

## INTRODUCTION

### 1.1 Background of Study

Chronic diseases, such as cancer, diabetes, and heart disease, are diseases that last at least one year or more and require continuous medical attention or limited activity of daily living or both (Maitso et al., 2021). There are several problems related to patients with chronic disease such as inadequate self-management support, lack of nutritional information, poor medication management, and adjusted physical activity. The problem can also come from physical symptoms that can limit the mobility of the patients and transportation problems. Cardiovascular diseases (CVDs) remain one of the leading causes of death worldwide (Reamy, Williams, & Kuckel, 2018) and physical disability in older adults. This eventually results in loss of self-care limits and the quality of life.

CVDs shown to have killed more people than cancer and respiratory disease are combined together (Reamy, Williams, & Kuckel, 2018). According to the World Health Organization (WHO), it is also responsible for an estimated 17.9 million people dying each year, representing 32% of all global deaths. Heart failure (HF) is one of the types in CVDs and is a condition where the heart is unable to pump blood around the body effectively therefore some support is needed. This disease can occur at any age but mostly in older people within the range of 55 and above. It is a long-term disease that usually gets worse over time and cannot be fully cured; however, the symptoms can be controlled. In Indonesia, HF is still one of the diseases that have high morbidity, mortality, and rehospitalization (Mumpuni et al., 2021). There are many causes of this problem that need special attention to increase the survival rate.

Based on the Lira Medika clinical immersion in October 2021, HF patients have minimal understanding about their disease. The majority of patients came at a later stage of HF. They tend to feel uneasy and confused when visiting the doctor, and out-patient care was more common. The majority of the problems are that most of the patients come at a later stage of HF, making it more difficult to treat. Majority people often underestimate the symptoms and do not go to doctors to seek proper medical examination. The financial problem also limits the patient going to the hospital as well. Hospital and medical examinations in Indonesia, especially in small cities and underprivileged areas are considered expensive making people reluctant to seek appropriate treatment. Not to mention the long hospital procedure, patients have to go through a lot of processes to make a doctor appointment. Besides, most people often tend to believe in recommendations from non-professional sources, such as neighbors, family members, shaman, etc. that can lead to false treatment, medication, or diet. Therefore, this project mainly focused on heart failure as one of the most

common types of CVDs or cardiovascular diseases that occur in Lira Medika Hospital to help manage and maintain the disease.

Out-patient care is the most preferable for most HF patients as it is cheaper and less restrictive. However, there are many drawbacks in out-patient care compared to in-patient care such as lack of medical records to support dosing, no active monitoring, false diet information, missed medication, and no reconsultation. Regularly visiting a doctor is a must especially if the patients have some serious symptoms and to gradually check the patient's condition. A care plan should be made for managing patients heart failure, including follow-up care, rehabilitation, and access to social care.

A heart specialist doctor from University of Gajah Mada (UGM) Academic Hospital (Satria, 2021) said that there are three important things in heart therapy that must be obeyed by HF patients. The first is to regularly take medicine that has been specifically dosed by the doctors. Second is to follow the diet based on the doctor's suggestion. For instance, a patient consuming blood thinner medication was suggested not taking many vegetables and fruit together with the medicine. And the last and very important is to regularly visit the doctor, as many people feel that they do not need to visit the doctor if they are not experiencing any major complaints or symptoms which is a big mistake. Doctor appointments have many purposes and play a big role in managing and monitoring the patients health. One of the examples is to evaluate the medicine given, if they are useful or not, the medicine dose, and if the medicine is working properly as each patient reacts to the same medicine differently. In doctor consultation, the patient can also ask questions that are specific to them, such as physical activity difficulty, specific diets, or lifestyle changes. Another very important reason is to detect the condition of the heart. Some HF patients do not feel any symptoms and suddenly they are in the later stage of HF. HF also can lead to other diseases such as kidney damage or failure, heart valve problems, heart rhythm problems, and liver damage (Chaeroni, 2020) so it is very important to regularly visit the doctor and do medical checkup for early detection and prevention of any more unwanted disease.

To overcome this problem, therefore, our team together with Lira Medika Hospital collaborated in making "Kembali Sehat" mobile application that is made for self-management to maintain HF patients and to optimize out-patient care. It will provide all the entails that include medical record storing and sharing, automated schedule booking, and medicine reminder and tracker (Table 1). This activity is under the MBKM program (research program) that can be claimed for 20 CUs (Credit Units) and was funded by *KEMENTERIAN PENDIDIKAN, KEBUDAYAAN, RISET, DAN TEKNOLOGI* with research schema number 094/E4.1/AK.04.RA/2021. This research was focusing more on the automated schedule booking, which automatically schedules a doctor appointment and reminds the patient to visit the doctor regularly. The patient's self-management and control are very

important to manage the disease other than the doctors or caretakers. Doctor consultation will act as a guide for the patients to improve their health condition. This app can also act as a way to support doctors' decisions in dosing, tackling side effects and diet issues, tracking and preventing missed medication, and relieving patient uneasiness in overcoming hospital procedures. Not only that, it can act as an approach to optimize HF treatment and monitoring more comprehensively. This module is one of three modules that i3L and Lira Medika team will create and then merge into their existing application (Appendix 1).

**Table 1. “Kembali Sehat” Application Features**

No.	Features	Description
1	Medicational Reminder and Tracker	Adjusted time, giving the best time interval to take the drugs, and act as a reminder.
2	Medical Record Storing and Sharing (Portable ECG)	Storing filtered ECG signal, P wave signal. Store BP, pulse, and symptoms check in.
3	Automated Scheduled Booking	To increase the patient adherence and re-consultation rate.

### 1.2 Research Aims

The aim of this overall project was to create self-management services and resources for patients with HF to maintain active monitoring of the disease, providing educational information, automated doctor booking, and medication reminder and tracker, while this research part was more focused on the automated schedule booking for increasing patient consultation frequency and creating informative content for HF patients.

### 1.3 Research Scope

The project consists of three different parts which were the chatbot, portable electrocardiogram (ECG), and health monitoring apps that will be merged into one comprehensive mobile application. This study was mainly focusing on making a new and comprehensive mobile application for self-management of heart failure patients named “Kembali Sehat” and this part was only focused on one of the features development which is the automated doctor scheduling that took place for 6 months. Besides, some informative content ideation for HF patients was also made to be further executed by the brand and communication team at Lira Medika Hospital.