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Hopeoasis: A Donation Website for Empowering Sudanese Healthcare

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Abstract
Donation websites have become crucial tools for assisting those in need. This project presents HopeOasis, designed to meet Sudan's critical healthcare needs amid ongoing civil conflict. The primary problem is the severe shortage of medical supplies, doctors, and access to medical treatment and consultations. HopeOasis aims to streamline healthcare donations, making essential medical resources and online medical consultations more accessible to affected communities. Developed using the waterfall methodology, the platform ensures a structured and reliable approach. Findings show significant improvements in medical supply distribution and increased donor participation. The platform's transparency and user-friendly design build donor confidence and engagement. HopeOasis effectively centralizes donation efforts, enhances healthcare delivery, and ensures aid reaches the most needed areas, showcasing the potential for scalability and future feature integration.

1. Introduction

Donation websites have become essential tools in modern philanthropy, efficiently connecting donors with causes, especially in crisis situations where traditional support methods often fail due to inefficiencies and delays [1]. The healthcare sector in Sudan is facing a severe crisis, exacerbated by prolonged civil conflict and inadequate infrastructure [2], leading to a critical shortage of medical supplies and services. To address these challenges, HopeOasis was developed as a web-based platform aimed at facilitating effective and targeted healthcare donations. This platform enhances healthcare delivery by making essential medical resources more accessible to the communities most affected by the conflict. Key features of HopeOasis include real-time donation tracking, needs assessment tools, and online medical consultations, collectively streamlining the donation process and improving resource management. The primary research question is: How can a webbased platform like HopeOasis improve the distribution and management of healthcare resources in conflict zones? The hypothesis posits that integrating digital tools for tracking and assessing needs, along with secure and transparent donation mechanisms, can significantly enhance the efficiency and effectiveness of healthcare delivery in Sudan. This paper explores the development and functionalities of HopeOasis, examining its potential to enhance transparency, accountability, and efficiency in donation management, ultimately aiming to improve healthcare delivery and outcomes in Sudan amid the ongoing civil war.outcomes in Sudan amid the ongoing civil war.

2. Literature Review

The literature review explores modern philanthropy and healthcare solutions, focusing on online medical consultations and donation management systems. It examines how these innovations facilitate remote healthcare access and streamline donation processes, providing insights into their efficacy and potential in conflict-affected regions like Sudan.

Several studies have explored the role of online donation platforms in streamlining charitable contributions. Systems like GoFundMe and MedShare focus on connecting donors with global causes, with GoFundMe offering a wide range of causes and MedShare focusing on medical supply donations [3], [4].-

HopeOasis, while similar to these systems in terms of facilitating donations, adds additional features that are particularly suited for Sudan's unique challenges. The platform not only allows for monetary donations but also enables users to donate medical supplies and volunteer time [5]. This added flexibility makes HopeOasis a comprehensive tool for addressing both immediate and long-term healthcare needs [6].

2.1 Online Medical Consultation

Online medical consultations are pivotal in modern healthcare, providing remote access to medical advice and services. Platforms like Teladoc, Doctor on Demand, and Babylon Health offer features such as appointment scheduling, patient-doctor communication, and prescription management. These services are especially beneficial in regions with limited medical facilities, ensuring timely consultations and reducing travel needs. Hopeoasis integrates an online medical consultation feature to mitigate healthcare challenges in Sudan. By connecting patients with global doctors, Hopeoasis ensures essential medical advice and care for those in conflictaffected areas, aligning with its goal of enhancing medical services through targeted healthcare donations.

2.2 Donation Management Systems

Donation websites have become essential tools in modern philanthropy, efficiently connecting donors with causes, especially in crisis situations where traditional support methods often fail due to inefficiencies and delays [1]. The healthcare sector in Sudan is facing a severe crisis, exacerbated by prolonged civil conflict and inadequate infrastructure, leading to a critical shortage of medical supplies and services. To address these challenges, HopeOasis was developed as a web-based platform aimed at facilitating effective and targeted healthcare donations. This platform enhances healthcare delivery by making essential medical resources more accessible to the communities most affected by the conflict. Key features of HopeOasis include real-time donation tracking, needs assessment tools, and online medical consultations, collectively streamlining the donation process and improving resource management.

2.3 Analysis of Existing Platforms

nvestigating well-established donation management platforms is crucial for understanding their strengths, limitations, and operational mechanisms. This comparative analysis explores three significant donation platforms—GoFundMe, MedShare, and Project C.U.R.E.—to examine their functionality and identify ways to improve and refine HopeOasis [7]. Each platform offers unique features that cater to various philanthropic efforts, but they also present challenges that HopeOasis aims to overcome in its design.

GoFundMe is a leading crowdfunding platform that allows individuals and organizations to create campaigns for personal, charitable, or global causes. The platform's strengths include its broad global reach and user-friendly interface, which allows donors to support various causes. However, GoFundMe primarily supports monetary donations, and the responsibility for ensuring the legitimacy of campaigns often falls on the donors, leading to concerns over potential fraudulent campaigns [8]. The decentralized nature of GoFundMe means that transparency regarding the allocation and impact of donations can be limited, which may reduce donor trust. For HopeOasis, this limitation presents an opportunity to create a more localized platform focused on Sudanese healthcare, where donors can contribute not only funds but also medical supplies and volunteer time. By providing transparent tracking of donations and showing the direct impact of contributions, HopeOasis addresses concerns about transparency and donor trust, fostering a more engaging and secure donation experience. Additionally, unlike GoFundMe, HopeOasis eliminates high transaction fees to maximize the impact of every donation.

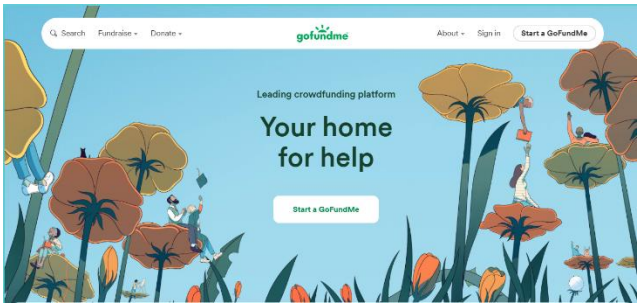


Fig. 1 GoFundMe Platform

For another platform we have MedShare is a nonprofit organization that specializes in providing medical supplies and equipment to underserved communities, with a focus on improving healthcare systems in developing countries. Its platform supports donations of both medical goods and financial contributions, enabling hospitals and clinics to access the necessary resources. The strengths of MedShare include its specialized focus on medical supplies, a feature that aligns closely with HopeOasis' goals of providing healthcare resources to Sudanese communities [9]. However, the platform is heavily focused on the logistics of medical supplies and has limited features for engaging individual donors or tracking the broader impact of their contributions. HopeOasis builds upon MedShare's approach by offering a more interactive and transparent system. While MedShare excels at medical supplies distribution, HopeOasis expands on this model by providing donors with a detailed, real-time overview of the impact of their donations. Additionally, HopeOasis supports a broader range of contributions—such as volunteer time and food supplies—in addition to medical goods. By enhancing donor engagement and providing comprehensive reporting, HopeOasis seeks to provide a more holistic and community-driven donation experience.

