

The Effectiveness of Mobile Health Utilization to Prevent Non-Communicable Diseases at the Group of Majelis Taklim

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ABSTRACT

Background: Mobile health application is a technological innovation that has proven effective use for the prevention and management of NCDs in other countries. However, there has been no test on the use of mobile health applications that have been launched in Indonesia, including the Halodoc application. The majlis taklim group is a target group in increasing community empowerment in the family order. **Objective:** This study was to examine Halodoc application in preventing noncommunicable diseases. **Methods:** The population is the member of the majlis taklim who was active in the last three months. The sample was respondents who were identified as having knowledge and bad behavior in NCD prevention efforts, 45 people. Descriptive analysis on respondents' characteristics and level of knowledge. While analytical analysis consists of dependent T tests to determine the difference in effectiveness before and after utilizing the application, the next test is the CBAM-Stage of Concern test, which is to assess respondents' perceptions through the level of respondents' concern for halodoc innovation. **Results:** Univariate analysis found that most respondents were poorly educated, namely 35 respondents (78%), as IRT 30 respondents (67%), family history of NCD disease 30 respondents (67%), and history of NCD disease in themselves 10 respondents (22%). The level of knowledge on the pretest was low at 23 respondents (51%), and the knowledge on the posttest was mostly high at 31 respondents (69%). **Conclusion:** The result of the dependent T test obtained a value of 0.000 means that statistically there is a significant difference in knowledge before and after the use of Halodoc for the prevention and management of NCDs. The test results with the Stage of Use Concern Questionnaire (SoC) analysis, obtained information on the percentage of respondents' perception of the highest acceptance of innovation before being given the Halodoc intervention (pretest) at the personal level, which is 60%. However, after utilizing Halodoc, most respondents' perceptions were at the level of unconcern, which was 81%.

Keyword: Non-communicable Diseases, Mobile Health, Halodoc, Majelis Taklim, Behavior

INTRODUCTION

One of the contributors to the incidence of death in the world is non-communicable diseases (NCDs). Indonesia is one of the largest developing countries contributing NCDs. The Global Status Report on Non-Communicable Diseases states that NCD risk factors include lack of physical activity, an unbalanced diet that has an impact on increasing blood pressure, blood sugar and blood fats (Kurniasih *et al.*, 2022). Therefore, sustainable Development Goal (SDG) 3 includes target 3.4 to reduce premature NCD mortality by one-third by 2030.

According to Riskesdas, there was an increase in the prevalence of non-communicable diseases such as the prevalence of hypertension increased from 25.8% to 34.1%, stroke increased from 7% to 10%, cancer increased from 1.4% to 1.8%, and diabetes increased from 6.9% to 8.5% (Kemenkes, 2013; 2018). The increase in NCD cases will significantly increase the burden on the community and on the government, due to the large cost and high need for technology for handling, the Ministry of Health since 2015 has developed a structured program for NCD prevention and control which includes health promotion efforts, namely

prevention of risk factors and disease management (Kemenkes, 2015). However, there is a gap between the prevention and control of NCDs, namely interventions carried out not optimally in unhealthy diet programs, obesity, and high blood pressure as well as risk factor control policies that have not targeted early age (Wahidin. M, 2022). In addition, other risk behavioral factors such as smoking behavior, not consuming vegetables and fruits and drinking alcohol are the causes of the increasing prevalence of NCDs.

NCD prevention and control strategies have been implemented to reduce the prevalence and mortality of NCDs. Globally, the World Health Organization (WHO) focuses on reducing the number of deaths from NCDs by 25% by 2025 and the target focus is on risk factors such as tobacco use, unhealthy diet, lack of physical activity, alcohol consumption, and excessive salt use (Aljunid, 2012). In line with this strategy, the prevention and control of NCDs in Indonesia through community empowerment approaches and health education and counseling efforts are interventions that are often applied to several community groups, both implemented by the government through puskesmas, academics, and non-governmental organizations (NGOs) that care about health.

