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International Journal of Nursing and Health Services (IJNHS) http://ijnhs.net/index.php/ijnhs/home Volume 3 Issue 3, June 20th 2020, pp 757-763 e-ISSN: 2654-6310 The Effectiveness of Android-Based ESMED on Decreasing Cholesterol Value and Blood Pressure among Risk of Chronic Heart Disease Patients Fatimah Zahra1*, Kusnanto 2, Padoli3 1Master Student in Nursing, Faculty of Nursing, Universitas Airlangga Surabaya, Indonesia 2 Department of Nursing, Faculty of Nursing, Universitas Airlangga Surabaya, Indonesia 3Department of Nursing, Politeknik Kesehatan Surabaya, Indonesia Artikel info Abstract. Coronary heart disease (CHD) is a leading cause of death Article history: and disability worldwide. This study used a quantitative method Received; June 27th, 2019 with a quasi-experimental design with a pre-post control group Revised: July 29th, 2019 Accepted: August 20th, 2019 study approach. The study was conducted at the Puskesmas in Malang district. The inclusion criteria, such as patients with aged 25-50 years old, be able to operate an Android-based mobile with Correspondence author: API 4.0. Data were analyzed using the Non-Parametric Wilcoxon Fatimah Zahra Rank test. There was an increase in respondents in the risk category E-mail: for mild CHD in the control and treatment groups. There was a imazahramurjiono@gmail.com significant effect of the application of Android-based ESMED applications on decreasing the total cholesterol and systolic blood pressure. There is still a cholesterol value of respondents at 200 DOI: mg/dl in the control group and treatment. The results of the systolic 10.35654/ijnhs.v3i3.216 blood pressure among the control group and the treatment group showed that the range of systolic blood pressure from 140-149 mmHg before and after receiving the intervention. The Android- based ESMED (Early Screening, Monitoring, and Education) application effectively reduces cholesterol and blood pressure in patients at risk for CHD. Keyword: Android, cholesterol, blood pressure systole, CHD This is an Open Access article distributed under the terms of the Creative Commons Attribution 4.0 International License CC BY -4.0 INTRODUCTION Coronary heart disease (CHD) is a leading cause of death and disability worldwide (1). Global heart disease causes 31% of deaths with CHD to represent 13% of deaths worldwide (2). The number of heart disease events in East Java Province is slightly more than the average number of patients in Indonesia who suffer 1.5 percent. The incidence of increasing age of 35-44 years (1.3%) and most diagnosed at the age of 75 years and above (4.7%) (3). The causes of increased heart disease sufferers are primarily due to unhealthy lifestyles such International Journal of Nursing and Health Services (IJNHS), Volume 3, Issue 3, June 20th, 2020 757 as consuming a lot of unhealthy foods, drinking too much alcohol, and excessive smoking, combined with a lack of physical activity (4). High cholesterol is also a trigger for coronary heart disease because high cholesterol causes blockage in peripheral blood vessels, which reduces blood supply to the heart. High cholesterol can also be a trigger for hypertension and stroke. Currently, hyper cholesterol and hypertension have become global problems because of the prevalence that continues to increase from year to year. The high incidence of CHD in Indonesia is caused by low awareness of early detection (5). Screening for heart disease increases cardiovascular risk in the future and other major organs (6). Testing can also help those who have risk factors that can be considered, which can be cultured so they can reduce the risk caused by cardiovascular disease (7). Primary cancellation guidelines for publishing coronary heart disease (CHD) screening and risk stratification are based on traditional risk factors, for example, using the Framingham Risk Score (FRS) in the United States (8). CHD screening for quality detection (9). They can support patients in self-care and drug management. Patients can also access electronic health records on independent mobile devices, so patients can be more concerned in health care and have their health management to extend and long term care (10). Therefore, it is necessary to make electronic media in the form of ESMED (Early Screening, Monitoring, and Education) as an early detection effort in patients with CHD risk, making it easier for them to maintain their health status. The use of an Android-based ESMED application that can be accessed on a patient's cellphone with a high risk of CHD can help determine a patient's cardiovascular status for the