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Implementation of Healthy Living Community Movement Supported Automatic Telehealth Machine for Public Health at Poltekkes Kemenkes Palu

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Abstract

BACKGROUND: Indonesia faces serious challenges from a double burden disease caused by changes in people's lifestyles. Hypertension, stroke, heart disease, and diabetes have taken up a growing share of health expenditure. These diseases are the comorbid of COVID 19 and strongly require routine health monitoring. Health monitoring will greatly develop along with the development of technology and information 4.0.

AIM: This study aims to implement the healthy living community movement programs using automatic telehealth machine (ATM) for health checking and education at Politeknik Kesehatan Kemenkes Palu.

METHODS: This research method is intervention research. The population were 167 employees of Poltekkes Kemenkes Palu. Sampling process used simple random sampling method with sample size consist of 96 people. The measuring instrument used are ATM device and a questionnaire that has been tested for validity and reliability. Analysis of research data using frequency distribution and bivariate test.

RESULTS: The study revealed the characteristic of respondents including gender and age, physical activity was generally good, and fruits intake was also good. The variables that were significantly related to systole were gender and age category ($p = 0.03$). The variables which were significantly related to diastole were gender ($p = 0.02$) and age category ($p = 0.01$). The results revealed that gender, age, physical activity, and fruits intake were not associated with total cholesterol levels.

CONCLUSIONS: ATMs can be implemented for health checking and education in healthy living community movement programs.

Introduction

The outbreak of coronavirus disease 2019 (COVID-19) by the severe acute respiratory syndrome coronavirus 2 is the leading worldwide healthcare problem due to its contagious nature, high morbidity, and mortality rates. The present pandemic has also brought an emerging situation regarding complications and comorbid disease mainly pointing out hypertension (HT) and diabetes mellitus [1]. For comorbidities, patients with COVID-19 had higher numbers of HT (52.1%), diabetes (33.6%), and other cardiovascular diseases (20.9%). Those three comorbidities proportion of deaths among other comorbidities [2]. Cardiovascular disease not only affects adults but also associated with the birth of stunted children [3], [4].

Risk factors for smoking and HT are the three main factors in increasing the problem of noncommunicable diseases (NCDs) in Indonesia. There needs to be a rigorous reorientation and increased response to effective and affordable health systems to prevent and control NCDs through cost-effective interventions and a more structured approach to high-quality primary care and more strategic prevention [5].

The Healthy Living Community Movement or Gerakan Masyarakat Sehat is one of programs for the community to foster a healthy lifestyle. It is a systematic and planned action carried out jointly by all components of the nation with awareness, willingness, and ability to behave in a healthy manner to improve the quality of life [6]. Structured programs for people residing in urban areas need to be considered for application of this programs [7].

Health services will greatly develop along with the development of technology and information in 4.0 generation. This includes nursing services in the future that will take advantage of developments in information technology, for example, applying telehealth. Telehealth in nursing can be developed for tele-nursing services, such as tele-counseling [8]. Tele-counseling is a professional activity that entails a relationship between a nurse and a patient or a group of people, which using some device to allow the distance communication. To be able to use various counseling skills effectively and efficiently, a nurse must first master communication

skills [9]. The telehealth program can be a milestone for the implementation of the Internet of Things in the health sector for the public and can be applied in Indonesia. Evidence on treatment with telehealth based in healthcare is feasible and effective for improving blood pressure control among patients with HT [10].

Automatic Telehealth Machine (ATM) for Public Healthy or Anjungan Telehealth Masyarakat Sehat (ATMs) is device for long distances health services. This device provides several telehealth features. The patients can perform health checking, such as blood pressure, blood sugar level, cholesterol level, weight, temperature, and blood oxygen levels. The health check results will be stored in an application that can be opened on a smartphone. The education feature will help the community to get information about NCDs of complications. ATM has patent registered with serial number: P00201607097 [11].

This study aims to implement the healthy living community movement programs using ATM for health checking of blood pressure, glucose, cholesterol as well as the health education at Politeknik Kesehatan Kemenkes Palu.

Methods

This research method is intervention research. The interventions were tele-counseling to consume fruits and perform physical activity, then followed by routine measuring glucose levels, cholesterol, and blood pressure using a ATM.

The research was conducted at Poltekkes Kemenkes Palu in Palu City, Central Sulawesi from June until September 2020. The population were 167 employees of Poltekkes Kemenkes Palu. The research used simple random sampling method to select 96 employees as respondents. This research has received ethical approval from The Poltekkes Kemenkes Palu of Research Ethics Committees with numbers LB0101/KE/01.152/III/2020.

