

Effectiveness of Electronic Muhammadiyah Monitoring Chronic Disease Application in Changing The Knowledge, Attitudes, and Behavior of People With Hypertension

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INDEXING

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ABSTRACT

Hypertension (HT) is a serious medical condition that significantly increases the risk of heart, brain, kidney, and other organ diseases. The disease course increases along with age and a bad lifestyle. One strategy to prevent the increasing number of HT sufferers is through health promotion. In the digital era, technology is a strategic approach to controlling HT. One of Indonesia's existing health applications is the Electronic-Muhammadiyah Monitoring Chronic Disease (E-MMCD) application. However, its effectiveness has not been tested in increasing the knowledge, attitudes, and behavior of people with HT. This quasi/experimental research was conducted using consecutive purposive sampling at Husada Utama Hospital, Surabaya, from September to November 2022. The number of samples was 57 patient respondents for each group, the intervention (I) and the control (C) group. The data was carried out using the pre-and post-test questionnaire after 1 month intervention period using the E-MMCD application. In group C, health promotion using applications was not given. Knowledge in groups C and I was insignificant different. Attitudes and behavior in group C were increased with an insignificant difference, while in group I were increased with a significant difference.

Kata kunci:

Aplikasi;
sikap;
perilaku;
hipertensi

Hipertensi (HT) adalah kondisi medis serius yang secara signifikan meningkatkan risiko penyakit jantung, otak, ginjal, dan organ lainnya. Perjalanan penyakit meningkat seiring dengan usia dan gaya hidup yang buruk. Salah satu strategi untuk mencegah peningkatan jumlah orang dengan HT adalah melalui promosi kesehatan. Di era digital, penggunaan teknologi merupakan pendekatan strategis untuk mengendalikan HT. Salah satu aplikasi kesehatan yang ada di Indonesia adalah dengan menggunakan aplikasi Electronic-Muhammadiyah Monitoring Chronic Disease (E-MMCD), namun belum teruji efektivitasnya dalam meningkatkan pengetahuan, sikap, dan perilaku orang dengan HT. Penelitian quasi eksperimen ini dilakukan di RS Husada Utama Surabaya pada bulan September hingga November 2022 dengan menggunakan consecutive purposive sampling. Jumlah sampel 57 pasien poliklinik Jantung untuk masing-masing kelompok, kelompok intervensi (I) dan kontrol (K). Pengumpulan data dilakukan dengan menggunakan kuesioner pre- dan post-test setelah 1 bulan masa intervensi dengan menggunakan aplikasi E-MMCD. Pada kelompok K tidak diberikan promosi menggunakan aplikasi. Pengetahuan pada kelompok K dan I tidak ada perbedaan signifikan. Sikap dan perilaku pada kelompok K meningkat dengan perbedaan yang tidak signifikan, sedangkan pada kelompok I meningkat dengan perbedaan yang signifikan.

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INTRODUCTION

Non-communicable diseases (NCDs) are currently the main cause of death and morbidity, causing more than 73% of deaths in 2017 (Lauber et al., 2020). One of the NCDs that is increasing in prevalence, namely hypertension – or increased blood pressure – is a serious medical condition that significantly increases the risk of heart, brain, kidney, and other organ diseases. This disease, also called the "silent killer", is responsible for 8.5 million deaths worldwide caused by stroke, ischemic heart disease, other vascular diseases, and



kidney disease (Organization, 2021). The national prevalence of hypertension (HT) based on the 2018 Riskesdas was 34.11%. Besides increasing age, several risk factors for hypertension can also be caused by lifestyle changes or bad lifestyles. Unhealthy lifestyles include smoking, wrong diet, and sedentary lifestyles (Rahman et al., 2021).

