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Continuous Ambulatory Peritoneal Dialysis (CAPD) Treatment Record Mobile App

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KEYWORDS

Continuous Ambulatory Peritoneal Dialysis (CAPD)
Peritoneal Dialysis (PD)

ABSTRACT

Continuous ambulatory PD was introduced in Malaysia in 1983 in a university hospital and a year later in a public general hospital. CAPD patients need to do daily treatment at their home and the result needs to be recorded in the book record given by the hospital. Kidney patients undergoing Peritoneal Dialysis (PD) treatment are performed 4 times a day at home and need to record incoming and outgoing PD solutions, hygiene of PD and UF solutions manually in a PD book given by the hospital. Patients need to bring the book together during the appointment. Besides, the doctor only can view the patient record manually during an appointment session. This project proposed a mobile application to facilitate patient to key in the daily treatment data and for the doctor to view patient's record periodically. The mobile application will be developed using MIT App Inventor and Firebase was used for login process. The data keyed in by patients will be saved in Google Sheets that link with the App. The result of this project is that kidney patients can key in their daily treatment data into the apps while the doctor can monitor the patients record remotely.

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1.0 INTRODUCTION

Continuous ambulatory PD was introduced in Malaysia in 1983 in a university hospital and a year later in a public general hospital. Around 39,711 patients with kidney failure are doing dialysis treatment and estimates will increase to 106,000 patients in 2040. In Continuous Ambulatory Peritoneal Dialysis (CAPD), the patient connects a bag of dialysate fluid to the Tank off catheter. This dialysate remains in the abdomen for 4 to 6 hours, following which the dialysate will be drained out of the abdomen and fresh dialysate will be reinfused.

CAPD patients do treatment at home and need to record the dialysis data into the book record given by the hospital. This project proposed to facilitate patients recording the daily treatment information and the doctor viewing the patient's record periodically [1].

Kidney patients undergoing Peritoneal Dialysis (PD) treatment are performed 4 times a day at home and need to record incoming and outgoing PD solutions, hygiene of PD and UF solutions manually in a PD book given by the hospital. Patients need to bring the book together during the appointment. Besides, the doctor can only view the patient record manually during an appointment session (interview session with Penolong Pengarah Unit Dialisis, Hospital Besar Kemaman). The objective of this project is to develop a mobile app for kidney patients to record their daily treatment result. Besides, for doctors to monitor patient records periodically. The development will be developed using MIT App Inventor.

2.0 LITERATURE REVIEW

2.1 Previous work

Optimizing of the chronic kidney disease – peritoneal dialysis App to improve care for patients on Peritoneal Dialysis is Northeast Thailand proposed patients record hydration data from each dialysis cycle, such as body weight, blood pressure, urine output, and ultrafiltration volume, into a PD notebook to track their level of hydration. Because of Thailand's Peritoneal Dialysis First policy, peritoneal dialysis (PD) is becoming more commonplace there. PD is a type of home-based renal replacement therapy in which people with chronic kidney failure exchange up to 4 peritoneal fluids per day with dialysate. One of the most frequent side effects in PD patients is overhydration, which is linked to higher morbidity and mortality rates [2].

Optical character recognition (OCR) and near-field communication (NFC) were integrated into the chronic kidney disease-PD (CKD-PD) software to automate the gathering of hydration metrics. The data was shown in the app for self-monitoring and uploaded to a database for professionals at the PD clinic to monitor in real-time. The morbidity and mortality associated with overhydration might be decreased by early detection and treatment of overhydration. Objective For the CKD-PD app with NFC and OCR and a monitoring system, this study attempts to uncover usability problems and technological acceptance barriers. It then uses this information to create rapid cycle improvements. Methods Nephrologists, nurses from the PD clinic, computer programmers, and engineers made up a multidisciplinary team that educated and supervised two groups of five participants using the CKD-PD app with NFC and monitoring system [2].

Results shown that three quick improvement cycles were performed on the CKD-PD app using NFC, OCR, and a monitoring system. The usefulness of the NFC and OCR data collection, app stability, user interface, and computation and display of hydration metrics were all found to have problems. The acquisition of hydration metrics was improved by NFC and OCR, but usability problems persisted. By the end of phase 3, app stability and user interface issues had been fixed, and hydration measurements had been successfully uploaded. The self-monitoring and clinical communication elements were well-received by participants, and their technology adoption scores fell but remained high [2].

