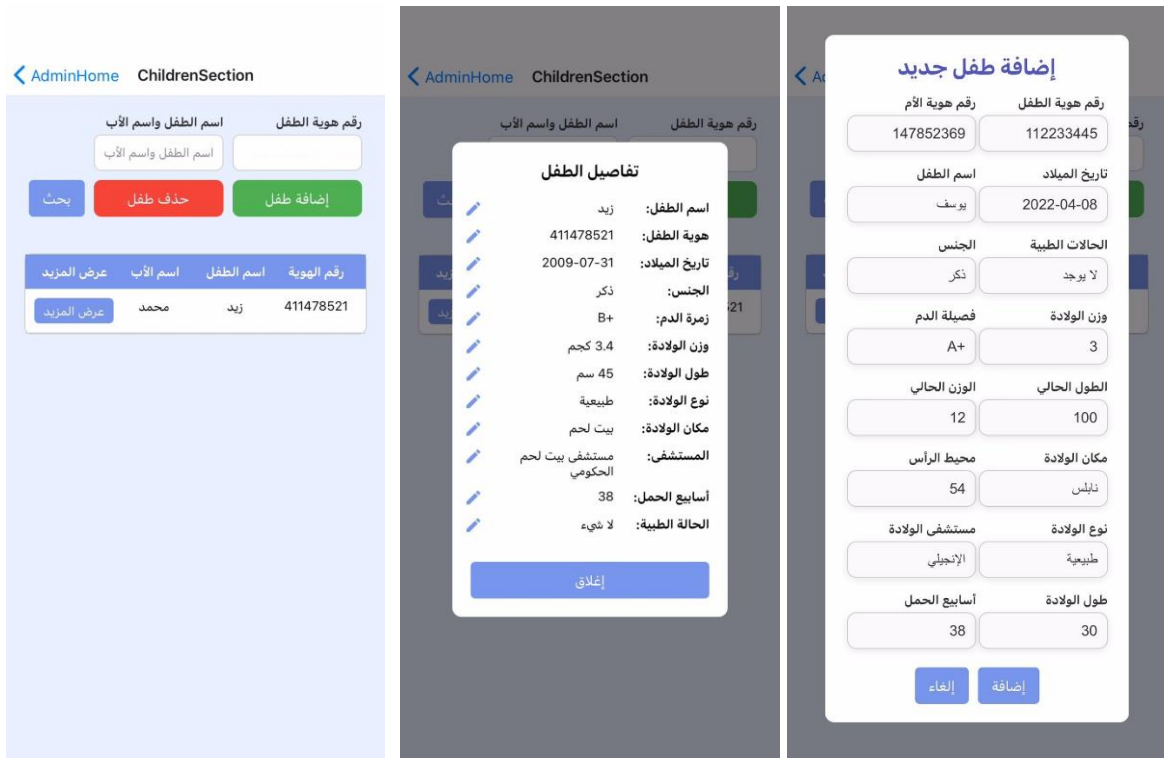


Figure 4.79: Children Management Screen

- Mothers Management Screen: This screen allows the administrator to search for any mother in the system or add a new mother.

