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Research Article

Android Based Education Application Design For Tuberculosis Patients In Tasikmalaya City

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Abstract.
Tuberculosis (TB) is an infectious disease with a high incidence rate in Indonesia. This disease is a health problem nationally and globally. Disobedience of TB patients in taking medication is an obstacle in healing. PMO (Drug Supervisor) officers have a very important duty to ensure TB patients are disciplined in taking their medication, so they can improve patient's quality of life. However, majority of patients forget to take medicine frequently and PMO to remind them in taking medicine unconsistently. This means that there is a high probability that good behavior that is carried out after education is not consistent, because patients do not have adequate support systems to comply with treatment and orderly in preventing transmission. The purpose of this study was to design an android-based educational application for TB patients in Tasikmalaya city. Prototype design was used in this research. The results found 4 features in the application design such as education (providing health education through pictures, posters and videos), screening (tracking of families are at high risk of spreading), taking medication (remind and evaluate of taking medication) and consultation (counseling related to disease). Based on the test results, it can be concluded that the SMART-TB application design can able to provide information and convenience for some TB patients in reporting taking medication and health-related consultations.

Keywords: Tuberculosis; application design; Android based

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1. Introduction

Tuberculosis (TB) is an infectious disease that causes high mortality rates in the world. TB is a public concern because it is one of the top 10 causes of deaths in 2016 with high infectious killer worldwid.In 2016 the World Health Organization (WHO) reported that 10.4 million people etimate to develove TB wordwide. In fact 140 cases of TB per 100.000 population. The global total for 2016 of multidrug-resistant TB (MDR-TB) was 490.000 patients and 110.000 patients of rifampicin-resistant TB (RR-TB) [26].Indonesia is facing tuberculosis cases totaling 330,910 cases. Java Island is the largest contributor to cases with 38% of the total cases [13]. The high prevalence of tuberculosis has an impact on society, the economy and the environment. One study from Nigeria found that friends of TB patients often have discriminatory attitudes towards them [2], because

of the stigma associated with the disease[6]. This disease has social implications: most patients in one study conducted in Mexico reported a loss of their sense of identity, including loss of productivity and connection with family, resulting in perceptions of severe isolation[17]. In addition, one study found that the costs associated with disease impoverished many households, as many patients accumulated debt and experienced a loss of income and productive agricultural assets. Among the 160 TB cases in this study conducted in China, the majority of TB patients were the head of the household, their main source of household income. Once diagnosed, they lose job opportunities due to social stigma and the effects of disease. As a result, 30% of the cases in the study earned income below the official poverty line [12].

One of the solutions to prevent TB disease recurrence is to detect early regular medication that could cause the disease to occur. One method that can be done is to use the artificial intelligence method, namely by designing an android-based educational application. For example the mHealth application can support functions such as communication and enable real time connections, with feedback, interactive and connected to social networks or social media between patients and health workers so as to allow behavior change interventions for adherence to TB treatment using mHealth media with a behavior change theory approach which is suitable for intervention via the internet, namely the behavior change intervention model via the internet and behavior change through social communication[5]. The application makes it easier for users to read and receive reports through the features provided.

The use of android-based applications can facilitate two-way exchange of information from health workers, families and to patients. Along with the expansion of global internet connections, the use of smartphones in the world in the last decade has increased rapidly, including in Indonesia. As many as 84.3% of households own smartphones, which is equivalent to 54.8 million households, where most of the users are of productive age and workers with access to health and health services are 38.8% [13]. Thus, digital health products are increasingly accessible to the public, including to support TB treatment and control programs. The use of mHealth health service information technology has been developed in various health sectors, but its use for monitoring medication adherence behavior with family support is limited in Indonesia. Applications on smartphones are ideal for improving health because of their popularity, connectivity and sophistication[27].

An important goal of treatment with electronic media is to give patients the opportunity to maintain their education effectively without interruption[22]. According to [8], the telenursing method is starting to be in demand as a health service to support patients in

self-care at home. Telenursing refers to the use of telecommunications and information technology in providing nursing care remotely that can help solve patient problems, reduce distance and travel time, and maintain the patient's health status at home.