Fig. 2 MidShare Platform

Lastly, we have Project C.U.R.E. (Commission on Urgent Relief and Equipment) is another prominent nonprofit that focuses on providing medical supplies to healthcare providers in underserved regions around the world. Similar to MedShare, Project C.U.R.E. works to address the healthcare challenges in developing countries by distributing medical equipment and supplies. Its strengths lie in its established network and ability to mobilize resources quickly to provide immediate aid. However, like MedShare, Project C.U.R.E. mainly concentrates on medical supplies and lacks a comprehensive system for engaging local communities or offering real-time donation tracking [10].

HopeOasis takes a step further by integrating donation tracking, beneficiary profiles, and a transparent system for managing donations. Unlike Project C.U.R.E., HopeOasis provides an online platform where donors can track their contributions in real-time and receive updates on how their donations have been used [11]. Additionally, HopeOasis emphasizes community engagement by allowing donors to contribute in a variety of ways—not just through monetary donations or medical supplies, but also through volunteer services and time-based contributions [12]. This inclusivity is a key differentiator that enhances the impact of the platform in the local context.

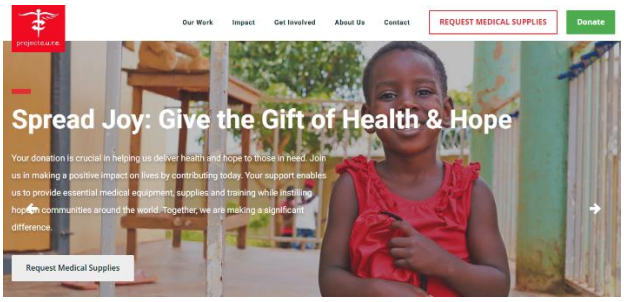


Fig. 3 Project C.U.R.E Platform

Comparison of Existing Platforms

Investigations and comparisons between GoFundMe, MedShare, Project C.U.R.E., and Hopeoasis reveal both similarities and differences in their features. While all platforms include essential modules such as Login, Registration, Donation, and Data Security, Hopeoasis stands out with its specialized modules like Doctor's Time and Appointment Scheduling and Supply Chain Management. These unique features address Sudan's specific healthcare needs, making Hopeoasis a comprehensive solution for managing healthcare donations. The findings, summarized in Table 2.1, provide a blueprint for the development of Hopeoasis.

Table 1 Comparison Table

Modules	GoFundMe	MedShare	Project C.U.R.E	HopeOasis
Registration	√	X	√	√
Login	√	X	√	√
Donation Module	√	√	√	√
Beneficiary Profile	X	X	X	√
Doctor's Time and Appointment Scheduling	X	X	X	√
Report And Donation History	√	√	√	√
User Dashboard	X	X	X	√

2.4 Significance of HopeOasis

HopeOasis addresses Sudan's healthcare challenges by connecting donors with local healthcare providers. It offers various donation types, including medical supplies, financial contributions, and volunteer time, ensuring comprehensive support. The platform emphasizes transparency, allowing real-time tracking of donations, which builds trust and accountability. Tailored to Sudan's needs, it supports local hospitals and clinics, making it easier for donors to make a direct impact on healthcare in the region.

3. Methodology

The development of HopeOasis followed a structured and user-centered approach to ensure that the platform meets the needs of both donors and healthcare providers in Sudan. The methodology utilized for this project is based on the Waterfall Model, which allows for clear, sequential development stages, ensuring that each phase is completed before moving on to the next

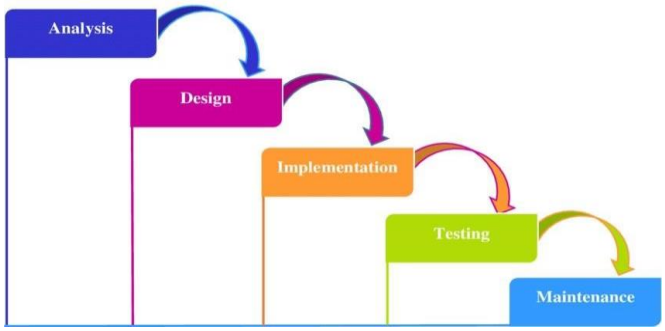


Fig. 4 Waterfall methodology

3.1 System Requirement Analysis

System requirement analysis is a process of defining the functional requirement and non-functional requirement of the proposed system. Functional requirement analysis describes what the system should do, while non-functional requirement analysis describes the system's operation capabilities and constraints that enhance its functionality. The follow section will describe the functional requirement and non-functional requirement that will be existed in the proposed system later.

Table 2 Functional Requirements

Modules	Description
Registration	• The system shall allow new users to enter their first name, last name, email address, password, phone number, and profile picture in the registration form. • The system shall warn the user for any invalid input.
Login	• The system shall allow the user to log into the system using their valid email and password. • The system shall verify the email and password entered by the user in the email and password data fields. • The system shall redirect users to their respective Dashboard after successful login.
Donation Module	• The system shall allow users to make monetary donations, supply donations, or donate their time (e.g., doctors providing consultations).
Beneficiary Profile	• The system shall display profiles and stories of beneficiaries. • The system shall highlight the impacts of donations on beneficiaries.
Doctor's Time and Appointment Scheduling	• the system shall allow doctors to schedule times for remote consultations. • The system shall allow patients to book online consultations with doctors.
Report And Donation History	• The system shall allow users to view their donation history. • The system shall provide details such as the date, amount, type of donation, and beneficiaries impacted by their contributions.

	• The system shall display a message if no donation history is available.
User Dashboard	• The system shall display a customized dashboard for each user based on their role (patient, doctor, or donor), showing relevant information and features specific to their role. • The system shall allow users to easily navigate between different sections of their dashboard (e.g., health records for patients, patient interactions for doctors, and donation history for donors).

Table 3 Non-Functional Requirement's

Requirements	Description
Usability	• The system shall provide a user-friendly interface that is easy to navigate. • The system shall offer support for at least two languages, including English and Arabic.
Reliability	• The system shall have an uptime of 95% to ensure availability during most times. • The system shall perform its functions correctly in 90 percent of use cases per month.
Security and Privacy	• The system shall use encryption to store sensitive data at rest. • The system shall implement role-based access control to restrict access to sensitive information.
Scalability	• The system shall support scalability to handle increasing numbers of users and transactions. • The system shall efficiently handle increased data volume without affecting performance.