Schreiber [3] proposes Changing landscape for peritoneal dialysis: optimizing utilization. Due to peritoneal dialysis's (PD) lower annual cost, early survival advantage over in-centre haemodialysis, and improved quality of life for patients treating their kidney disease at home, PD will grow in the future in direct correlation with the US healthcare system's transition to a value-based payment model. In accordance with this approach, nephrology practices will need to place more emphasis on managing the transition from chronic kidney disease to end-stage renal disease (ESRD), giving patient education to choose the right modality and set up the right access before starting dialysis.

Over the course of their ESRD, most patients will need more than one therapy, therefore switching between them needs to be carefully planned. As practices advance in an integrated renal care setting where home modalities become a crucial ESRD beginning point, they should embrace several interventions (such as kidney health and dialysis alternatives education, collaborative decision-making, urgent start, etc.). Nephrology practitioners must discuss potential obstacles to PD

progression with their entire group, department, or healthcare organization to successfully negotiate the shift of patients from CKD to ESRD.

The result of the research shown no matter whether doctors participate in end-stage renal disease (ESRD) Seamless Care Organizations, Medicare Advantage special needs plans, Medicare Advantage capitation, or commercial shared savings, the adoption of integrated kidney care will accelerate because of the shift to a value-based payment system and necessitate an increased focus on patient experience/patient-reported outcomes and costs. Additionally, comparisons between providers for patient and payer care decisions will be made possible by publicly released data on specific metrics indicating practice quality targets. DaVita developed the Patient-Focused Quality Pyramid to direct doctors and assisting medical staff toward a comprehensive patient-centred care strategy as the main means of enhancing quality patient survival.

Kidney supportive Care in Peritoneal Dialysis: Developing a person- Cantered kidney Disease Plan proposed by [4]. The care of patients with kidney failure and earlier stages of chronic renal disease has advanced over the past ten years as kidney supportive care has become increasingly acknowledged, crucial component (CKD). 1- 3 Kidney supportive care integrates palliative medicine principles in nephrology and focuses on providing an individualized approach to shared decision making (SDM), which is used throughout the course of advanced CKD and dialysis decision-making. Kidney supportive care is also referred to as "kidney palliative care," "renal supportive care," or "renal palliative care" in various clinical or research settings.

The provision of person-centred kidney disease care and the related creation of a person- centred renal care plan constitute renal supportive care. The term "renal supportive care" has undergone some changes over the years, but modern definitions still include assessment and management of kidney-specific symptoms, information sharing, forecasting, and HR through expert communication, interdisciplinary team support, non- dialysis care (also known as "conservative management,"), and end-of-life care. 3 The focus of therapeutic decision-making is altered to reflect what matters most to individuals in accomplishing their objectives and priorities through a person-centred approach to kidney disease care. Evidence-based practice continues to guide.

As a result, because of the potential for greater decision-making complexity and a wider range of treatment options to consider, the greater magnitude of prognostic uncertainty with fewer available prognostic tools, potential differences in the range or type of symptoms experienced, and the consequent importance of understanding individual PD patient motivations, the need for kidney supportive care in PD patients may be even greater than that for those on HD. Kidney supportive care takes a person-centred approach to treating kidney disease, so PD patients and healthcare professionals will be better able to frame their decisions about kidney treatment in the context of their ongoing and potentially changing disease course, as well as their own personal goals and priorities, when choosing a dialysis regimen.

3.0 METHODOLOGY

The first step is understanding the CAPD Treatment Process including the steps involved, important metrics to monitor, and the overall treatment workflow. Identify App features and functionalities which determine the key features that the app should have, such as patient profile management, treatment recording, reminders for medication and procedure times, data visualization, and possibly communication with healthcare providers. Next step is designing the user Interface using MIT App Inventor's drag-and-drop interface to design an intuitive and user-friendly interface. Ensure the design is simple, easy to navigate, and accommodates all the necessary functionalities. Set up a database to store patient data securely using Google Sheets and Firebase. Next step is identified and resolve any bugs or issues within the app. Test the app's functionality on different devices to ensure compatibility and a smooth user experience. Gather feedback from potential users and healthcare professionals to identify areas for improvement. Use this feedback to iterate and enhance the app's features and functionalities. Lastly, provide regular maintenance and updates to improve

the app's performance, address any issues, and incorporate new features based on user feedback and technological advancements.