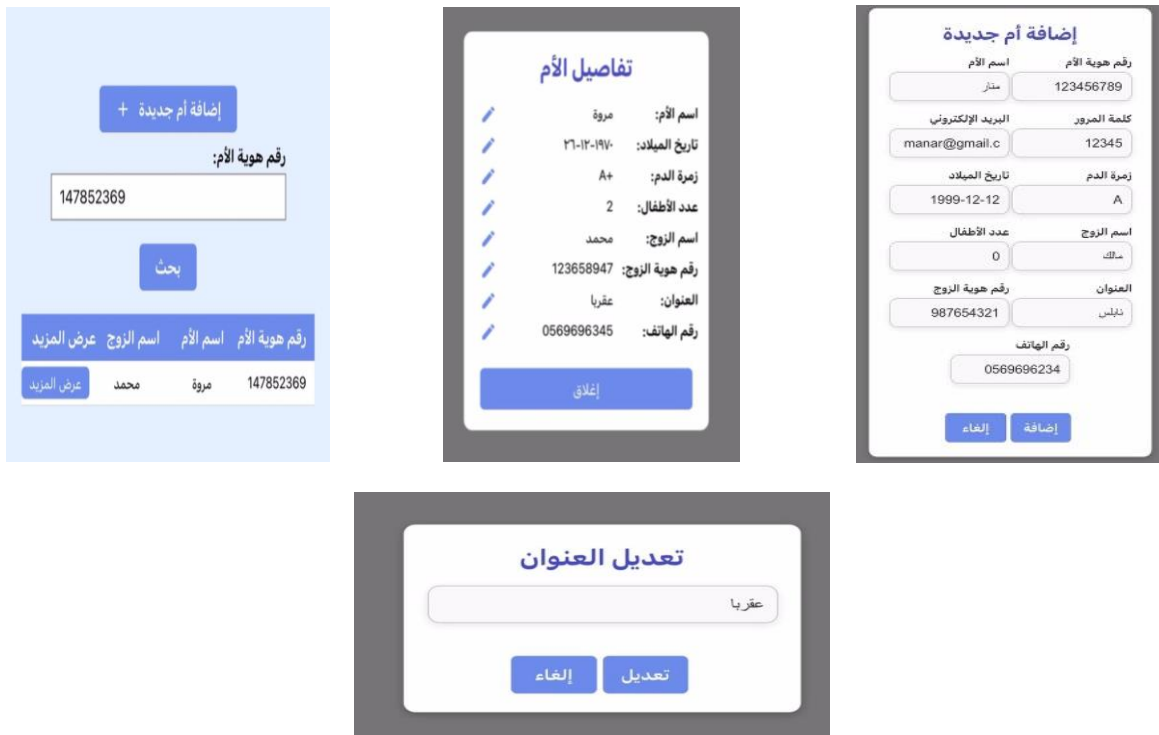


Figure 4.80: Mothers Management Screen

- **Appointment Cancellation Notification Screen:** This screen allows the administrator to send cancellation notifications for appointments scheduled on specified days. The administrator enters the date of the canceled appointments and the reason for the cancellation. The system then sends a notification to all users with appointments scheduled for that day, telling them of the cancellation and the reason. This function provides good communication between the clinic and its users in the event of unforeseen scheduling changes.



Figure 4.81: Appointment Cancellation Notification Screen

- **Statistics Screen:** This screen displays essential statistics, such as the number of children who received a particular vaccine. It provides the administrator with useful information about the clinic's vaccinations progress, allowing them to monitor and enhance vaccine coverage.



Figure 4.81: Statistics Screen

- Feedback and Survey Results Screen: This screen allows the administrator to view the ratings, comments, and survey replies that users have provided regarding their clinic experience. It gives administrators insights into user happiness and helps them find areas for development. The administrator can utilize the input to improve the clinic's offerings and handle any issues identified by users.