3.2 Design Phase

The design phase of HopeOasis focuses on establishing a detailed plan for the system's functionality, user interface (UI), and architecture. The logical design defines how the system will meet user needs and solve the problems identified in earlier phases, ensuring a coherent approach to functionality. The physical design specifies the required hardware and software components, outlining the necessary infrastructure, including servers and databases, and the technologies needed for the system's operation. The UI design involves creating wireframes and mockups to visualize the layout and flow, ensuring an intuitive and user-friendly experience for both donors and healthcare providers. In addition, the system's data management is structured through the creation of class diagrams, activity diagrams, and sequence diagrams. These diagrams help model the system's components, define how processes flow within the platform, and illustrate how different parts of the system interact with each other, ensuring efficient data handling and seamless system behavior. This comprehensive planning ensures that the platform is built on a solid foundation, reducing risks and aligning the project with its intended objectives before moving on to the implementation phase.

3.3 Implementation Phase

The Hopeoasis system's extensive design documents are converted into a functional software system during the implementation phase. This includes coding the front-end and back-end components, configuring the development environment, and integrating various modules. In order to provide user-friendliness and intuitive navigation, front-end development concentrates on developing the user interface using the wireframes and mockups that were previously built. Back-end development simultaneously configures the application logic, database, and server to manage data processing effectively. All modules are checked and integrated after the first development is finished to guarantee smooth operation. Any problems are fixed quickly, and the system is continuously improved in accordance with the structured waterfall technique to guarantee robustness and reliability.

3.4 Testing Phase

The HopeOasis system is thoroughly tested during the testing phase to ensure it satisfies all requirements and functions as intended. This involves system testing to assess overall functionality, unit testing to test individual components, integration testing to confirm components function together, and user acceptability testing (UAT) with real users to gain feedback and guarantee usability. The testing process also incorporates both alpha and beta testing approaches. Alpha testing is conducted internally to identify and fix issues early, while beta testing involves real users to gather valuable feedback and ensure the system meets user expectations. Any issues discovered during these tests are promptly addressed, ensuring the system is dependable and ready for deployment.

3.5 Maintenance Phase

The maintenance phase is crucial for keeping the Hopeoasis system effective and up to date after deployment. This involves monitoring system performance, fixing bugs, and implementing updates to enhance functionality and security. For Hopeoasis, it means improving the platform for efficient donation and medical supply management by identifying performance issues, swiftly resolving problems, and regularly updating the system with the latest technology. It also includes integrating user feedback to enhance the user experience and maintaining strong security measures to protect sensitive data. Adhering to the waterfall methodology, this phase ensures the platform remains a reliable and valuable tool for supporting healthcare resources in conflict-affected areas.

4. Result and Discussion

This section provides a comprehensive analysis of the findings from the development and testing phases of the HopeOasis platform. It presents the outcomes of various functionalities and features, highlighting their effectiveness in meeting user needs. The section also includes an evaluation of user feedback from beta testing, offering insights into both the strengths and areas for improvement. By analyzing the platform's performance, usability, and user satisfaction, this section helps identify potential enhancements to optimize the user experience. It also discusses the platform's impact on healthcare donations and patient-provider interactions, with a focus on transparency, ease of use, and overall effectiveness in addressing healthcare challenges in Sudan.

4.1 Use Case Diagram

The Use Case Diagram illustrates the interactions between various actors and the system. It includes Donors, Patients, Doctors, and Administrators, each with specific roles and functionalities. Donors can register, log in, make donations, and view their donation history. Patients can register, log in, view their profile, access a dashboard, and book consultations with doctors. Doctors have the ability to log in, access a dashboard, and schedule consultations with patients. Administrators manage user accounts, generate reports, and oversee the profiles of beneficiaries receiving donations. The diagram also highlights relationships between use cases, including Extend (e.g., "View Donation History" extends "Make Donation") and Include (e.g., "Authenticate User" is included in actions such as "Register New Account" and "Login to the System").

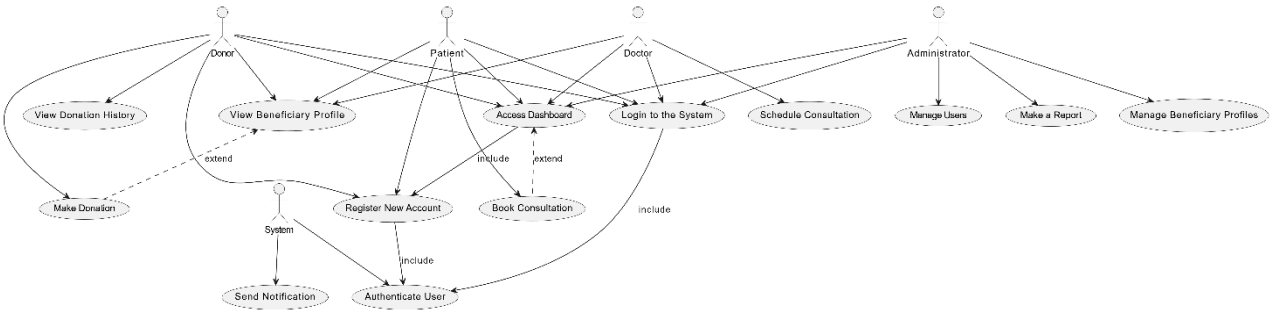


Fig. 5 Use case Diagram

4.2 Class Diagram

The class diagram for the HopeOasis System illustrates the relationships between different entities, focusing on user roles such as Donors, Administrators, Patients, Doctors, and Beneficiaries. The central User class defines attributes like user ID, name, email, and role, with methods for login, registration, and profile updates. The Donor class allows users to make and track donations, while the Donation class handles the donation details and payment processing. Administrators manage staff accounts and view donation reports, and Beneficiaries have profiles with health records and stories. The Patient and Doctor classes manage health consultations, with the Consultation class scheduling and viewing consultations. The HealthRecord class stores medical histories, and the DoctorContribution class tracks contributions made by doctors. Supporting classes like AppointmentScheduler manage available slots, ensuring the efficient operation of appointments and donations within the system.

