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APPLICATION DEVELOPMENT OF ANDROID BASED FOR MONITOR PREDIABETIC SELF CARE

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ABSTRACT
Diabetes occurs starting from the symptoms of prediabetes. Individuals with prediabetic conditions are more likely to develop Type-2 Diabetes mellitus 4 times greater than those with normal glucose tolerance. Intervention mobile app can be one of the solutions to increase awareness and compliance of intervention self-management of prediabetes state. There has been no research in the systematic review of intervention mobile phone applications to prevent the state of prediabetes. Objective: this study was to determine the behavior of prediabetes Self-Care in the Program Keluarga Harapan (PKH) group Method: The research method uses a cross-sectional approach. Results: respondents as many as 63 with the most age distribution of 26-35 years (31.7%) mostly female 73.1%, Education 84.1%. The results of the analysis of problems in the development of multimedia on Self-Care Prediabetes in the Hope Family Program group (PKH) for the risk of prediabetes into the category of moderate 36.5% and the results of self-care behavior prediabetes including bad category 57.1% Conclusions: Analysis of potential problems became the initial foothold in the development of smartphone-based self-care applications are still in the revision stage of the application media.

Keywords: android application; prediabetes; self care

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INTRODUCTION

Prediabetes is a condition in which blood glucose levels are higher than normal, but not high enough to be diagnosed as diabetes mellitus (Dai et al., 2023). The International Diabetes Federation in 2019 reported that globally the estimated number of prediabetes is estimated at 374 billion. Currently, there are three countries with the highest prevalence of prediabetes in the world, namely China (48.6 million), the United States (36.8 million), and Indonesia (27.7 million), and in accumulation equal to one third of the prevalence of prediabetes in the world (Adolph, 2016). Prediabetes is also characterized by decreased insulin sensitivity or increased insulin resistance.Research (Hsu et al., 2015) states that Asian populations have a higher risk of developing diabetes due to a lower body mass index (BMI) due to a higher tendency to store visceral fat.This condition is caused by poor self-management behavior ranging from meal planning (diet), lack of fruit and vegetable consumption, not doing routine checks, and smoking habits (Soelistijo, 2021). This prediabetes can be prevented and controlled by controlling the risk factors of DM (Dany et al., 2020), if diabetes educators cannot be managed properly, it will cause new problems, namely facilitating the course of the disease to complications (Du et al., 2017). Diabetes management consist of 5 pillars can control blood glucose levels in cases of Diabetes Mellitus (Perkeni, 2015).

Primary prevention needs to be done to support the effectiveness of lifestyle and prevent the progression of prediabetes to diabetes (Adolph, 2016). The role of nurses as educators in the Prevention of diabetes complications is needed so that patients with diabetes are able to take care of themselves (Pranata et al., 2020). Telediabetes may improve patient access to

physicians specializing in diabetes management due to the diversity of telehealth modes, many different service models for telediabetes have been developed (De Guzman et al., 2020)

Telediabetic can be in the form of telephone, mobile phone, website use, social media, and interactive video in the process of remote nursing care. Telediabetic can be in the form of telephone, mobile phone, website use, social media, and interactive video in the process of remote nursing care (Pennant et al., 2020). Efforts to improve the quality of human life is to strengthen health services that include promotional and preventive efforts. One form of health services provided by health workers is effective communication of information and education through health promotion by utilizing technology as a media tool in the form of smartphones regarding the treatment of diabetes mellitus so as not to sustain complications. Research results (Hanifah et al., 2019) shows that there is an influence with the value of Asymmp Sig (p) = 0.000 health education through the Salam-Sehat application media on the self-management behavior of DM in Bengkulu city erdapat the influence of health education on the self-management behavior of people. this study was to determine the behavior of prediabetes Self-Care in the Program Keluarga Harapan (PKH) group.

METHOD

The method used in this study is research and development. Educational research and development is a process used to develop and validate educational products. Descriptive statistics were utilised to describe participant, The number of respondents in this study was 63 respondent and the mobile devices and apps they currently use with a cross-sectional approach. Application development namely analysis of potential problems. Data at this stage were collected using the Prediabetes Risk Score (INA PRISC) questionnaire to determine the risk of prediabetes and data collection questionnaire to determine the behavior of diabetes mellitus self-care. The INA PRICS questionnaire was validated on 6,933 subjects and concluded that it can be used to predict prediabetes. with AUC = 0.646 (95% CI 0.623–0.669) (Destu, 2019). The Questionnaire questionnaire of Health Literacy of Diabetes Mellitus of the Public (QHLDP). The QHLDP questionnaire has been tested for reliability and validity in previous research by Luo B (2016) with a Cronbach's of 0.866 (Luo et al., 2018).

RESULT

The first stage of potential, problems and data collection This stage is done because of the phenomenon in the PKH community who do not have the knowledge comprehensive self-care about diabetes so that there is no behavior expected and potential health problems and complications data at this stage was collected by using a questionnaire containing knowledge of reproductive health and the need for educational media in health promotion.