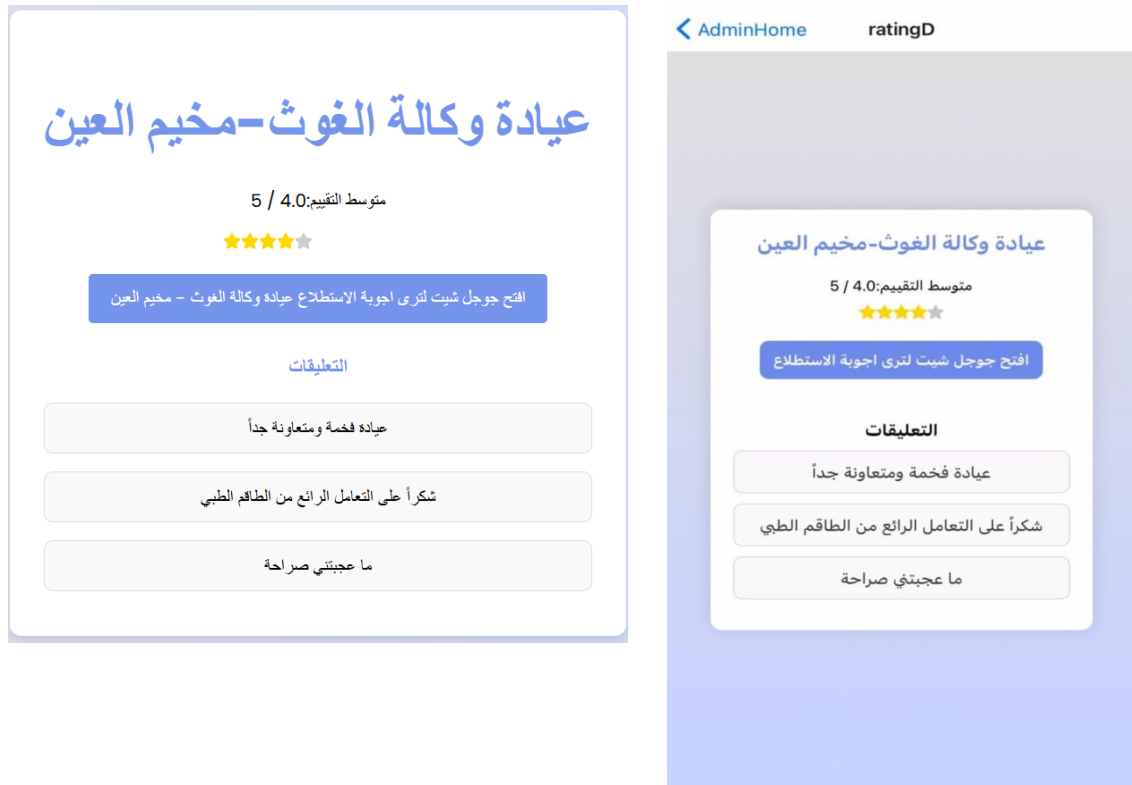


Figure 4.82: Feedback and Survey Results Screen

Discussion

The "Baby Shot" app addresses the critical need for effectively managing children's vaccines while also supporting clinic operations. The app makes it easier for mothers to manage their children's vaccines and receive reminders for future appointments. It also includes capabilities for doctors and nurses to manage children's data, schedule vaccines, and perform health screenings.

Administrative functions such as managing doctors, children, moms, and appointments help to ensure that clinic operations run smoothly. Important elements such as cancellation notifications, statistics, and feedback analysis improve communication and decision-making.

Using modern technologies such as React Native and React, Node.js, and MySQL, the project provides a dependable and user-friendly solution.

Bibliographic

Result and Conclusion

The "Baby Shot" application has successfully met its major goal of making it easier for moms to handle their children's vaccines. The app provides great convenience for moms, particularly those who are unfamiliar with technology, by making vaccinations schedules, reminders, and education materials easily accessible, as well as allowing appointment bookings and modifications.

This project was also our first experience designing a mobile application, and it taught us vital skills in mobile app development, particularly with React Native. It also improved our teamwork and communication abilities, as we worked together to fulfill project deadlines, solve problems, and produce a user-friendly solution. Overall, "Baby Shot" not only achieved its goals, but also presented us with fresh learning opportunities and deeper understanding of mobile app development.

Future Work

As we continue to develop the "Baby Shot" app, various exciting upgrades can be implemented to improve the user experience and increase the app's capabilities:

- A dynamic community feature would enable mothers to create and join groups based on common experiences, such as their children's health needs or age. This would allow users to interact, share advice, and encourage one another, increasing engagement and fostering a sense of community within the app.
- **Multilingual Support:** Adding several languages will allow the app to reach a larger audience, particularly in places with different linguistic populations, making it more accessible to moms worldwide.
- **Tracking the child's medical history:** This feature would allow moms to view and manage their child's health data, including previous illnesses, treatments, and doctor visits, ensuring that essential health information is readily available for future appointments and care decisions.

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