Respondents were given 100 g of fruits and did activity for at least 30 min every working day for 44 working days. The measuring instrument used is device and a questionnaire that has been tested for validity and reliability. Analysis of research data using frequency distribution and bivariate test (Chi-square) with significance $p < 0.05$.

Results

This research was conducted on October 28 to December 6, 2020. Respondents have performed regular health checks, stretched at 10 am and 2 pm, and consumed fruits. Respondents get traction of health checking and information about disease in ATM App. Message reminder for stretching and fruits benefit has been sent from the ATMs app that linked to WhatsApp group.

The study revealed that most of respondents were female and aged 40–65 years, physical activity and fruits intake was generally good. Systole 11.5% ≥140 mmHg, diastole 25% ≥90 mmHg, glucose 6.3% ≥200 mg/dl, and cholesterol 76.0% ≥200 mg/dl (Table 1).

Table 1: Characteristics of respondents who implemented the healthy living community movement programs using automatic telehealth machine

Characteristics	n (%)
Sex	
Man	41 (42.7)
Women	55 (57.3)
Age (years)	
25–39	26 (27.1)
40–65	70 (72.9)
Physical activity	
Good	72 (75.0)
Not good	24 (25.0)
Fruit intake	
Good	67 (69.8)
Not good	29 (30.2)
Systole (mmHg)	
< 140	85 (88.5)
≥ 140	11 (11.5)
Diastole (mmHg)	
< 90	72 (75.0)
≥ 90	24 (25.0)
Glucose level in blood (mg/dl)	
< 200	90 (93.8)
≥ 200	6 (6.3)
Cholesterol level in blood (mg/dl)	
< 200	23 (24.0)
≥ 200	73 (76.0)

The variables that were significantly related to systole were gender and age category ($p = 0.03$). Men had higher systolic blood pressure than women in this study, and people aged 40 to 65 had higher systolic blood pressure than people aged 25 to 39 (Table 2).

Table 2: The relationship between respondent's systole with sex, age, physical activity, and fruits intake at Poltekkes Kemenkes Palu

Variable	Systole		Total	p
	< 140 mmHg, n (%)	≥ 140 mmHg, n (%)		
Sex				
Men	33 (80.5)	8 (19.5)	41	0.03
Women	52 (94.5)	3 (5.5)	55	
Age (years)				
25–39	26 (100)	0 (0)	26	0.03
40–65	59 (84.3)	11 (15.7)	70	
Physical activity				
Good	65 (90.3)	7 (9.7)	72	0.35
Not good	20 (83.3)	4 (16.7)	24	
Fruit intake				
Good	62 (92.5)	5 (7.5)	67	0.06
Not good	23 (79.3)	6 (20.7)	29	

The variables which were significantly related to diastole were gender ($p = 0.02$) and age category ($p = 0.01$). Men had higher diastolic blood pressure than women in this study, while people aged 40 to 65 had higher diastolic blood pressure than people aged 25 to 39 (Table 3).

The results revealed that gender, age, physical activity, and fruits intake were not associated with blood sugar levels (Table 4).

Table 3: The relationship between respondent's diastole with sex, age, physical activity, and fruits intake at Poltekkes Kemenkes Palu

Variable	Diastole		Total	p
	< 90 mmHg, n (%)	≥ 90 mmHg, n (%)		
Sex				
Men	26 (63.4)	15 (36.6)	41	0.02
Women	46 (83.6)	9 (16.4)	55	
Age (years)				
25–39	24 (92.3)	2 (7.7)	26	0.01
40–65	48 (68.6)	22 (31.4)	70	
Physical activity				
Good	56 (77.8)	16 (22.2)	72	0.27
Not good	16 (66.7)	8 (33.3)	24	
Fruit intake				
Good	53 (79.1)	14 (20.9)	67	0.15
Not good	19 (65.5)	10 (34.5)	29	

Resource: Primary data, 2020.

The results revealed that gender, age, physical activity, and fruits intake were not associated with total cholesterol levels (Table 5).

Table 4: Relationship between blood glucose levels of respondents with sex, age, physical activity, and fruits intake at Poltekkes Kemenkes Palu

Variable	Random glucose blood level		Total	p
	< 200 mg/dl, n (%)	≥ 200 mg/dl, n (%)		
Sex				
Men	38 (92.7)	3 (7.3)	41	0.71
Women	52 (94.5)	3 (5.5)	55	
Age (years)				
25–39	26 (100)	0 (0)	26	0.12
40–65	64 (91.4)	6 (8.6)	70	
Physical activity				
Good	69 (95.8)	3 (4.2)	72	0.14
Not good	21 (87.5)	3 (12.5)	24	
Fruit intake				
Good	64 (95.5)	3 (4.5)	67	0.58
Not good	26 (89.7)	3 (10.3)	29	

Discussion

The study reveals that most of respondents were female and age between 40 and 65 years old, physical activity and fruits intake was generally good. According to the findings of this study, most of the blood pressure, glucose, and cholesterol levels of employees at Poltekkes Kemenkes Palu were good. However, some respondents reported systole greater than or equal to 140 mmHg, diastole greater than or equal to 90 mmHg, glucose greater or equal to 200 mg/dl, and total cholesterol more than or equal to 200 mg/dl, according to the study's findings.