The project requirements for developing this project are laptop or computer and platform MIT app inventor 2. For the database linkage is using Google sheet for patient record, treatment record and history while Firebase is used for storing a login information of the users.

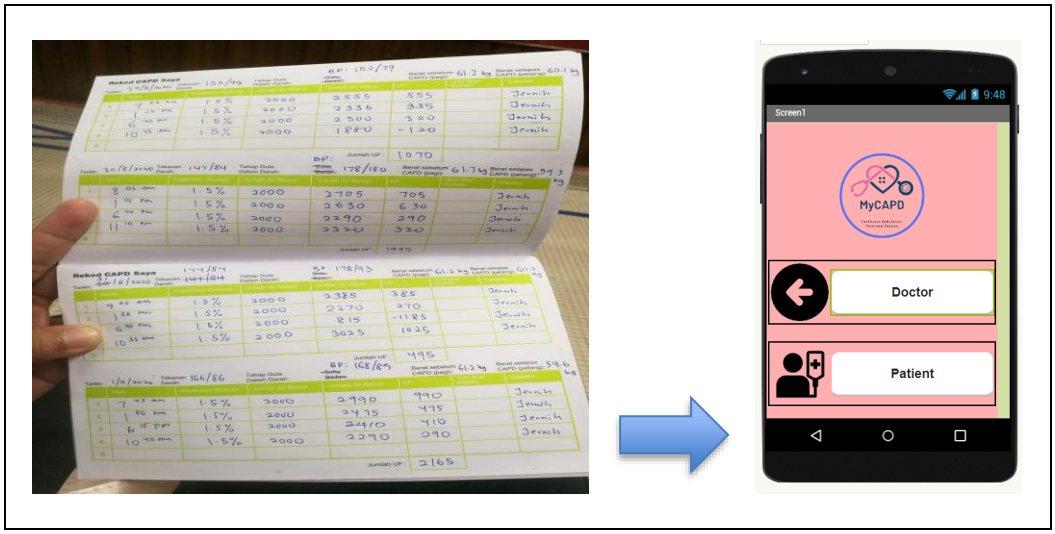

Figure 1: App Development

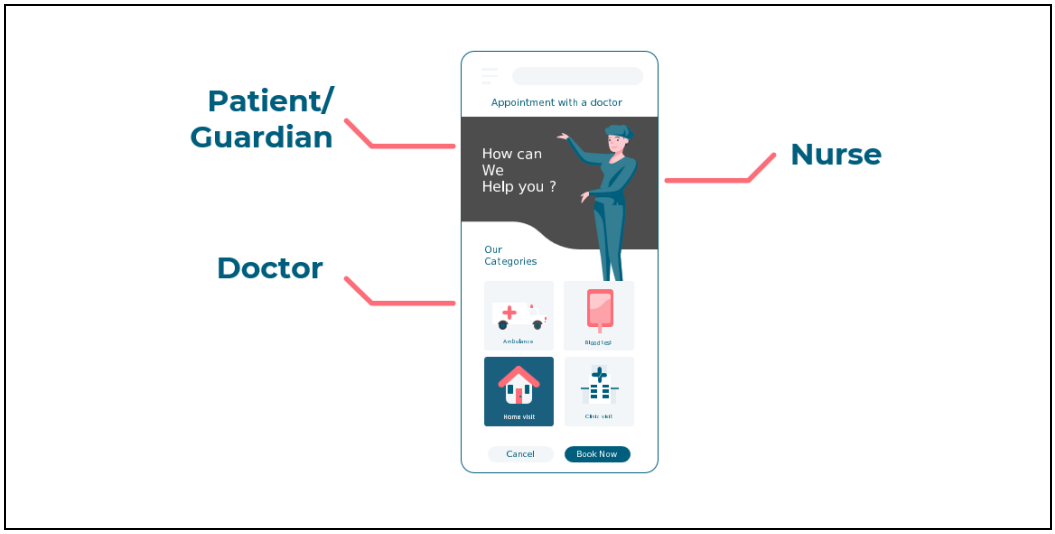

Figure 2: Target Users

3.1 Project Diagram

MyCAPD app will be developed using MIT App Inventor. Based on the project diagram, the Doctor will monitor the patient only through the application MyCAPD. The patient can directly contact the doctor if there is a critical problem that occurs. This application can help doctors monitor patients using only the phone. This will save time and human energy.