next ten years. OBJECTIVE This study aimed to examine the effectiveness of Android-based ESMED (Early Screening, Monitoring, And Education) on decreasing the cholesterol and blood pressure among patients at risk of CHD. METHOD This is a quantitative method with a quasi-experimental design with a pre-post control group study approach. Sixty respondents were divided into the experimental and control groups. The study conducted at the Puskesmas in Malang district. The inclusion criteria Patients Were aged range 25-50 years. Patients should be able to operate an Android-based mobile with API 4.0, Patients at risk of CHD with no history of smoking are at risk of CHD with no / or no history of increased cholesterol. Exclusion criteria were patients with impaired consciousness, being treated for complications of CHD. This research instrument uses an Android-based CHD application adapted from the Framingham Risk Score. The cholesterol and blood pressure levels are carried out by health workers and laboratories in the health center based on the standard. The cholesterol values using Analitycon reagents while blood pressure measurements using a digital Sphygmomanometer on the client's right arm sitting position. Respondents were divided into two groups, control and treatment groups. In each group, a blood pressure examination, cholesterol, and HDL blood sampling were carried out. The respondent's control group was measured using the Framingham risk score assessment sheet and given a leaflet. The treatment group of respondents, the ESMED application, was International Journal of Nursing and Health Services (IJNHS), Volume 3, Issue 3, June 20th, 2020 758 then measured using the Framingham risk score on each respondent's handphone. In addition to feature screening, there are also features of monitoring and health education. Then the data were presented and analyzed using the Non-Parametric Wilcoxon Rank test. The Ethics Research Committee approved the study of the Faculty of Nursing, Airlangga University, with the number of ethical certificates: 1422-KEKP. All respondents were informed about their participation in the study. RESULTS Characteristic of respondents Table 1 showed the characteristics of respondents. The findings explained that the age of the respondents in the control group and the treatment group spread evenly. In the control group, the majority were in the 45-49 years range, 23.3%, while in the treatment group, there were more than 30 years of age, namely 40%. The sex characteristics in the control group were mostly women as many as 19 people, 63.7%, while in the sex treatment group, the most were men as many as 16 people, namely 53.3%. The control group's job characteristics were more than 13 people in entrepreneurship, 43.3%, while the highest occupational treatment group was housewives (IRTs) of 43.3%. Table 1. Characteristic of respondents Characteristics Groups Control (n=30) Intervention (n=30) F % F % Ages <30 3 30-34 3 35-39 5 40-44 6 45-49 7 50-54 2 55-59 4 10 12 10 6 16.7 6 20 1 23.3 0 6.7 3 13.3 2 40 20 20 3.3 0 10 6.7 Sex Men 11 36.7 16 53.3 Women 19 63.7 14 46.7 Occupation Housewife Entrepreneur Civil servant Others 10 33.3 13 43.3 5 16.7 2 6.7 13 43.3 9 30.0 4 13.3 4 13.3 Mean difference of risk of CHD, total cholesterol, and systolic blood pressure among the experimental group and the control group Table 2 showed a mean difference in CHD risk, total cholesterol, and systolic blood pressure among the experimental and the control groups. The findings showed that the mean of CHD risk among the experimental group before receiving the intervention was 1.47, and after receiving the intervention, it was 1.33. Whereas the mean of risk of CHD among the control group before receiving the intervention was 1.43 and after receiving the intervention was 1.27. International Journal of Nursing and Health Services (IJNHS), Volume 3, Issue 3, June 20th, 2020 759 Regarding the mean of total cholesterol, the findings showed that the mean total cholesterol among the experimental group before receiving the intervention was 2.47 and after receiving the intervention was 2.20. Whereas the mean of total cholesterol among the control group before receiving the intervention was 3.07 and after receiving the intervention was 2.37. The findings of blood pressure level also showed the mean difference among the experimental group before receiving the intervention was 3.27 and after receiving the intervention was 2.97. Whereas the mean of blood pressure level among the control group before receiving the intervention was 3.23 and after receiving the intervention was 3.10. Overall variables were significant