There are two approaches to managing HT: lifestyle changes and medicine administration. Based on the 2014 Evidence-Based Guidelines for the Management of HT in Adults issued by the Eight Joint National Committee, lifestyle management is the first step in managing HT in patients over 18. The second step is to determine blood pressure targets based on the patient's age, whether there is a history of diabetes mellitus (DM), chronic kidney disease conditions, and administering drugs to achieve these targets. It shows how important it is to help sufferers maintain a healthy lifestyle and undergo medical therapy to maintain their blood pressure by developing self-management skills (Kang and Park, 2016). One strategy to prevent the increasing number of non-communicable disease (NCD) sufferers is through health promotion. Health promotion aims to empower individuals and communities to consciously involve themselves in adopting healthy living habits and create changes in reducing risk factors that cause NCDs to increase (Rahman et al., 2021). Considering these conditions where the prevalence of HT is increasing, it is necessary to develop new and cost-effective innovations to assist HT sufferers in undergoing treatment and making healthy eating patterns and living behaviors according to recommendations.

In the digital era, technology is a strategic approach to self-monitoring in controlling several diseases, including HT. Health applications using mobile digital technology, such as mHealth in the United States national hospital, as well as the Health App Library in England, have been used since 2013 (Volpi et al., 2021, Kang and Park, 2016, Kassianos et al., 2017). Applications known as mHealth (mobile health apps) make it easier for patients to monitor their health conditions, such as diet, weight, blood pressure, mood, and sleep patterns. They can be combined with traditional treatment systems to speed up access to information. This mHealth application can also be useful as a guide in managing disease independently by increasing awareness of lifestyle changes and adherence to a healthy lifestyle, providing mental support for users. It can also be used as a strategic intervention for health service providers, especially in tracking patient data, providing social influence benefits and entertainment benefits (Kassianos et al., 2017, Kang and Park, 2016, McBride et al., 2020, Volpi et al., 2021). Smartphones may open up new insights about the experience of using applications to support medication adherence in people with HT (McBride et al., 2020).

One of the existing health applications in Indonesia, developed by a team of doctors from Universitas Muhammadiyah Yogyakarta (UMY), uses the Electronic-Muhammadiyah Monitoring Chronic Disease (E-MMCD). This application is designed according to the needs and wishes of the users. Users easily install this application on the Google Play store on Android-based smartphones. This application can record and monitor the latest health conditions of people with HT by filling in the data that has been provided. This application can monitor physical activity, diet, physical examination, medication adherence, and spirituality. Based on previous research, Kusumo et al. found that E-MMCD is an application that can prevent complications in people with Diabetes Mellitus and also hypertension. However, its effectiveness has not been tested in changing the knowledge, attitudes, and

behavior of people with HT, so researchers intend to conduct research using the E-MMCD application.

RESEARCH METHOD

This research design used a pretest-posttest quasi-experimental design. The intervention used the E-MMCD app for people with HT to determine the effectiveness of the application in changing the knowledge, attitudes, and behavior of respondents related to healthy lifestyle changes. Then an evaluation of knowledge, attitudes, and behavior was evaluated again after a month of using the apps. This research was conducted at Husada Utama Hospital, Surabaya, from September to November 2022. The local ethics committee of Husada Utama Hospital, with the number 027/KEP-RSHU/VIII/2022, approved all procedures involving humans.

The population of this study was adult people with HT who visited the outpatient clinic at Husada Utama Hospital. The sampling technique in this study used purposive sampling with the eligibility criteria: patients aged > 18 years to 65 years who were registered for treatment at the outpatient clinic, were willing to become respondents and agreed to participate (informed consent), people with a diagnosis of hypertension, can read and understand Bahasa. In addition, participants in the intervention group were required to have an Android smartphone. The researchers did a simple random sampling to decide the patient group, familiarity with smartphone apps (family and participant) and internet access on the smartphone. Exclusion criteria were patients with pregnant and lactating conditions undergoing dialysis. The number of samples in the intervention (I) group and the control (C) group after each count was 57 samples. In this study, the independent variable was the E-MMCD application which analyzed its effectiveness in terms of changes in knowledge, attitudes, and behavior of people with HT.