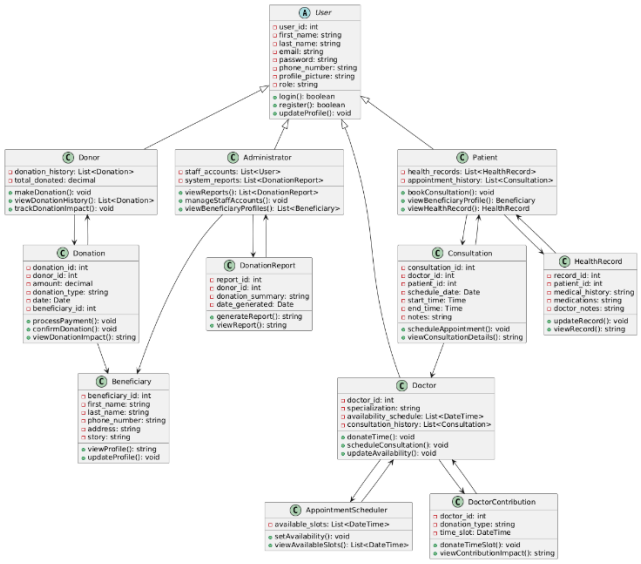


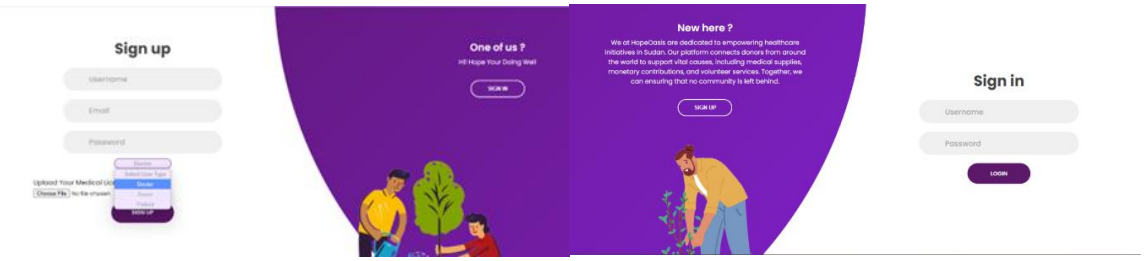
Fig. 6 Class Diagram

4.3 Implementation

The HopeOasis system consists of the following models: Registration Model, Login Model, Donation Management Model, Beneficiary Profile Model, Doctor Appointment Scheduling Model, View Donation History Model, and Report Donation History Model. Each model is implemented using Visual Studio Code (VS Code) as the primary development environment and hosted on the InfinityFree server. Each model is described in detail with a focus on its functionality and the key code segments that enable its operation. This structured approach highlights how the system was developed to meet its objectives efficiently and ensures that each module integrates seamlessly to deliver the required functionalities.

4.3.1 Registration and Login

The login and registration pages are designed for a smooth user experience. The registration form includes fields for username, email, password, and a file upload option for doctors to submit their medical license. A drop-down menu lets users select their role, ensuring appropriate access. After filling in the form, users can click "SIGN UP" to complete the registration. The login page allows users to enter their username and password, with the "LOGIN" button granting access to role-specific features upon successful authentication.



(a) (b)

Fig. 7 (a) Registration page (b) Login Page

4.3.2 Donation Module

This section describes the implementation of the Donation Module within the HopeOasis platform, enabling users to contribute to healthcare causes in Sudan. Donors can choose from various donation categories, such as monetary contributions, medical supplies, and volunteer time. Administrators manage the module, ensuring transparency by tracking donations in real-time and generating detailed reports. Beneficiaries, including healthcare providers and patients, can view donations and track how they are used to improve healthcare access. The Donation Module facilitates seamless contributions and strengthens the overall efficiency of healthcare support in Sudan.

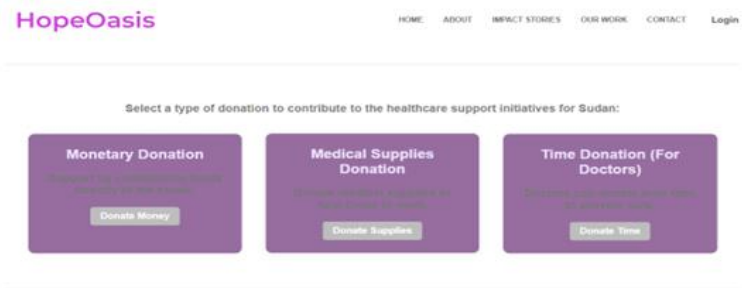


Fig. 8 Donation Type page

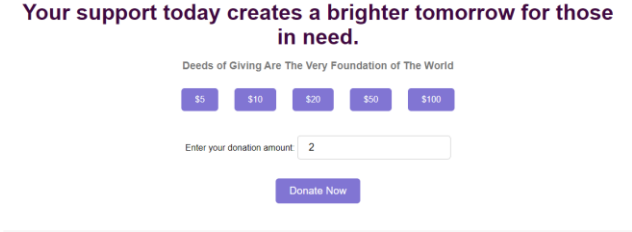


Fig. 9 Monetary Donation Page

Fig. 9 allows users to make monetary donations by selecting a predefined amount or entering a custom amount. The "Donate Now" button facilitates the donation process and then leads to the payment page

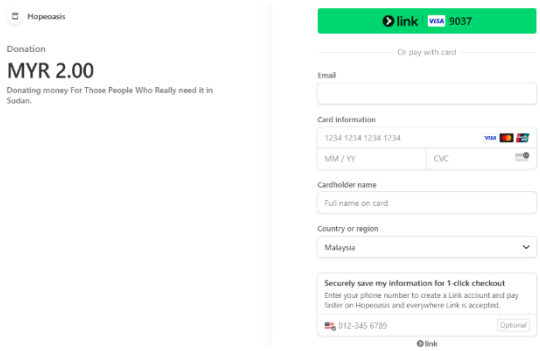


Fig. 10 Payment Details Page for Donation

The images in Fig. 10 facilitate the payment process after the user selects a donation amount. It allows the donor to enter their payment details, including card information, email, and billing country. The user can securely process the donation by clicking the "Pay" button or save information for quicker future donations.

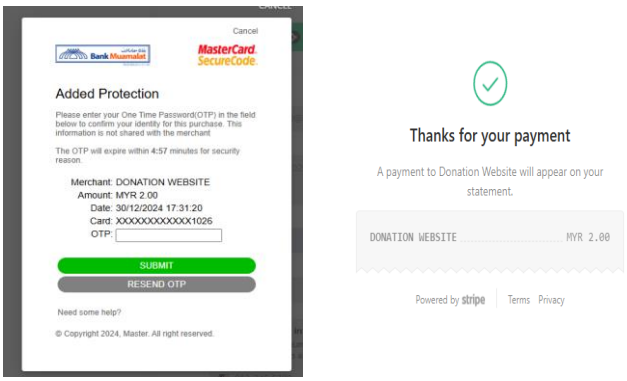


Fig. 11 1 Payment Confirmation and Security Verification

Fig. 11 shows The two steps after a donation is made. The first image shows an added security step, where the donor enters a One-Time Password (OTP) for verification to complete the transaction. The second image confirms successful payment with a thank-you message, displaying the payment details.