2. Methods

The prototypemethod was used in this study. Problem analysis is whether the data obtained is categorized into needs analysis, functional analysis, or non-functional analysis. The next step is to design an application, which consists of designing a flow and designing an interface. Implementation is done using the Android operating system. Application testing will be carried out after designing and creating an application, and using a smartphone as a testing tool. The last stage is maintenance, carried out after the application has been made and used.

3. Results and Discussion

The results found 4 features in the application design such as education (providing health education through pictures, posters and videos), screening (tracking of families are at high risk of spreading), taking medication (remind and evaluate of taking medication) and consultation (counseling related to disease).

The SMART TB application consists of three types of users, consist of administrators, sufferers and medication supervisors.
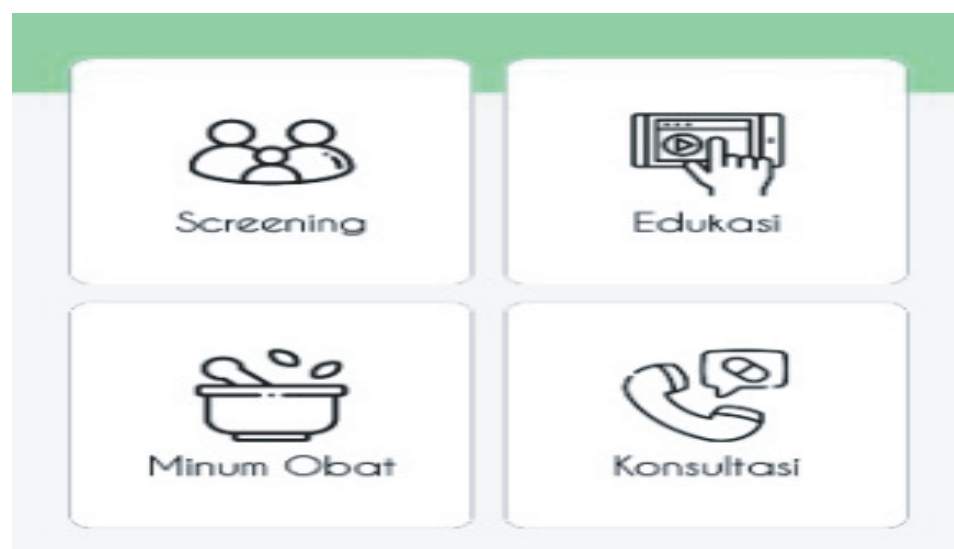

Figure 1: Smart-TB main menu.

3.1. Administrator.

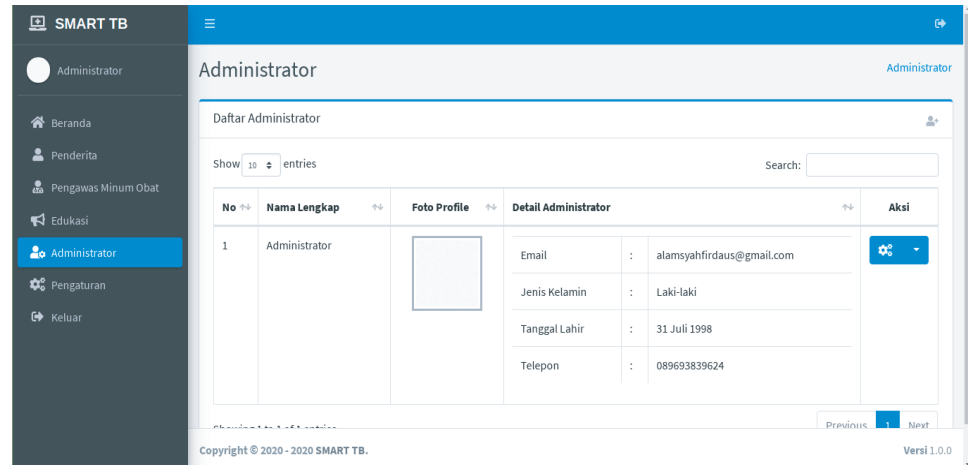The administrator menu functions to manage administrator data in the SMART TB application.