Digital transformation in the health sector currently provides convenience in health services, one of which is through telephone and smartphones, better known as mobile health (M Health), which is one of the systems or applications on three smartphone devices for health purposes that utilize wireless networks. Several literature studies globally describe health education with an online system, namely mobile health, which can be applied to efforts to prevent and manage NCDs, including self-management through mobile health in cancer patients (Bagriacık & Vural, 2022). The results of other studies state that mobile health applications are effective in improving the quality of life of cancer patients both physically, cognitively, and socially (Macdonald *et al.*, 2020).

Other NCD diseases that apply the m Health application are prevention of diabetes complications, researchers explained that the application is effective in controlling blood sugar and adherence

to treatment, and patients feel comfortable using the application (Lee *et al.*, 2020; Yang *et al.*, 2020). The literature review of the effectiveness of the application of m mobile in Indonesia is only limited to literature reviews of mobile health applications applied in other countries, including studies on the effectiveness of m mobile for the management of cancer, diabetes, hypertension, and obesity (A.L BP, 2021; Asih & Rahman, 2021; Andriyana *et al.*, 2023; Lisna. S, 2023).

Studies on the effectiveness of mobile health applications implemented and used by people in Indonesia are still minimal, especially in efforts to prevent NCDs. Some applications in Indonesia that are used as digital health services that can be accessed by the public include HaloDoc, Alodokter, GoodDokter, SehatQ, ProSehat, YesDok and KlikDokter (Setiaji, 2012; Handayani *et al.*, 2012). Halodoc is an application that has been tested using ISO 25010: 2011 where the test results on users of the application show good values in each standard, namely an average value of 4 out of a maximum value of 5, and these results show that the application has good software quality (Arga *et al.*, 2021). However, it has never been evaluated how effective the use of mobile health is on NCD prevention efforts.

Based on data from the Pekanbaru City health office in 2021, from the estimated number of hypertension risks in residents over 15 years old, only 2.0% get health services. Similarly, from the estimated group at risk of diabetes, only 10.1% get health services (Dinkes Pekanbaru, 2021). This information shows that management efforts are still not optimal for NCD risk groups. Thus, an intervention strategy is needed that requires community independence to participate in NCD prevention.

The use of information technology is one of the efforts to change people's behavior, including increasing knowledge and attitudes about the risks and mitigation of NCDs. Mobile Health Application is one of the innovations that is increasingly being developed by the Ministry of Health which is designed to be used by the community. However, in the literature search, there has been no study on the effectiveness of mobile health

applications that have been implemented in Indonesia.

METHODS

The population are 95 women of majlis taklim who have been active in the last three months. Data collection in this study consists of two stages. The sample was women who met the following criteria: 1) able to operate an android phone and willing to download the Halodoc application 2) had a low level of knowledge and poor NCD prevention 3) were willing to follow the research to completion. The instrument used is a questionnaire adopted in previous studies. The samples that met these criteria were 45 people. Data collection tools in the form of questionnaire sheets containing questions about NCD knowledge and preventive measures Effectiveness assessment on mobile health applications is carried out with two types of tests, namely first independent *t test* to determine the difference in effectiveness of knowledge before and after using the application. Univariate analysis to determine the frequency distribution of the variables studied. Bivariate analysis

uses independent t-tests to determine differences in effectiveness.

Second, the effectiveness of the application was tested using CBAM-Stage of Concern, which is to assess respondents' perceptions through the level of respondents' concern for mobile health innovations. The effectiveness test instrument adopted from the Concerns Based Adoption Model (CBAM) (Gorge *et al.*, 2006) aims to identify various 8 levels of individuals in receiving an innovation in classroom learning but can be applied to other fields including online health education. This model can assist the community and health educators in developing health promotion implementation strategies. This model provides an opportunity for researchers to develop a profile, challenges of change, thus reducing the obstacles that occur. Measurement of attention level by adopting the CBAM model, specifically The Stages of Concern Questionnaire (SoCQ).