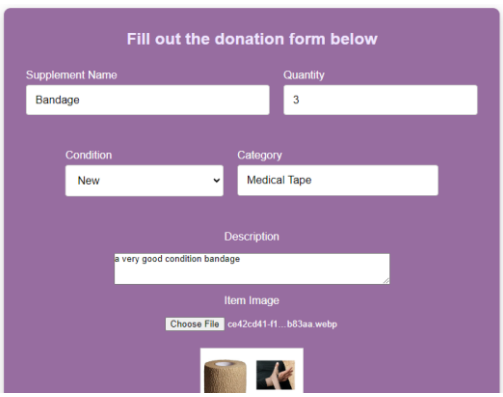


Fig. 12 Medical Supplies Donation Form

Fig. 12 shows that the users can fill out this form with information on the medical supplies they want to give after clicking the "Donate Supplies" button on the donation page. They can choose a Category, like "Medical Tape," and define the Supplement Name, Quantity, and Condition (like "New, Used, Used Like New and Old"). For clarification, donors can also submit an item image and include a description of the item. The contribution procedure is streamlined by this easy-to-use form, which guarantees that items are correctly identified and prepared for distribution to people in need

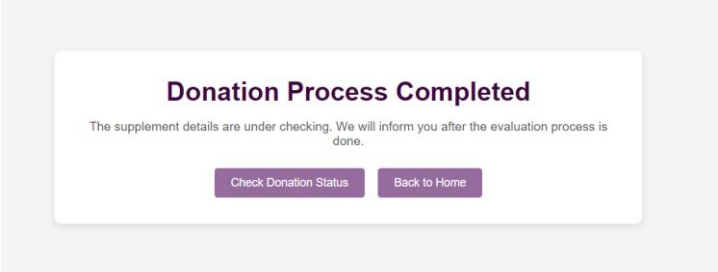


Fig. 13 Donation Process Completed Confirmation

Fig. 13 shows a Donation Process Completed confirmation screen. It notifies the donor that the supplement details are under checking, and they will be informed once the evaluation process is complete. The page offers two options: Check Donation Status, allowing the donor to track the progress of their donation, and Back to Home, which redirects the donor to the homepage. This confirmation ensures transparency and keeps the donor updated about the status of their contribution.

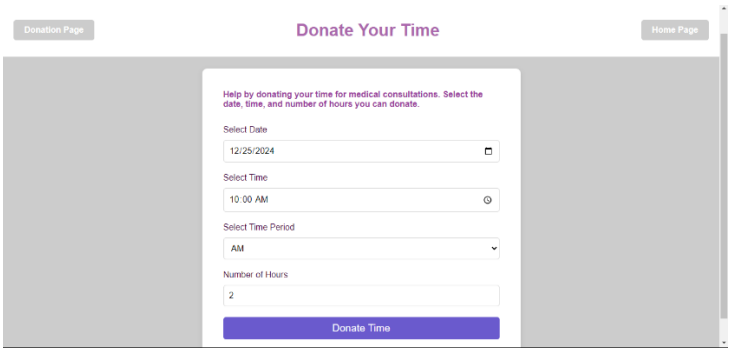


Fig. 14 Time Donation for Doctor's

Fig. 14 shows the Time Donation form that appears after a user selects the Time Donation option, provided the user is a doctor. The form allows the doctor to donate their time for medical consultations. It prompts the user to Select Date, Select Time, and Select Time Period (AM/PM), followed by entering the Number of Hours they are willing to donate. After filling in these details, the doctor can click the Donate Time button to complete the donation. This feature enables doctors to contribute their expertise to those in need, making it easier for patients to access virtual consultations.

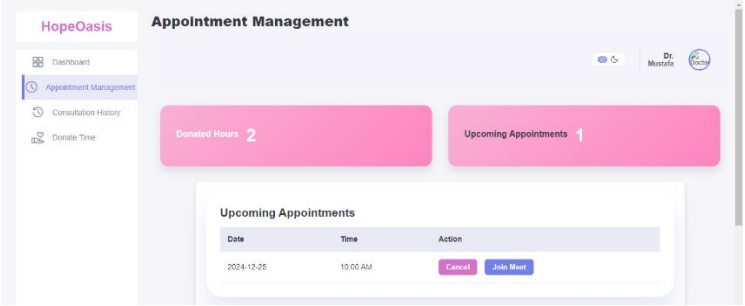


Fig. 15 Doctor Dashboard Appointment Management Section

Fig. 15 shows the Appointment Management section of the Doctor Dashboard. After the doctor clicks OK in the previous confirmation screen, this section displays the Donated Hours (2 hours) and Upcoming Appointments (1 upcoming appointment). The doctor can view the appointment details (Date: 2024-12-25, Time: 10:00 AM) and has the options to Cancel or Join Meet for the consultation. This section helps doctors manage their appointments efficiently.

4.1.3 Doctor's Time and Appointment Scheduling

The Doctor's Time and Appointment Scheduling Module in HopeOasis helps doctors manage their donated hours, upcoming appointments, and consultation history efficiently. Users can view, cancel, or join appointments easily. Clicking "Join Meet" takes them to a live session, with options to "Join Stream" or "Back to Dashboard" for better control. This module ensures smooth appointment management and facilitates seamless communication between healthcare providers and patients.

Fig. 16 Join Meeting Page

Fig. 16 Shows The Online Meeting feature in HopeOasis provides an easy and efficient way for users to manage their scheduled meetings. After selecting an upcoming appointment, users can click the "Join Stream" button to enter the live session, where they can participate in virtual consultations or meetings with healthcare providers. This allows for seamless interaction and real-time engagement. Alternatively, if users wish to exit the session and return to their tasks on the platform, they can simply click the "Back to Dashboard" button. This streamlined functionality enhances user experience by allowing quick access to appointments and effortless navigation back to the dashboard, making appointment management more efficient and user-friendly.

(a) (b)

Fig. 17 (a)one person in the meet (b) 2 people in the meet Meeting session page

Fig. 17 show two views of a meeting on the HopeOasis platform. The first image displays a single participant with controls to manage the microphone and camera, as well as a "Leave Stream" button to exit the meeting. The second image shows two participants, providing a split-screen view with the same controls for managing audio and video settings. These features allow users to easily participate in and control their virtual meetings.