Figure 2: Main page of the Administrator Application.

3.2. Sufferers

The patient menu in the medicine taking medication application only displays a list of sufferers that are monitored by himself and in this manual there is a function to send broadcast messages, send messages personally and ask and answer questions between sufferers and supervisors taking medication.
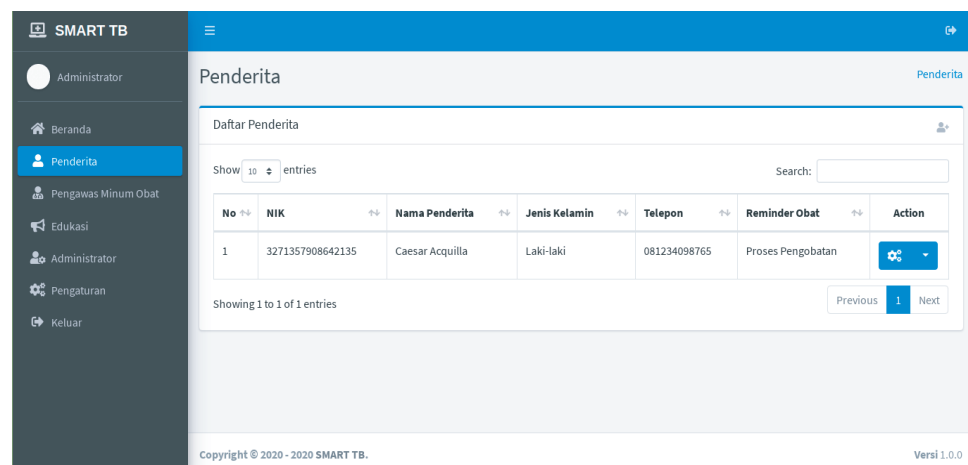

Figure 3: Main Application of Patients.

3.3. Supervisor of Taking Medicines

The monitoring menu for taking medication has the same function as the patient's menu, but the difference is that in this menu there is no reminder to take medication and the data it manages is the Supervisor of Taking Medicines.

Figure 4: Main page of Supervisor of Taking Medicines.

This application that is currently being developed is still in the stage of improvement. SMART TB allows patients to interact between medical tim (doctors, nurses, psychologists, pharmacists) and patients and even families.It is hoped that the features in this application can help the success of TB treatment and reduce the incidence of TB in Indonesia.

Several studies on TB applications have been carried out by [14] explaining that through the Cochrane database on monitoring TB treatment using a reminder system for TB patient control via cell phones, it shows that the number of control visits to the clinic and treatment completeness is higher in the experimental group than in the control. a risk ratio from 1.1 to 5.0 [15], as well as the SIMmed program in North Africa as a monitoring medium for taking medication via SMS and Interactive Reminders in the form of interactive SMS reminders to take TB drugs. referred to as mDOT in Pakistan, Tajikistan and Nepal showed fairly good results in improving TB treatment adherence[1].

The design that has been carried out by WHO, namely the use of mHealth to increase the success of TB treatment, has not been implemented thoroughly and research is still in the form of a pilot study such as in Kenya[9]. Most of the use of mHealth both widely by the community [7, 25]and individuals [4, 11] emphasizes more on Behavioral dimensions of TB treatment adherence only and no one has suggested the need to increase the dimensions of preventive and promotive behavior to increase the success

of the TB program as a whole including changes in unhealthy lifestyles, ethics of sputum disposal, use of masks during infectious periods, room ventilation and so on [14]. By using ICT[16, 20, 24] in the health sector in an effort to increase the success of TB eradication programs through its application [11, 23, 28] both in improving medication adherence [3], promotive and preventive efforts [5].

With the design of an android based educational application such as SMART TB, it can help in changing the behavior of TB patients. Behavioral change interventions [10, 19]are cognitive-based which not only change individual cognition but also affective and motivational approaches and are certainly reinforced by family support as part of social support [21, 18].

4. Conclusions

Based on the test results, it can be concluded that the SMART-TB application design can able to provide information and convenience for some TB patients in reporting taking medication and health-related consultations.

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