The questionnaire is translated and validated through a professional proofreader. Each stage consists of five questions that have been arranged randomly according to the topic of each stage as follows:

Table 1. Perception/Concern of Innovation

Stage of Concern	Perception/Concern
Self	<i>Unconcerned</i> 0. (indifference to the innovation)
	<i>Informational</i> 1. (looking for information related to the innovation)
	<i>Personal</i> 2. (awareness and interest in using such innovations that have a good impact on individuals)
Task	<i>Management</i> 3. (Individuals focus on processes and tasks in the use of innovation i.e. efficiency, organization, management, and schedule)
Impact	<i>Consequence</i> 4. (This focus will have an impact on other users)
	<i>Collaboration</i> 5. (coordination of efforts already made to others to expand innovation)
	<i>Refocusing</i> 6. (have ideas and ways to make this innovation better)

After obtaining the filling results, a calculation is carried out by looking at the standard percentile value in the SoC to see the stage value of each respondent. The tested data and analysis results show that Cronbach's alpha is 0.967 for all items with a corrected item total correlation value for all items >.361.

Descriptive statistics with a central tendency are used to measure mean, standard deviation, and percentage (Gorge *et al.*, 2006).

RESULTS AND DISCUSSION

Univariate Analysis

Table 2. Frequency distribution of univariate analysis of respondent characteristics and level of knowledge before and after halodoc intervention

No	Characteristic	Measurement results	F	%
1	Education	Low	35	78
		Tall	10	22



2	Occupation	Housewife	30	67
		Teacher	5	11
		Pension	10	22
3	History of PTM in yourself	None	35	78
		Exist	10	22
4	Family history of NCDs	None	15	33
		Exist	30	67
5	Pre-Test Knowledge	Low	23	51
		Tall	22	49
6	Post Test Knowledge	Low	14	31
		Tall	31	69
Total			45	100

Univariate analysis found that the majority of respondents' characteristics include low education which is 35 respondents (78%), IRT work which is 30 respondents (67%), history of NCD disease (Diabetes, Hypertension, Heart, Stroke, Asthma, Cancer, and Cholesterol) in the majority family there is NCD disease which is 30 respondents (67%), and history of NCD disease (Diabetes, Hypertension, Heart, Stroke, Asthma, Cancer, and Cholesterol) in themselves the majority there is NCD disease which is 10 respondents (22%). While the variable of pretest knowledge with a low category is 23 respondents (51%), and posttest knowledge with a high category is 31 respondents.

Dependent T Test Analysis

The results of the analysis of respondents' knowledge level before and after the intervention of implementing the Halodoc Health application can be seen in table 2. The analysis with the Dependent T Test can be seen as follows:

Table 3. Dependent T Test Interpretation Differences in Respondents' Knowledge Level Before and After Halodoc Utilization Intervention

Knowledge	Mean	SD	Pvalue
Pretest	55,67	14,629	0,000
Posttest	78,24	14,427	

Based on Table 2, it is known that the provision of mobile health about NCD prevention increased respondents' knowledge from 55.67 to 78.24. The dependent T test result obtained a value of 0.000 means that statistically there is a significant difference in pretest and posttest knowledge with the use of Halodoc for the prevention and management of NCDs.

According to Susanti *et al.*, 2023, in people with hypertension (NCD), lack of knowledge and low education are problems related to the importance of using *mobile health smartphone* applications (blood pressure trackers) in managing healthy lifestyles such as routine control, activity (exercise), diet, taking medication. Education is one of the factors that influence knowledge, in addition to providing information and economics. Education is an effort to develop one's personality and abilities.

People who have higher education will be more widely knowledge, but someone who is less educated does not mean low knowledge, the provision of information can be obtained both from formal and non-formal education that can have a short-term influence to produce changes and increase knowledge.