4.3.4 Beneficiary Profile

The Beneficiary Profile section on the HopeOasis platform is designed to highlight key initiatives and areas in need of support. This section presents a collection of causes, each accompanied by relevant images and brief descriptions, offering users a comprehensive overview of ongoing projects that require assistance. The section aims to connect donors with various healthcare needs, helping them discover initiatives that align with their values and interests. By showcasing the most critical areas in need of support, the Beneficiary Profile enhances user engagement and promotes transparency, making it easier for users to explore, learn about, and contribute to causes that have a tangible impact on communities in need.

Fig. 18 Beneficiary Profile Section

Fig. 18 shows The Beneficiary Profile section on the homepage of the HopeOasis platform highlights various ongoing donation drives and initiatives that are currently in need of support. Each cause is visually represented with images and displays the total amount of donations received. Examples include Maxis Kampf 2.0 with 3.4K donations, help support families in need with 1.2K donations, and Dr. Maniruzzaman's medical supplies campaign with 1.5K donations. This section provides a clear overview of the most pressing needs and offers users the opportunity to learn more about these causes and contribute directly

4.1.5 Report and Donation History

The Report and Donation History section in HopeOasis allows admins, doctors, and patients to track and manage donation activities. Admins can view and download donation reports, doctors can access consultation histories, and patients can monitor their donations. The Donation Invoice feature provides users with detailed invoices for transparency and record-keeping, enhancing the overall user experience with easy access to donation data and reports.

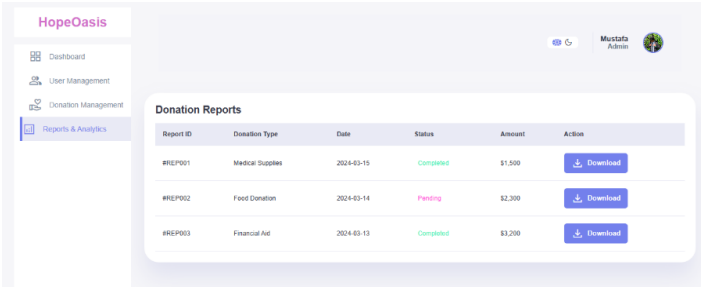


Fig. 19 Donation History - Admin Dashboard

Fig. 19 illustrates the Donation Reports section in the Admin Dashboard, which lists detailed donation reports, such as medical supplies, food donations, and financial aid. Admins can download individual reports for further analysis.

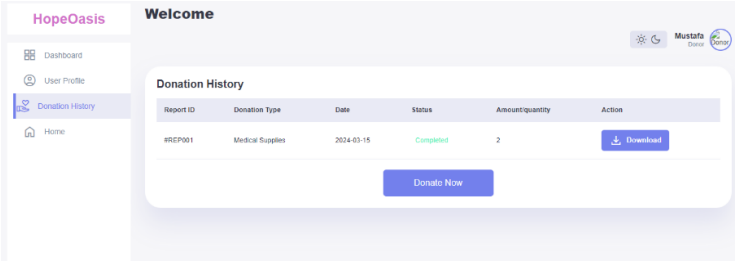


Fig. 20 Donation Reports - Donor Dashboard

Fig. 20 displays the Donation History section of the Admin Dashboard, where admins can view and track all donation details, including donation type, date, status, and amount. Admins can also download detailed donation reports using the "Download" button.

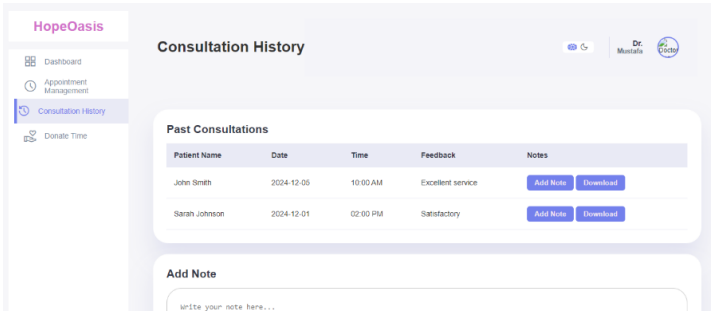


Fig. 21 Consultation History - Doctor Dashboard

Fig. 21 shows the Consultation History section from the Doctor Dashboard, where doctors can view past patient consultations, including feedback and notes. Doctors can add notes and download consultation details for record-keeping.

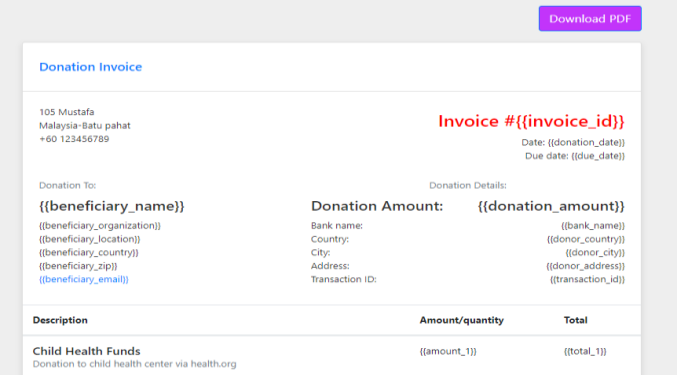


Fig. 22 Donation Invoice - Generated Report

Fig. 22 depicts the Donation Invoice report generated for a specific donation, containing donor and beneficiary details, donation amounts, transaction information, and itemized descriptions. The "Download" button allows users to download the invoice as a PDF for their records

4.5.6 User's Dashboard

The Users Dashboard module in HopeOasis provides personalized interfaces for different users, including donors, doctors, patients, admins, and NMSF. Each dashboard displays relevant information: donors can track their donations, doctors manage appointments and consultations, admins oversee platform metrics and user activities, NMSF handles doctor verifications and medical supply donations, and patients monitor their appointments and doctor feedback. This module ensures efficient management and easy access to key data, promoting transparency, organization, and seamless interaction for all users.

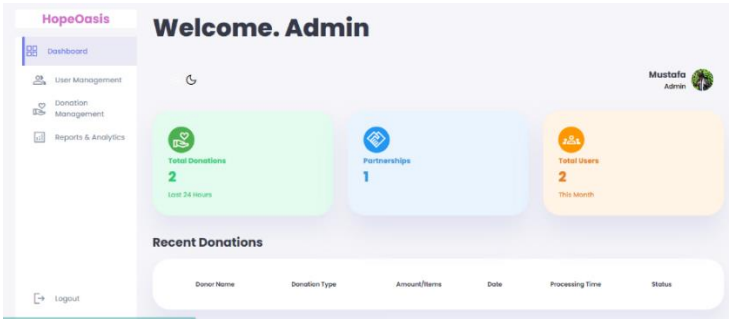


Fig. 23 Admin Dashboard

Fig. 23 shows the Admin Dashboard in HopeOasis, which includes important metrics like Total Donations, Partnerships, and Total Users for the month. The Recent Donations section lists donor names, donation type, amount/items, date, and processing time. The admin can monitor donation activities, user management, and partnership details to ensure smooth platform operations.