This study was conducted in Kartasura PKH Community the number of respondents was 63, according to the inclusion and exclusion criteria. Table 1 shows that most of the respondents aged 19-25 (28.6%) the respondents were female (73%). More than half of the respondents had a high school education (82.5%) and most of the respondents not have Diabetes History (71.4%). Repondents with physical activity <150 min/week 58.7%, More than half of the respondents had BMI 18.5-22.9 (normal) (55.6%) and blood value 80/120 - 100/160 mmhg (47.6%).

Table 1.
Respondent characteristics (n= 63)

Variabel	f	%
Age		
19-25	18	28.6
26-35	20	31.7
36-45	15	23.8
46-55	10	15.9
>55	0	0
Sex		
Male	17	27
Female	46	73
Education level		
Out of School	0	0
Low Education	11	17.5
High Education	52	82.5
Diabetes History		
Yes	18	28.6
No	45	71.4
Smoking Habit		
Yes	15	23.8
No	48	76.2
Physical Activity		
No< 150 min/week	37	58.7
Yes>150 min/week	26	41.3
BMI		
>25 (obese)	12	19.0
23-24.9 (overweight)	16	25.4
18.5-22.9 (normal)	35	55.6
Blood pressure		
<80/120mmhg	5	7.9
80/120 - 100/160 mmhg	30	47.6
>100/160mmhg		
	28	44.5

Tabel 2.
Distribution of Frequency Prediabetes Level (INA-PRISC) PKH (n=63)

Variabel	f	%
Low Risk	22	34.9
Medium Risk	23	36.5
High Risk	18	28.6

Table 2 it was found that 36.5% of respondents were at risk, while age and education were the dominant variables influencing the risk results. In the INA-PRISC questionnaire, these two variables have the greatest weight compared to other variables. The higher the age category the more at risk a person falls into the category of prediabetes. The prediabetes risk score will be used as a screening tool that is cheap and easily performed on individuals who appears to be healthy in general population to determine the population at risk in accordance with the basic principles of screening (Fujiati et al., 2017).

Table 3 self-care behavior in prediabetes including Bad Behavior category 57.1% this desebabkan associated with diabetes prevention behavior respondents: sedentary lifestyle < 6 hours/ day (66.7%), physical exercise < 3 times/week (58.7%), unhealthy diet every day (52.4%), do not pay attention to diet (54%), the choice of diet every day salty, sweet, high fat (57.1%), medical examination < 1 100%). In Table 5.5 shows that there is an increase in blood sugar levels of ≥ 126 mg / dl associated with instability in blood sugar levelsit was found that 66.7% of respondents have sedentary behavior < 6 hour/day, while age and

education were the dominant variables influencing the risk results. In the INA-PRISC questionnaire, these two variables have the greatest weight compared to other variables. The higher the age category the more at risk a person falls into the category of prediabetes.

Tabel 3.
Distribution of Frequency Diabetes Self Care (n=63)

Variabel	f	%
Sedentary behavior		
≥ 6 hour/day	21	33.3
< 6 hour/day	42	66.7
Physical Activity		
< 3x/week	37	58.7
≥ 3x/week	26	41.3
Healthy Diet		
Yes	30	47.6
No	33	52.4
Dietary Habit		
Yes	29	46
No	34	54
Diet Pattern		
Tasteless	27	42.9
Salty/Sweet/Fat	36	57.1
Medical Examination		
< 1x/year		
≥ 1 x/year	33	52.4
	30	47.6
Alcohol Consumption		
Tidak Pernah		
< 3 kali/ minggu	63	100
≥ 3 kali / minggu	0	0
	0	0

Table 4. Self-care behavior in prediabetes including bad behavior category 57.1% this desebabkan associated with diabetes prevention behavior of respondents: sedentary lifestyle < 6 hours/ day (66.7%), physical exercise < 3 times/week (58.7%), unhealthy diet every day (52.4%), do not pay attention to diet (54%), the choice of diet every day salty, sweet, high fat (57.1%), medical examination < 1 once a year (52.4%), never consume alcohol (100%).

Tabel 4.
Distribusi Prediabetes Level *Questionnaire of Health Literacy of Diabetes Mellitus of the Public* (QHLDP) PKH (n=63)

Variabel	f	%
Bad Behavior	36	57.1
Good Behavior	27	42.9

DISCUSSION

Research Data shows the age of 26-35 years as much as 31.7% of the total respondents. This shows the risk factors for prediabetes can be experienced by anyone. Several factors that can increase a person's risk of suffering from prediabetes (Nasional & Penelitian, 2019) one of them is age a risk factor for prediabetes and Diabetes mellitus that cannot be modified so that the prevalence of prediabetes will increase with age. In 2018, the prevalence of diabetes for the 15-24 age range increased to 2%, the 25-34 age range increased to 4.1%, and the 35-44 age range increased to 8.6% (Riskesdas, 2018). The increasing prevalence of diabetes and the trend of shifting to younger ages, are associated with prediabetes conditions that are often undetected and tend to be ignored. Prediabetes is a condition where blood sugar levels exceed normal levels, but are not yet sufficient to establish a diagnosis of diabetes (ADA, 2015). This

is in contrast to the theory that gender contributes to self-care. In men, there are more health irregularities such as lack of weight management and smoking habits than in women. The most important risk factors are excess weight, lack of physical activity, as well as experiencing poor nutrition. Other factors that play a role are ethnicity, family history of diabetes, history of gestational diabetes, and advanced age (Nasional & Penelitian, 2019).