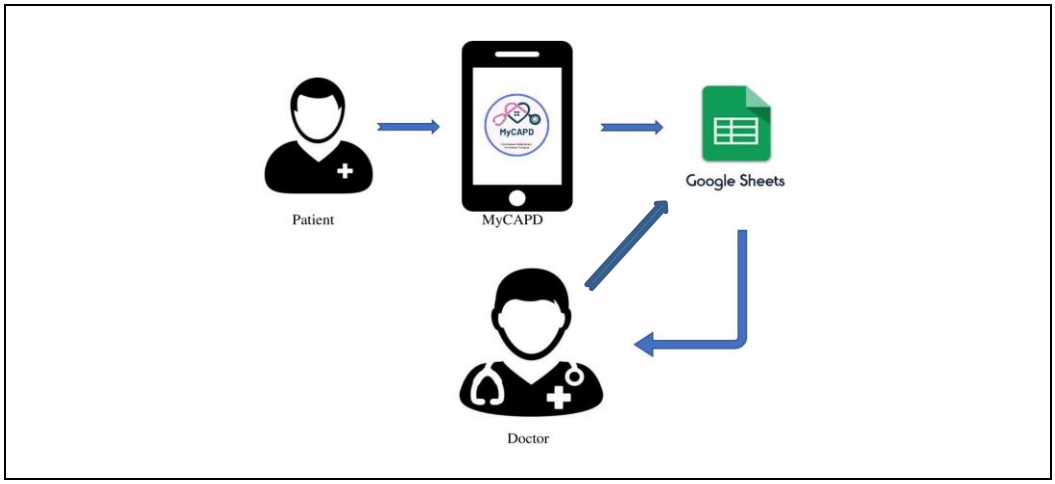

Figure 3: Project Diagram

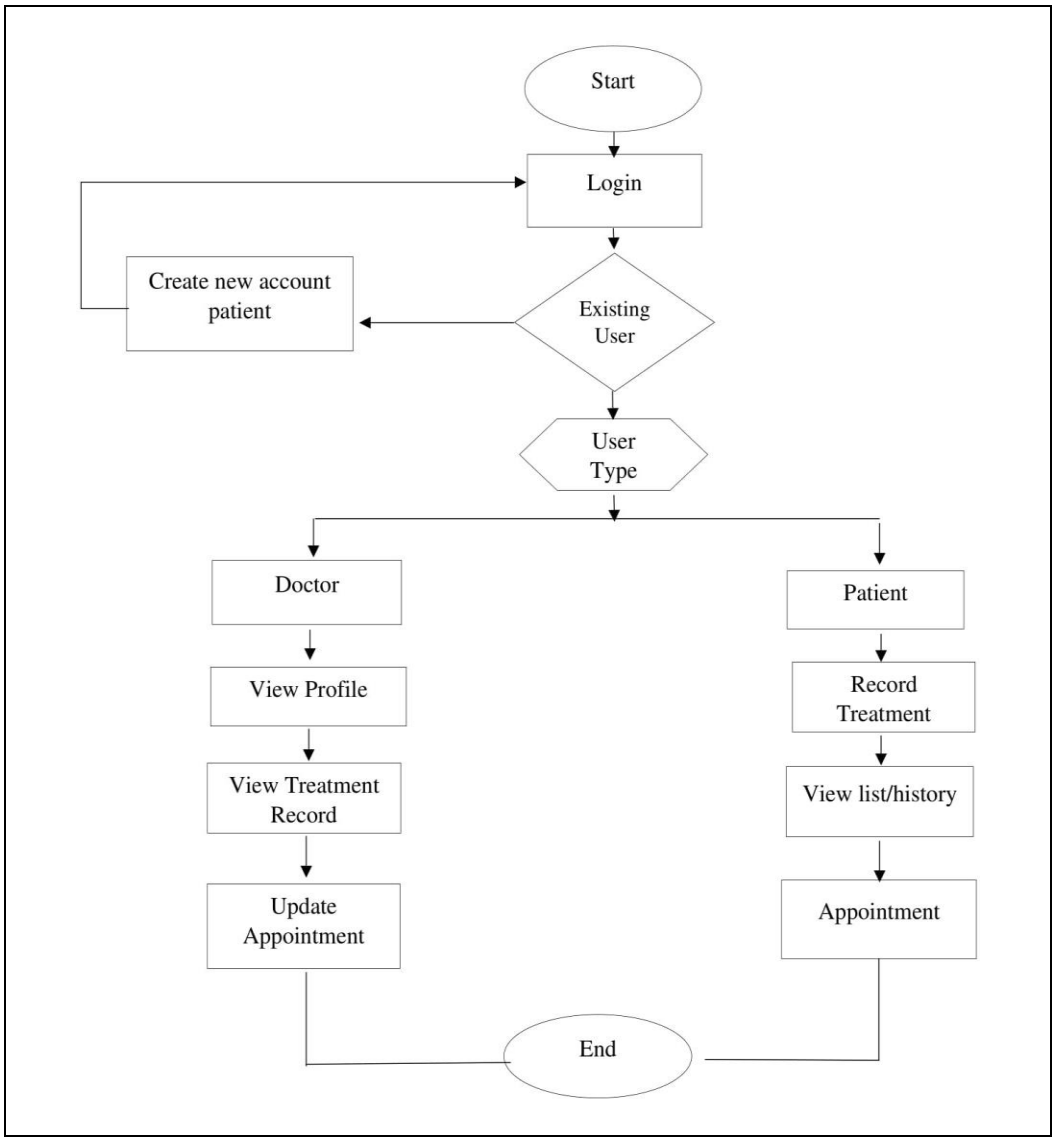

Figure 4: Flowchart

3.2 Project Implementation

The process of developing MyCAPD app will be discussed in this section including interface design and link with the google sheets. For the login process, firebase is needed to act as account database. The testing process will also be carried out using different client devices and different OS platforms to ensure the success of the system. The figure 3 shows the main page for the patient and doctor. Users need to login to access the app.