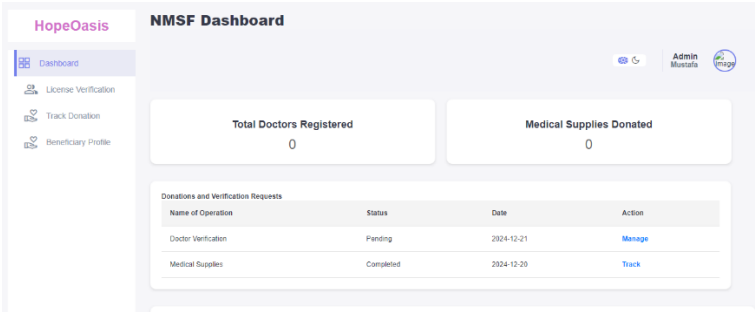


Fig. 24 NMSF Dashboard (National Medical Supplies Fund)

Fig. 24 illustrates the NMSF Dashboard in HopeOasis. It provides information such as Total Doctors Registered and Medical Supplies Donated. Below, the Donations and Verification Requests section allows the NMSF admin to manage and track doctor verification requests and medical supply donations. This dashboard enables effective management and oversight of medical resources and personnel registration.

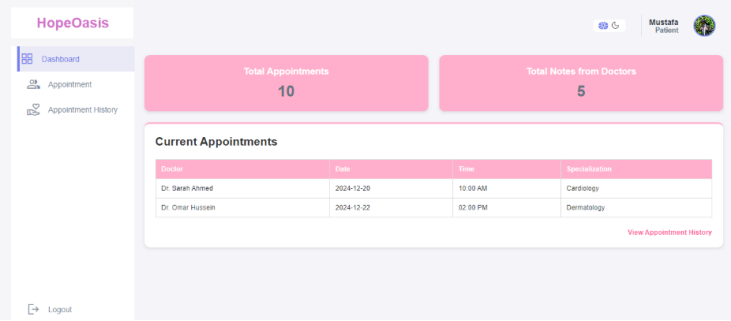


Fig. 25 Patient Dashboard

Fig. 25 shows the Patient Dashboard in HopeOasis, where users can see their Total Appointments and Total Notes from Doctors. The Current Appointments section lists upcoming appointments, including the doctor's name, date, time, and specialization. This dashboard offers patients an overview of their healthcare appointments and helps them stay organized with upcoming medical consultations.

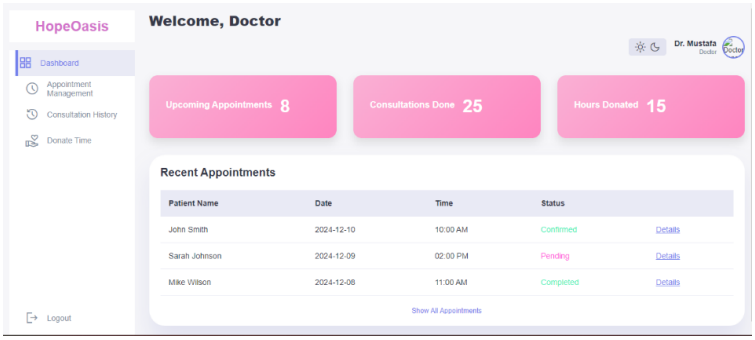


Fig. 26 Doctor Dashboard

Fig. 26 represents the Doctor Dashboard on HopeOasis. It highlights important information, such as Upcoming Appointments, Consultations Done, and Hours Donated. Below, the Recent Appointments section displays the patient's name, date, time, and status of appointments. Doctors can manage their appointments and access additional details via the "Details" button, helping them track their consultations and work hours effectively.

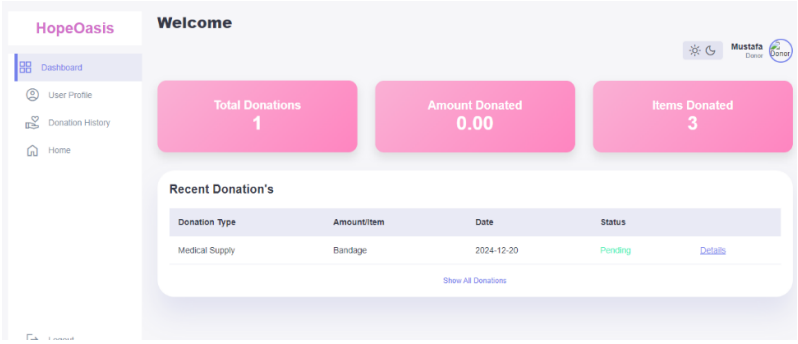


Fig. 27 Donor Dashboard

Fig. 26 displays the Donor Dashboard on HopeOasis. It shows key metrics such as Total Donations, Amount Donated, and Items Donated. Below, the user can view the Recent Donations, including donation type, amount/item donated, date, and status. The "Details" button allows the donor to access further information about each donation. This dashboard provides an overview of the donor's activity and current contributions.

4.4 Testing

Testing is a fundamental phase in the development lifecycle of software applications, ensuring that systems operate as intended and meet the expectations of users *(Smith, 2023).* For platforms such as Hopeoasis, testing is not just about validating functionality, but also ensuring the reliability, security, and overall user experience.

This section focuses on the comprehensive testing approaches implemented for Hopeoasis, which include unit testing, integration testing, and user acceptance testing (UAT). These methodologies are designed to evaluate both individual components and the overall system to ensure it functions smoothly and efficiently. The goal is to identify and resolve any potential issues, enhance system performance, and provide a secure platform for users to donate and access critical healthcare resources. By applying structured testing procedures, Hopeoasis strives to deliver a robust, user-friendly, and trustworthy platform for its users *(Smith, 2023).*

4.4.1 Alpha Testing

Alpha testing in the development of Hopeoasis plays a critical role in assessing the platform's functionality and performance before it enters the beta phase and is made available to real-world users. This phase involves detailed testing of the application to verify that its behavior meets predefined expectations and the system operates as intended. Alpha testing ensures that the platform is stable, secure, and ready for further scrutiny during beta testing. As discussed in relevant literature, this phase helps identify and address bugs or performance issues early on (Johnson & Roberts, 2022). The table below presents the test cases designed and executed for Hopeoasis, highlighting the key areas assessed during the alpha testing phase.