The data collection technique was carried out by collecting data using pre- and post-test questionnaire both in intervention and control groups. The questionnaire instrument passed the validation and reliability test (Kusumo, 2021). In this study, content validity was not tested because it had been done in previous research when a new instrument was developed for diabetes patients in Sleman Regency, Yogyakarta (Kusumo, 2020; Kusumo, Prabandari and Dewi, 2021). The instrument was entered into the Google Form link and then filled in by the research sample. Health promotion interventions were given in the intervention group by installing the E-MMCD application on Play Store. The researchers helped participants with difficulty using the app during the process and gave them feedback and more detailed instructions. The researchers created a group communication for each group and reminded the intervention participants to complete the application every day until one month. In the control group, health promotion interventions using applications were not given. After 1 month, both groups conducted a post-test using a questionnaire instrument. The results of filling out the pre-and post-test questionnaire on both groups were then analyzed using the Wilcoxon test because of the ordinal data.

RESULTS AND DISCUSSION

A study of 114 samples was carried out. The samples were divided into 57 that received the intervention (group I) in the E-MMCD application and 57 control samples (group C) that

did not use the application. All samples met the sample inclusion and exclusion criteria and were willing to participate in the study until it was completed (by signing an informed consent). Group I was attended by 23 men (40.3%) and 34 women (59.7%). Meanwhile, group C was attended by 19 men (33.3%) and 38 women (66.7%). The criteria for acceptance of the sample based on the age taken were 18-65 (according to the Indonesian Ministry of Health in 2009). Most of the research participants were in the age group of 56-65. In the treatment group were 19 people (33.3%), as was in the control group with 27 people (47.7%). The mean age of the control group was 52.4 years, and that of the treatment group was 47.7 years. Regarding education, 31 people (54.4%) had higher education in the treatment group, while 26 (45.6%) had secondary education in the control group. Most of the research participants in the treatment group worked as private employees, with 31 people (54.4%), while in the control group, 32 people (56.2%) did not work. The demographic data represents in Table 1.

Table 1. Demographic Data Respondents in Control and Intervention Group

Variable	Categories	Intervention (I)		Control (C)		Total	
		Freq	%	Freq	%	Freq	%
Sex	Male	23	40,3	19	33,3	42	36,8
	Female	34	59,7	38	66,7	72	63,2
	Total	57	100	57	100	114	100
Age	17-25	2	3,5	0	0	2	1,7
	26-35	4	7,02	1	1,8	5	4,4
	36-45	18	31,6	12	21	30	26,3
	46-55	14	24,6	17	29,8	31	27,2
	56-65	19	33,3	27	47,4	46	40,4
	Total	57	100	57	100	114	100
	Average	47,7		52,4		50	
Education	Low	6	10,5	14	24,6	20	17,6
	Middle	20	35,1	26	45,6	46	40,3
	High	31	54,4	17	29,8	48	42,1
	Total	57	100	57	100	114	100
Work	Civil	3	5,3	2	3,5	5	4,4
	Private worker	31	54,4	19	33,3	50	43,8
	Self-employed	6	10,5	4	7	10	8,8
	None	17	29,8	32	56,2	49	43
	Total	57	100	57	100	114	100

Knowledge in group C were analyzed with the Wilcoxon test and showed an insignificant difference between the pre-and post-test with $p = 0,880$ ($p > 0,05$) (Table 2). Knowledge in group I also showed an insignificant difference between the pre-and post-test ($p > 0,05$) (Table 2).

Table 2. Result of Knowledge Analysis

Control	Knowledge		P
	Median	Min-Max	
Pre Test	26,00	0-30	0,880
Post Test	26,00	0-30	
Intervention	Knowledge		P
	Median	Min-Max	
Pre Test	24,00	2-30	0,401
Post Test	24,00	9-30	

Attitudes in group C were increased. Pre-test results with a median of 42,00 were lower than post-test results with a median of 43,00. Analysis with the Wilcoxon test showed an insignificant difference in the median between the pre-and post-test $p=0,250$ ($p>0,05$). In the I group, the pre-test results with a median of 41,00 were lower than the post-test results with a median of 45,00. Analysis with the Wilcoxon test showed a significant difference between the pre-and post-test ($p<0,05$) (Table 3).