difference before and after receiving the intervention with p-value <0.05 Table 2. Mean difference in risk of CHD, total cholesterol, and systolic blood pressure Pre-test Post-test p-value Mean± SD Mean± SD Risk criteria for CHD Control group 1.43± 0.679 1.27 ±0.640 0.012 Treatment group 1.47 ± 0.730 1.33± 0.661 0.000 Total cholesterol Control group 3.07±1.048 2.37±0.850 0.000 Treatment group 2.47± 0.937 2.20±0.805 0.021 Systolic blood pressure Control group 3.23±1.569 3.10±1.494 0.046 Treatment group 3.27±1.337 2.97±1.159 0.003 DISCUSSION Based on table 2, the value of p <0.05 indicates that Android-based ESMED is effective in reducing the risk of CHD. The p-value in the treatment group is smaller than the control group; This shows that the use of android electronic media is more effective in reducing the risk of CHD compared to leaflet media. The control group in this study were positive control groups who were given health education through leaflets so that the p-value was also significant in the control group. The significance value was smaller in the treatment group. In addition, the treatment group is more effective in reducing the risk of CHD, one of which is also influenced by age. In the treatment group, as many as 40% of respondents aged <30 years are of productive age. This is consistent with the research that age has a strong correlation r = 0.605 with the level of one's knowledge (11). The average productive age is the age with the most roles and has robust activities and has good cognitive abilities so that at this age, it is sufficient to change the level of knowledge. In the control group, there were three respondents included in the high-risk category aged 45-59 years, including two men and one woman. This is the same as the treatment group 4 respondents who are in the high grade at the age of 55-59 years; all are men. Cardiovascular disease is significantly higher in men over 55 years and in women over 65 years. In the treatment group, there were more respondents at less than 30 years of age, so the risk incidence was lower than the control group. The Nababan study at the Pirngadi General Hospital in Medan showed the same results, in which there was more coronary heart disease in the age group ≥ 40 years. Age factors are associated with deaths from coronary heart disease (12). Signs and symptoms of coronary heart disease are often found in older people. The age factor is also related to cholesterol levels. Total cholesterol levels will increase with age. Excessive fat content in the blood of hypercholesterolemia can cause cholesterol buildup in the walls of blood vessels so that blood International Journal of Nursing and Health Services (IJNHS), Volume 3, Issue 3, June 20th, 2020 760 vessels will narrow. Consequently, blood pressure will increase, and coronary heart disease will occur (13). Using the ESMED application, some respondents are categorized as mild but have low HDL values, high cholesterol, and more in women. In the control group, the results of the respondent's pre-test numbers 12,16,17, and 30 were included in the mild upper limit with HDL values of 45-49 mg/dl, cholesterol values of more than 200mgdl and blood pressure values of 130-149 mmHg. It was also made worse by 2 of those who had a history of diabetes and were over 45 years old. In the treatment group, there were two respondents with a mild risk of upper limit exacerbated with HDL values <35 and cholesterol values> 200mgdl. All respondents are female. This is consistent with the study in the current analysis among older adults. FRS underestimates the risk of absolute CHD, especially in women(14). Therefore, the risk of CHD in women is not seen early in life and is burdensome at the age of 40 years. The results of the study show that cholesterol values in CHD risk in table 2 show a significant effect of EDMED application on the decrease in total cholesterol values. This indicates that the future in ESMED applications that can be accessed at any time by respondents is beneficial. In the treatment group, 43.3% of respondents were housewives (IRT). According to (11), employment and education levels affect the risk of CHD. Women who have jobs outside the home are at a lower risk of CHD compared to female housewives due to lack of physical activity and low levels of education. Although ESMED was effective in reducing cholesterol values in the treatment group, the significance value was lower than in the control group. The study results were 40% in the control group, and 33.35 in the treatment group had cholesterol values above 200mg / dl. Body cholesterol is essential and must be adequate because it functions to build