It states that low levels of education will be followed by a decrease in health degrees due to lack of knowledge. Knowledge is very close to education, so someone who has higher education will have wider knowledge (Susanti *et al.*, 2023).

According to Natoatmodjo's theory (2018) which states that knowledge is needed to produce a certain behavior when facing a certain situation. Knowledge or cognitive is a very important domain for the formation of behavior and behavior based on knowledge will be more lasting than behavior that is not based on knowledge (Notoadmodjo, 2018).

Based on the facts and theories above, researchers can conclude that respondents have good knowledge because they have previously received information related to NCDs by health extension officers. However, respondents do not know how to use the Mobile Health

application. Before providing NCD prevention information through mobile health, pre-test knowledge results were obtained at 55.67 and post-test at 78.24, meaning that statistically there was a significant difference in pretest and post-test knowledge after the intervention of using Halodoc as NCD prevention information.

Analisis CBAM-SoC

The questionnaire on the stages of concern for the use of innovations on the CBAM Stage of Concern allows researchers to measure the picture of respondents' concern for the mobile health innovations developed. In this study, the innovation analyzed is the Halodoc application which contains the features needed as a solution to health-seeking behavior against complaints and diseases experienced by the community.

Table 4. Halodoc mMobile Pretest and Postest Frequency Distribution using CBAM-SoC

	Stage	Pretest (%)	Postest (%)
Self	Unconcerned	40	81
	Information	57	72
	Personal	60	74
Task	Management	31	39
	Consequence	43	18
Impact	Collaboration	34	20
	Refocusing	31	27

The test results using the Stage of Use Concern Questionnaire (SoC) analysis on 45 respondents, obtained information on the percentage of respondents' perception of the highest acceptance of innovation before being given the Halodoc intervention (pretest) at the personal level, which was 60%. Most respondents care about Halodoc's innovation. Respondents wanted to know how the use of these innovations affects health, who is involved in the innovation, and what efforts they will make while utilizing this innovation. However, after utilizing Halodoc, most respondents' perceptions were at the level of unconcern, which was 81%. This level of unconcern shows that respondents are less concerned and prefer other innovations as solutions for promotive and preventive efforts against non-communicable diseases (NCDs). Respondents' perceptions are also still low at Task (Management) and Impact

(Consequence, Collaboration and Refocusing) levels. At the level: 1) Management is an individual who has not focused on his role in managing the application such as carrying out his duties as a halodoc user such as choosing a doctor and scheduling consultations. At this level perception is only 39%. 2) Level consequence is the respondent's focus on the impact of innovation so that it becomes a consideration to utilize innovation permanently. At this level, the lowest percentage is 18%. 3) The level of collaboration is still the low perception of respondents to coordinate and cooperate with others, both family and community. At this level it is only 20%. 4) Level Refocusing is that respondents have not maximally looked for ways and alternatives so that the halodoc application can be better utilized. At this level it is still 27%.

In other studies, Halodoc is effectively utilized by the community such as Nuralifah's research in 2018, that users who have a positive attitude towards the halodoc application will take advantage of the application and feel the benefits after using it (Mangkunegara et al., 2018). Furthermore, the benefits felt by respondents correlate with respondents' satisfaction with the halodoc application, such as the findings of Putu Aditya in 2021 stated that respondents were satisfied with the halodoc application which helped them get medicine without queuing and waiting at the hospital (Putra. Putu Aditya, 2022). However, in this study there was a decrease in the level of perception of the innovation. The gap in percentile values in pretest and posttest can be seen in figure 1 below:

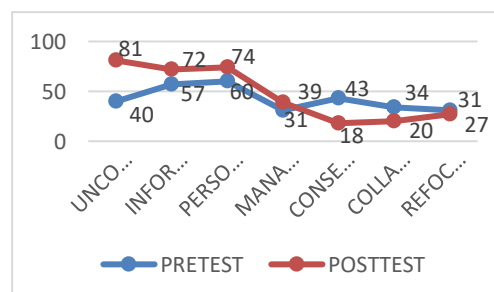


Figure 1. Pretest and Posttest Graphs of Innovation Utilization Through CBAM SoC Percentile Analysis