The study Data showed self-care behavior 58.7% less than < 150 minutes per week. Self care agency that can be done in patients with diabetes mellitus includes monitoring blood sugar levels, drug therapy, foot care, diet (diet) and physical exercise. Physical activity is body movement with the aim of increasing and expending energy which plays a role in controlling blood sugar by converting glucose into energy (Kamaruddin, 2020). Prolanis gymnastics can reduce blood glucose levels of respondents that are seen before doing prolanis gymnastics, namely having a range of 58 - 454 mg / dl, (out of 16 respondents, there were 6 respondents who had blood sugar levels > 200 mg / dl.) and after doing prolanis gymnastics, the results were obtained in the range of 79-306 mg / dl (there was 1 person who had blood sugar levels > 200 mg / dl) (Zahira & Farhan, 2020). Recommended sports are CRIPE (Continuous, Rhythmical, Interval, Progressive, Endurance Training) sports. Some examples of recommended sports include walking or jogging, cycling, swimming, aerobics and so on. This aerobic exercise is done for at least 30-40 minutes per day, preceded by a 5-10 minute warm-up and ended with a 5-10 minute cool-down (Decroli, 2016).

Monitoring blood sugar levels aims to control blood sugar levels blood whether high or not. Drug therapy aims to control blood sugar levels and can prevent complications from occurring. Foot care aims to care for the feet and prevent the occurrence of injuries to the feet and cause diabetic wounds. Physical exercise aims to increase insulin receptors so that it can support a person in doing activities well and smoothly (Chaidir et al., 2017). Other Data found in this study is the proportion of respondents who pay attention to diet (54%), a healthy diet every day (52.4%), and tasteless diet (42.9%). The development of pre-diabetes into diabetes can be prevented by up to 58% in three years and 34% in 10 years through improving diet (proper diet) and increasing intensive physical activity (Care & Suppl, 2021). The results of this study were lower than the results of the study Luo et al except for the results of the proportion of respondents who pay attention to diet. Where in the study the proportion of people with prediabetes pay attention. to diet (48.6%), a healthy diet every day (96.1%) and a diet of tasteless/tasteless (59%) (Luo et al., 2018). The development of pre-diabetes into diabetes can be prevented by up to 58% in three years and 34% in 10 years through improving diet (proper diet) and increasing intensive physical activity (Kerrison et al., 2017). Differences in the results of this study may be influenced by various factors including physical, social and intrapersonal environmental factors. According to research (Listrikawati, 2023) the results are that there is an increase in self-care with the provision of IMBS education with the use of smartphones in adolescents who are at risk of prediabetes. Lifestyle changes such as regulating nutritional intake and diet, physical activity and exercise, stopping smoking, and increasing health literacy (Jess et al., 2018).

Health literacy is a condition in which individuals have the capacity to obtain, process, and understand basic health information needed to make informed decisions about health (Patandung et al., 2018). Health literacy is a strategy to increase individual control over their health. Health literacy was once defined from the perspective of basic reading and understanding skills, but this has now become more comprehensive to include the abilities and skills to assess, understand, appraise, communicate, and use health information (Lee et al., 2018). Health literacy is the degree to which individuals have the capacity to obtain, process and understand the basic health information and service need to make informed health

decision. Over the past decades, a growing body of research suggests that inadequate HL is associated with adverse health outcomes, such as poor self-rated health, misunderstandings about medical conditions and increased mortality risk (Hu et al., 2019). Factor affecting health literacy are educational status, sources of diabetic information, members of DM association, and social support were significantly and positively associated with the diabetic health literacy of DM patients. But, the duration of diabetes onset was negatively associated with the diabetic health literacy of respondents (Mogessie et al., 2022).

CONCLUSION

Characteristics of PKH respondents as many as 63 with the largest age distribution of 26-35 years (31.7%) mostly female 73.1%, Education 84.1% as many as 53 respondents took up higher education level. The results of the analysis of problems in the development of multimedia on Self-Care Prediabetes in PKH community for the risk of prediabetes in the category of bad behavior 57.1% Good Behavior 42.9%. The conclusion of this study shows that problem analysis found analysis of potential problems became the initial foot hold in the development of smartphone-based self-care applications are still in the revision stage of the application media.

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