and maintain membranes, regulate membrane fluidity in physiological and intracellular temperature ranges, signal cells, and nerve conduction (15). However, if excessive cholesterol is consumed and hyperlipidemia occurs. The body cannot metabolize appropriately so that cholesterol levels in the blood increase and cause atherosclerosis (16). Almost all respondents with excessive BB and obesity had total cholesterol values> 200 mg/dl in the control and treatment groups. This is supported by research (17) that body mass index, which is moderate and moderate overweight with a BMI value above 25.1, tends to 30% higher cholesterol levels compared to respondents who have normal weight. The body mass index reflects a picture of a person's body. Being overweight means excess substances, including blood cholesterol, which can risk coronary heart disease. The results of the study in Table 2 show that the number of respondents with hypertension levels 3 and 2 decreased to high normal hypertension to hypertension level 1. The p-value indicated that the ESMED application based on Android was effective against a significant decrease in systolic blood pressure compared to conventional media leaflets. In the results of the control group study in the pre-test, there were five people with severe hypertension, namely 150 to> 160mmHg, which was exacerbated by smoking behavior by four respondents. However, when the post-test control group reduced the value of systolic blood pressure in respondents who had stopped or reduced smoking. In the Framingham study, it has been shown that people who have a blood pressure> 140/90 mmHg cause a doubled risk of CHD compared to people who have a blood pressure <120/80 mmHg (Paneni, 2013). Hypertension can be caused by secondary factors or other diseases or lifestyle habits such as cholesterol, diabetes and smoking contribute as much as 60% in increasing hypertension (15). Based on age and sex, the results of the study showed that four young men were the youngest of 35 years, and the oldest was 59 years with high systolic blood pressure and smoking. The results of Tri Novitaningtyas (2014) also found that in the elderly compared to age 55-59 years with ages 60-64 years. There was an increased risk of hypertension 2.18 International Journal of Nursing and Health Services (IJNHS), Volume 3, Issue 3, June 20th, 2020 RESULTS Characteristic of respondents Table 1 showed the characteristics of respondents. The findings explained that the age of the respondents in the control group and the treatment group spread evenly. In the control group, the majority were in the 45-49 years range, 23.3%, while in the treatment group, there were more than 30 years of age, namely 40%. 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In this study, 27.5% of women experienced hypertension, while men only 5.8%. Women will experience an increased risk of high blood pressure (hypertension) after menopause, which is above 45. This is by the study results that female respondents with high blood pressure in the control and treatment groups were at the age of more than 45 years with blood pressure values> 160 mmHg in the 50-54 year age range and overweight (overweight). This is supported by the results of the study (21) which found that more than half of hypertensive patients were obese (56.6%) and central obesity (54.9%) there was a significant relationship between obesity and the incidence of hypertension (p <0.05; OR = 1.82) and central obesity with the prevalence of hypertension (p <0.05; OR = 2.72). Obesity can cause hypertension through a variety of mechanisms, both directly and indirectly. Direct obesity can cause an increase in cardiac output because the higher the body mass, the more the amount of blood circulates so that cardiac output increases (22). In the post-test control group and the treatment group, the blood pressure above 140 mmHg is at risk of moderate CHD. Townsend's research in 2012 proved that 50% of coronary heart disease in developing countries is caused by hypertension. This shows that hypertension is one of the main risk factors for coronary heart disease (23-24). CONCLUSION The use of an Android-based ESMED (Early Screening, Monitoring, And Education) application is effective in reducing the value of cholesterol and blood pressure in patients at risk for CHD. Health services for both health centers and hospitals are expected to be able to provide CHD screening services with applicable media suitable for patients' needs, namely an ESMED application based on Android. REFERENCES (1) Park LG, Howie-esquivel J, Chung ML, Dracup K. 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