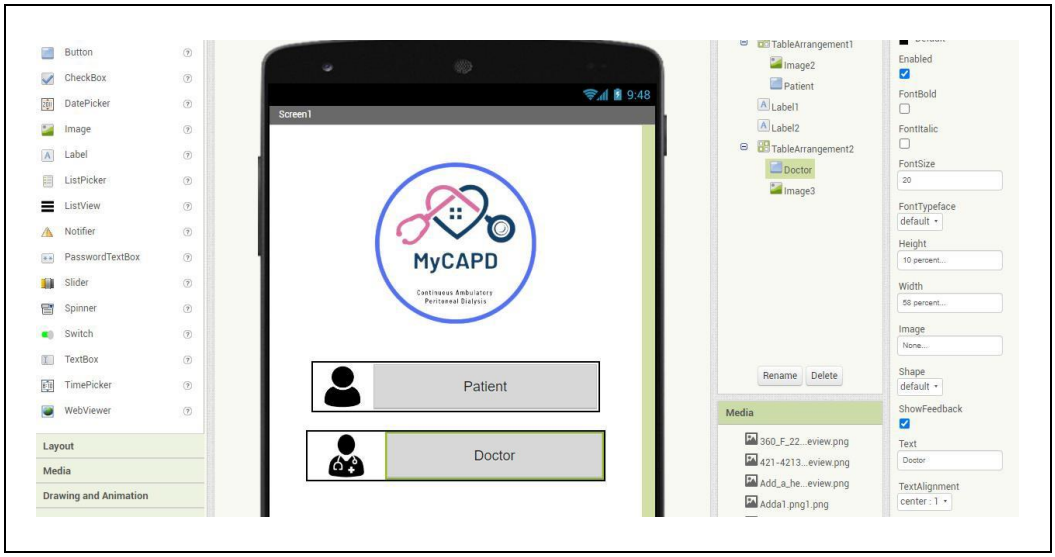

Figure 5: Dashboard

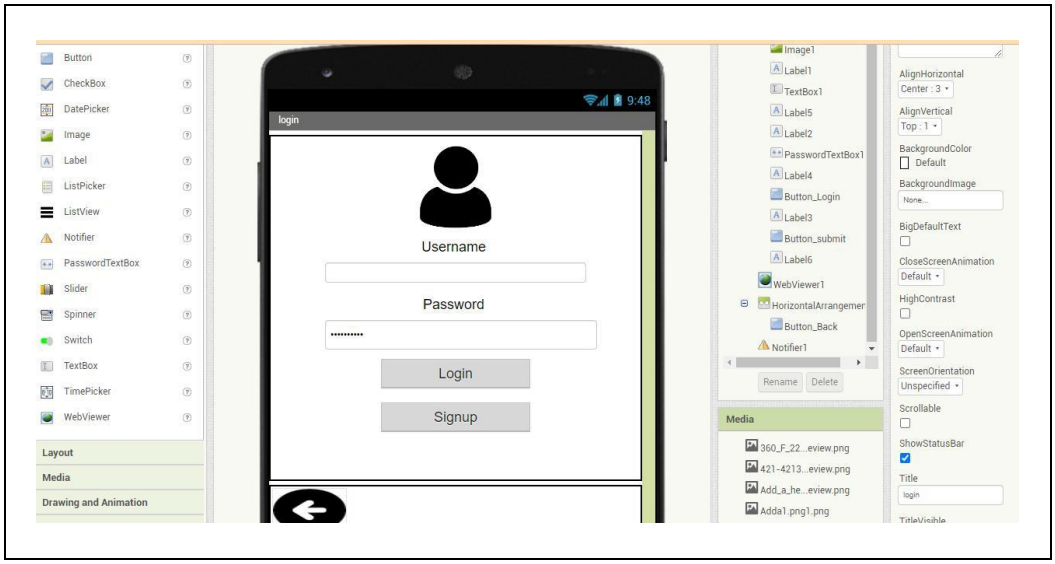

Figure 6: Login Page

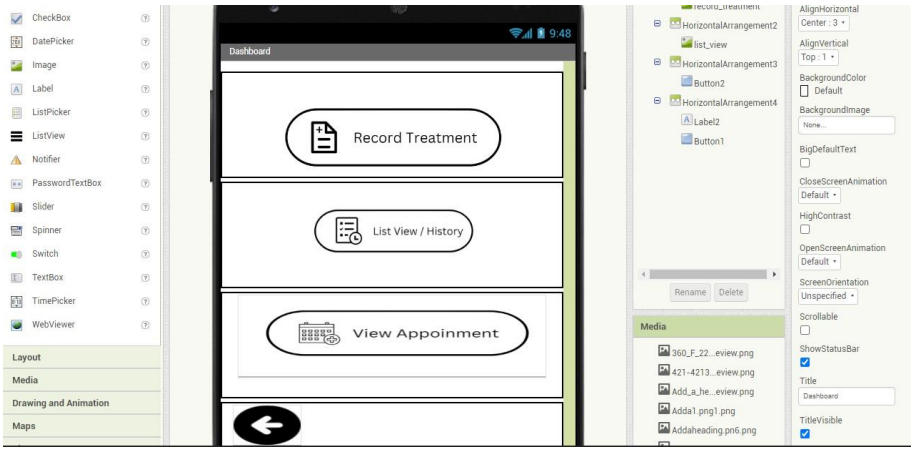

Figure 7: Menu for Patient

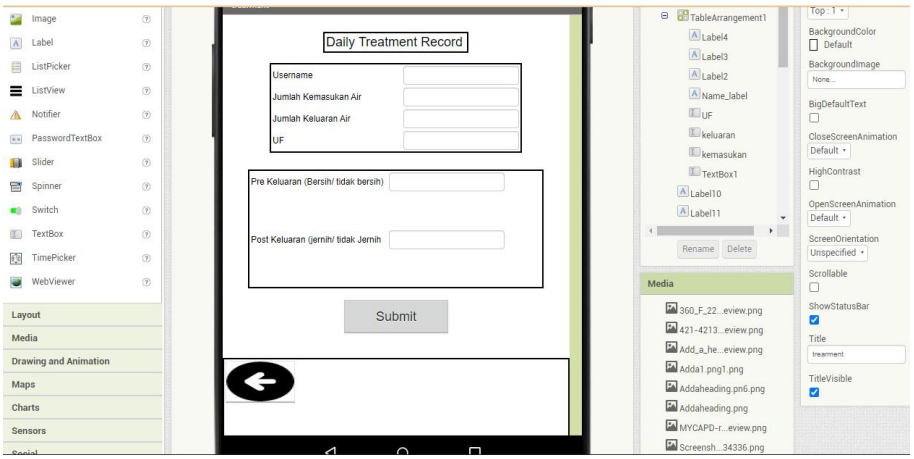

Figure 8: Daily Treatment Section

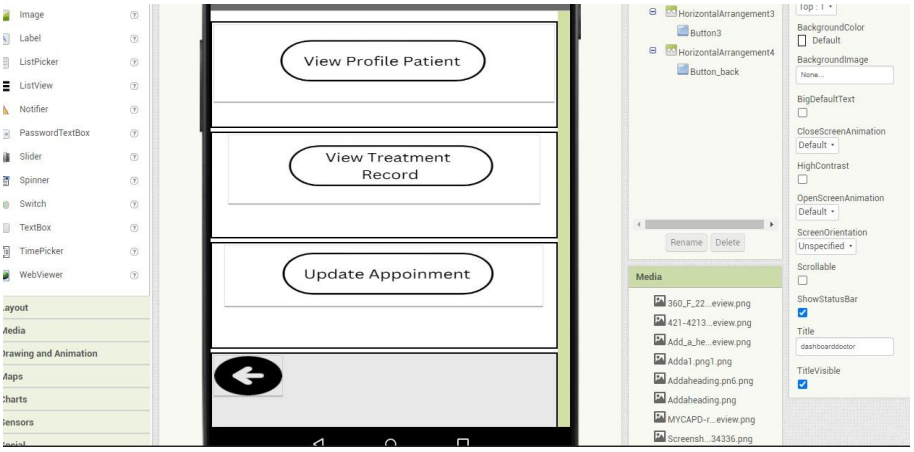

Figure 9: Menu for Doctor

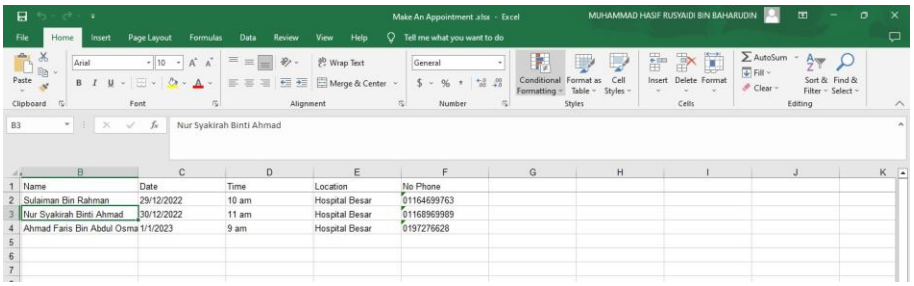

Figure 10: Appointment Record

4.0 RESULT AND DISCUSSION

This chapter will elaborate more on the findings gathered of this project. Besides, this phase will perform all the mechanism involved with the result refers to the project. Based on the result occurred, we would discuss about the Continuous Ambulatory Peritoneal Dialysis and anything that related with the project. Besides, the overall result of this project will be display and discuss in this chapter. To demonstrate that this project was successful and yielded a result.