Before being given the intervention, respondents seemed

enthusiastic about Halodoc's innovation. This is because the majority of respondents have a history of non-communicable diseases both in themselves and in the family, so curiosity is very High with the perception that with the Halodoc innovation, it makes it easier for them to get health services that are not limited to place and time, meaning that wherever they are at any time, individuals can get services such as free information about diseases and health complaints, online doctor consultations (paid), drug purchase and delivery services, health insurance services other than BPJS, and other features. After utilizing halodoc innovation, most respondents have reconsidered to use halodoc again.

Although there are still respondents who continue to use and are interested in disseminating the innovation again to their families and others. According to the observations of researchers in the field, some of the obstacles to the use of these innovations include the existence of paid services at halodoc. Such as doctor consultation services. Respondents felt that so far consultation services to primary clinics and referral hospitals were free of charge (free) because of BPJS health insurance coverage. Respondents also lack the skills to utilize existing features, observations in the field look respondent still not yet independent to follow the stages of using the application, respondents are still assisted by the research team. This is in accordance with the research of Lutfi Indra Hakim (2021) said that the obstacle for (Irfan L *et al.*, 2021) new users is the length of time logged in using the application and the menu display is still general, so it is a difficulty for respondents to search for topics about non-infectious diseases (Masriadi, 2019)

This is contrary to the results of Nuralifah's research in 2018 which concluded that respondents tend to believe in continuing to adopt the halodoc application because most respondents at productive age who depend on their daily routines use the application on the gadget, including for their health needs. In addition to being a necessity, these respondents believe that doctors who are members of Halodoc are doctors registered with the Indonesian Medical Association (IDI) and the Indonesian

Medical Council (KKI) (Mangkunegara *et al.*, 2018).

Another study that contradicts this research is Putu Aditya's research in 2021, which found respondents remained loyal to using the halodoc application (Putra *et al.*, 2022). The researcher analyzed the loyalty of these respondents because in addition to feeling the benefits of ease in taking drugs and doctor's appointments, the research site collaborated with the halodoc application so that patients were facilitated to take advantage of the application. Based on the literature review, respondents in the study, the members of majlis taklim, were able to increase their perception in utilizing halodoc mobile health which has been statistically proven to be effective in increasing knowledge.

Thus, it is necessary to test the collaboration of the halodoc application and other applications for collaboration with primary and referral health service facilities in Pekanbaru so that by facilitation, the community will use the application so that the government's goal to achieve a healthy community with promotive and preventive efforts on NCD disease independently is achieved.

CONCLUSION

Univariate analysis found that the characteristics of respondents included low education at 35 respondents (78%), work as a housewife at 30 respondents (67%), history of NCD disease in the majority family of 30 respondents (67%), and history of NCD disease in themselves the majority of 10 respondents (22%). The variable of pretest knowledge with a low category was 23 respondents (51%), and posttest knowledge with a high category was 31 respondents (69%).

The average value of respondents before getting the intervention was 55.67 and after the intervention 78.24 after the dependent T test obtained a value of 0.000, meaning that statistically there was a significant difference in pretest and posttest knowledge with the use of Halodoc for the prevention and management of NCDs.

The test results using the *Stage of Use Concern Questionnaire* (SoC) analysis, obtained information on the percentage of respondents' perception of the highest acceptance of innovation before being

given the Halodoc intervention (pretest) at the personal level, which is 60%. After utilizing Halodoc, most respondents' perceptions were at the level of *unconcern*, which was 81%.

The Halodoc mobile health application in this study was only effective in increasing respondents' knowledge, but it did not increase respondents' perceptions at a good level of acceptance of innovation.

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