4.4.2 Beta Testing

Beta testing is a vital stage in the development of Hopeoasis, where the platform is tested in real-world conditions by external users before its official launch. This phase follows alpha testing and serves as a key component of external user acceptance testing. It enables the identification of bugs, performance issues, and valuable user feedback, which are essential for enhancing the software's quality and reliability. The beta testing for Hopeoasis has been conducted across three user groups: donors, doctors, and patients. Detailed findings for each user group will be presented in the following subsections

4.4.2.1 User Acceptance Testing for Doctor

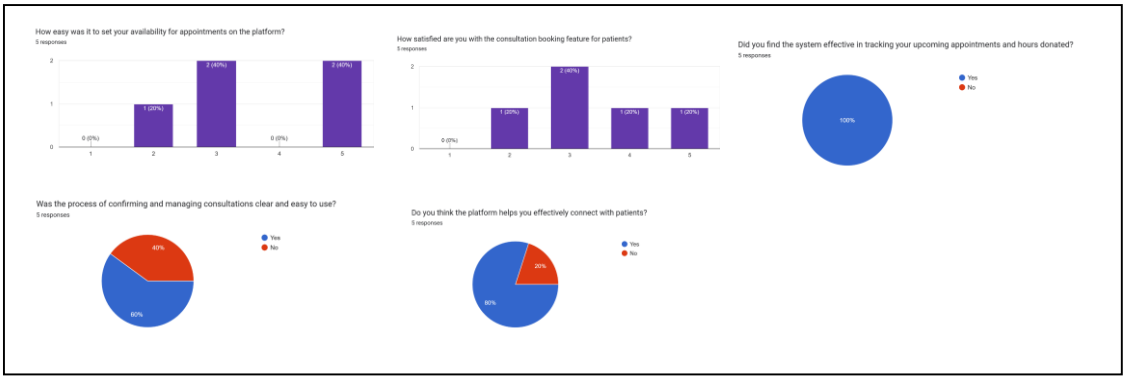


Fig. 28 Doctor Feedback

Fig. 28 shows the Feedback from 5 doctors during HopeOasis beta testing highlighted mixed results. While 40% found setting availability easy, 40% rated it neutrally, and 20% found it somewhat difficult. However, all doctors (100%) agreed that the system effectively tracks appointments and donated hours. Satisfaction with consultation booking was mixed, and 60% found managing consultations clear and easy, while 40% felt it needed improvement. Despite this, 80% of doctors felt the platform effectively connects them with patients. Overall, while HopeOasis performs well, improvements in scheduling and consultation management are needed.

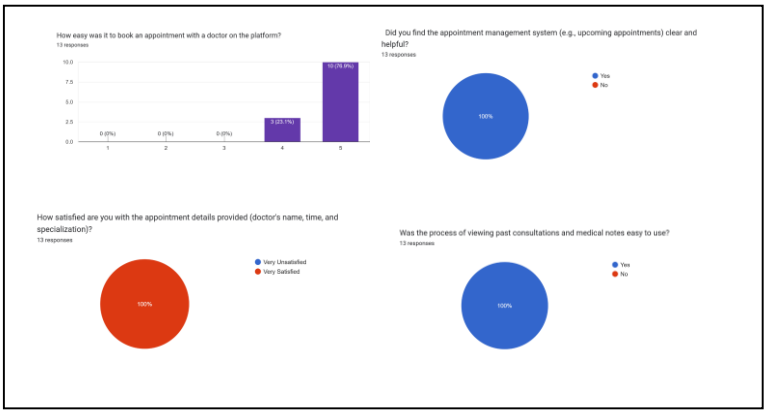


Fig. 29 Patient Feedback

Fig. 29 shows the Patient feedback from HopeOasis beta testing shows high satisfaction with key features. 76.9% of patients found booking an appointment very easy, and 100% agreed that the appointment management system was clear and helpful. All patients were satisfied with the appointment details provided and found the process of viewing past consultations and medical notes easy. This feedback highlights that HopeOasis offers a user-friendly experience for managing appointments and accessing medical information.

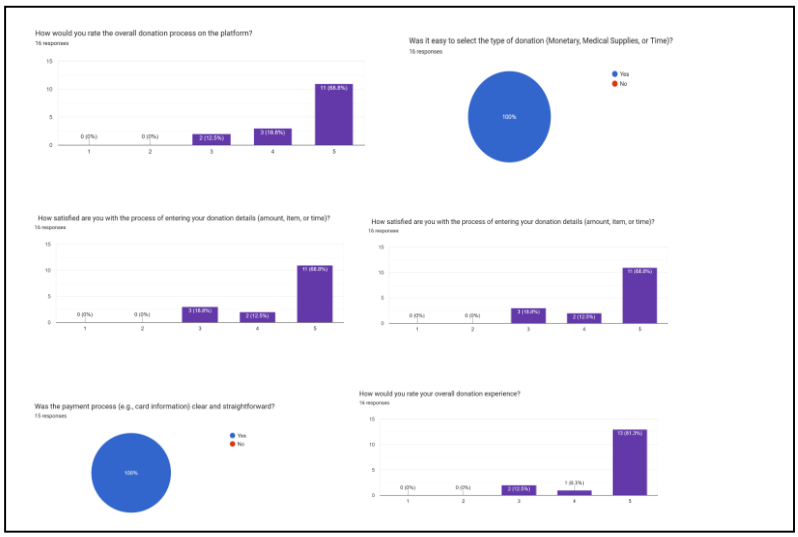


Fig. 30 Donor Feedback

Fig. 30 shows the Donor feedback from HopeOasis beta testing shows high satisfaction with the donation process. 68.8% rated the overall process as excellent, and all donors found selecting donation types easy. 68.8% were also highly satisfied with entering donation details, and 100% found the payment process straightforward. Overall, 81.3% of donors rated their experience highly, indicating that HopeOasis effectively meets donor needs with a clear, efficient, and user-friendly donation process.

5. Conclusion

HopeOasis offers a powerful, user-friendly platform to address Sudan's healthcare challenges, particularly in conflict-affected areas. By connecting donors, healthcare providers, and patients, it facilitates streamlined healthcare donations and online consultations. The platform's transparency and real-time donation tracking enhance donor trust, while its tailored modules—such as appointment scheduling and consultation management—ensure that healthcare needs are efficiently met. The testing phases, including alpha and beta testing, have demonstrated the platform's effectiveness, though feedback suggests areas for improvement, particularly in appointment management and scheduling. With its holistic approach to healthcare donations, HopeOasis has the potential to significantly improve healthcare delivery in Sudan and can be expanded with additional features to further address the region's needs.

Acknowledgement

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Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

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