Table 3. Result of Attitudes Analysis

Control	Attitudes		P
	Median	Min-Max	
Pre Test	42,00	32-52	0,250
Post Test	43,00	36-52	
Intervention	Attitudes		P
	Median	Min-Max	
Pre Test	41,00	27-51	0,000
Post Test	45,00	35-52	

Group C's behavior showed no significant difference $p = 0,736$ ($p>0,05$). In the I group, the pre-test results with a median of 32,00 were lower than the post-test results with a median of 34,00. Analysis by the Wilcoxon test showed that the median difference between the pre-and post-test was significant $p = 0,043$ (Table 4).

Table 4. Result of Behavior Analysis

Control	Behavior		P
	Median	Min-Max	
Pre Test	37,00	0-52	0,736
Post Test	37,00	0-52	
Intervention	Behavior		P
	Median	Min-Max	
Pre Test	32,00	17-52	0,043
Post Test	34,00	20-48	

This study's total number of participants was 114, with the female dominance of 63% (72 people) and 37% male (42 people). According to a report by the World Health Organization (WHO), in 2003, almost 2/3 of the world's population (1 billion people) or 26% of the population, especially in developing countries, were suffering from HT. Between 1990 and 2020, worldwide HT is anticipated to increase 120% in women and 137% in men. The risk of suffering from HT will increase with age. High blood pressure is more common

in men until 64, and after 65, women suffer from high blood pressure more easily (Sharma et al., 2019). Based on the 2013 Riskesdas, the national HT prevalence was 25.8% (Ministry of Health, 2017), of which only 1/3 were diagnosed, 2/3 were undiagnosed, and 0.7% of people diagnosed with HT took HT medication. Most sufferers are unaware they have HT or receive treatment. Based on age classification, HT mostly occurs at ages 35-44 years (6.3%), ages 45-54 years (11.9%), and ages 55-64 years (17.2%), following the Riskesdas data in 2013, HT mostly occurs at the age of 55-64 years.

The analysis results on the knowledge of HT sufferers in the control and treatment groups found no significant differences because public health literacy in urban areas is quite high, and the education level is also high. After all, residents of urban areas have easier access to obtaining health information (Kusnandar VB, 2022), both from the mass media (television, newspapers, radio) and from various applications that also on smartphones from social media (Instagram, Facebook, Tiktok) and various online communication groups such as Whatsapp Group, Telegram, Line, WeChat, and many others. The easy access to information in urban areas seems to influence the results of observations in terms of knowledge.

Changes in Attitude and Behavior in the intervention group that used the E-MMCD application using the analysis test with the Wilcoxon test found that there was a significant increase after one month of use with $p=0000$ ($p<0,05$), as well as changes in behavior also obtained a significant increase with a value of $p = 0,043$ ($p <0,05$). Marcolino et al. stated that mHealth is increasing worldwide. The high mobility of mobile technology, fast access, and direct communication makes the transfer of health information faster, thus making the delivery of health services worldwide easier, especially in low and middle-income countries. mHealth is used in terms of 1) communication, monitoring, and educating patients; 2) reducing the burden of poverty-related diseases; 3) increasing access to health services, clinical diagnosis, and treatment adherence; 4) chronic disease management. In general, mHealth is useful in managing chronic diseases such as chronic lung disease, diabetes mellitus, and hypertension by reducing mortality and hospitalization in people with chronic lung disease, improving sugar levels in people with DM, and controlling blood pressure in people with HT, and improving quality of life in patients with chronic diseases. Changes in attitudes and behavior for the better in the group that received the E-MMCD application are following the research objectives because, with this application, the awareness of HT sufferers about their disease and self-care will be better so that they can control HT disease and can prevent complications caused by the disease (Marcolino et al., 2018).

This study showed that application could increase a healthy life. However, there were some limitations, such as this study did not test and analyze confounding variables, didn't do the homogeneity test, and limited research time.

CONCLUSION

E-MMCD can potentially increase attitudes and healthy living behavior for people with hypertension in the outpatient clinic at Husada Utama Hospital, but not in knowledge. E-MMCD is effective in increasing attitudes and healthy living behavior for people with hypertension in the outpatient clinic at Husada Utama Hospital, but not in knowledge. There are significant differences in the attitudes and behavior of people with hypertension

after using the E-MMCD application compared to before using the application. This application is expected to be used for HT and all people with chronic diseases.

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