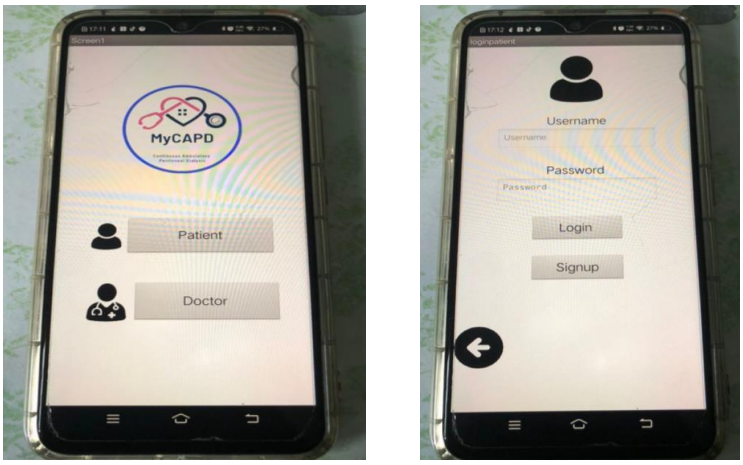

Figure 11: Interface for patient

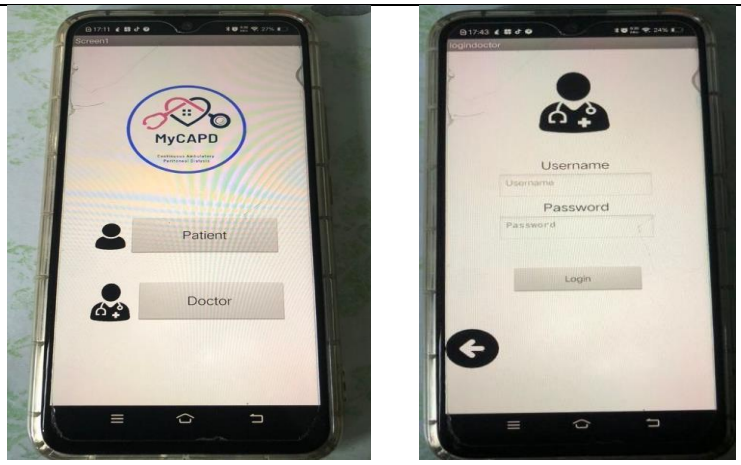

Figure 11: Interface for Doctor

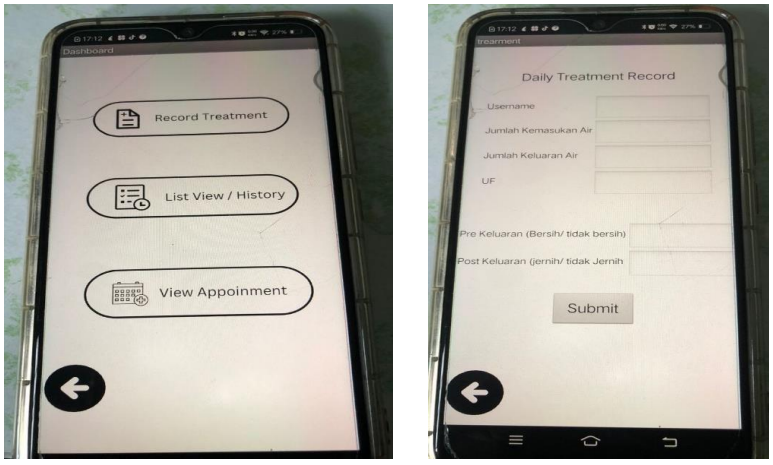

Figure 13: Dashboard and Treatment Record for Patient

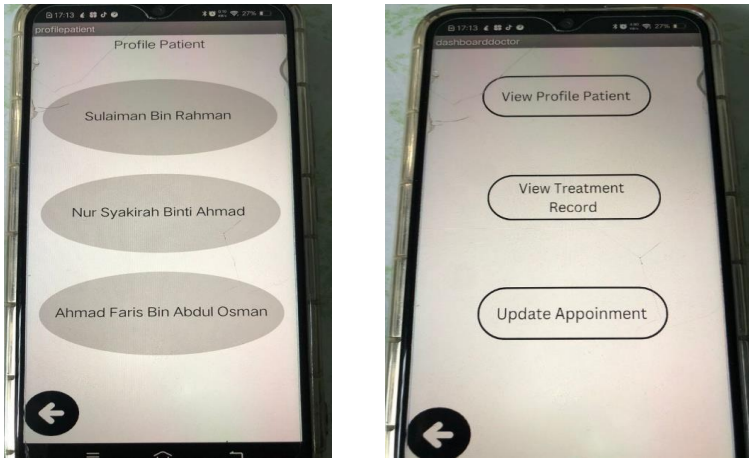

Figure 14: Dashboard and View Record for Doctor

5.0 CONCLUSION

Using the Continuous Ambulatory Peritoneal Dialysis treatment record Mobile Application can help doctors and patients to record and update kidney pain treatment. This project involves 4 phases, namely recording and updating appointments that may be made if a patient needs to meet a doctor. Second, the planning, design and methodology phase which includes hardware and software, implementation, model process, database setup and coding. For the third phase, decisions and discussions will be made to ensure the project runs as needed. This period is mandatory for the last step, called recommendations and conclusions. This project is expected to help all patients and doctors manage the method of recording the amount of water intake and output by updating appointments with doctors and avoiding using any books or notes.

Author Contribution

Siti Norwahidayah Wahab: Methodology, writing and editing, Muhammad Hasif Rusyaidi Baharudin and Ahmad Najmuddin Amri: Implementation

Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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