Table 5: Relationship between cholesterol levels of respondents with sex, age, physical activity, and fruits intake at Poltekkes Kemenkes Palu

Variable	Total cholesterol level		Total	p
	< 200 mg/dl, n (%)	≥ 200 mg/dl, n (%)		
Sex				
Men	11 (26.8)	30 (73.2)	41	0.569
Women	12 (21.8)	43 (78.2)	55	
Age (years)				
25–39	7 (26.9)	19 (73.1)	26	0.678
40–65	16 (22.9)	54 (77.1)	70	
Physical activity				
Good	15 (20.8)	57 (79.2)	72	0.214
Not good	8 (33.3)	16 (66.7)	24	
Fruit intake				
Good	15 (22.4)	52 (77.6)	67	0.584
Not good	8 (27.6)	21 (72.4)	29	

The variables that were significantly related to systole were gender and age category. Men have a higher systolic blood pressure than women, and those between the ages of 40 and 65 have a higher systolic blood pressure than those between the ages of 25 and 39. Otherwise, the variables that were significantly related to diastole were gender and age category. Men have a higher diastolic blood pressure than women, and those between the ages of 40 and 65 have a higher diastolic blood pressure than those between the ages of 25 and 39. The findings of this study show that the prevalence of HT is increasing at Poltekkes Kemenkes Palu. In a national population-based cross-sectional survey, the Indonesia Family Life Survey 5 interviewed and assessed people. The research reveals that 33.4% of research participants had HT; therefore, prevalence in males 31% and females 35.4%. However, males have a higher incidence of HT than females between the ages of 18 and 29, whereas women have a higher prevalence of HT than men between the ages of 40 and older [12]. Although the exact mechanism is unknown, sex appears to have an impact on both the prevalence and control rate of HT. Another Korean study looked into the factors that are linked to the prevalence of HT in people. Men had a higher prevalence of HT than women in general. However, after the age of 60, ladies were more likely than males to have HT. In women, old age, low education, and a high Body mass index (BMI) were positively linked with HT prevalence; in men, rising age, low income, alcohol consumption, and a high BMI were significantly associated with HT prevalence [13].

Dyslipidemia, obesity, and a history of smoking are still the major risk factors for HT disease, and heart disease is the most common target organ damage linked to HT [14]. In Indonesia, coronary heart disease (CHD) is the most prominent of the major cardiovascular disorders. According to HT status, the link between dyslipidemia and the incidence of CHD varies. After controlling for age, hypertensive respondents with dyslipidemia were 18.1 times more likely to develop CHD than non-dyslipidemic respondents, while non-hypertensive respondents with dyslipidemia were 2.5 times more likely to develop CHD than non-dyslipidemic respondents. It is suggested that the community get frequent medical examinations [15].

During a 6-year follow-up, some in England intended to examine the cardiovascular risk management and cardiovascular risk factor outcomes of the health check program. According to the findings, those who get a health check have lower risk factor values and are more likely to get risk factor interventions. BMI, blood pressure, and smoking risk factor values indicate net reductions up to 6 years after a health check, which may be of public health importance [16].

Adults who received telehealth interventions (THI) had lower levels of cardiovascular risk factors,

but the effect of THI on cardiovascular disease (CVD) is still debated. The evidence from randomized controlled trials that explored the possible impact of THI on the incidence of CVD in people with or without prior CVD was summarized in a meta-analysis. According to the findings, those who received THI had a significantly lower CVD incidence than those who received standard treatment. Furthermore, THI had a greater effect in patients who had a history of CVD than in patients who had never had a CVD [17]. A systematic literature evaluation of randomized controlled studies, on the other hand, yielded different results. Three of the 13 studies included measured Framingham 10-year CVD risk scores, and meta-analysis revealed no clear evidence of overall risk reduction. A reduction in systolic blood pressure and total cholesterol was found to be inconclusive. High-density lipoprotein cholesterol levels and smoking rates were unchanged. The effectiveness of THI in reducing overall CVD risk is unknown due to a lack of evidence. More research is needed to assess the THI for CVD prevention, as well as to measure total CVD risk and directly compare different telehealth programs [18].

The results showed that gender, age, physical activity, and fruits intake on glucose and cholesterol did not show a significant relationship. The Centers for Disease Control and Prevention, State and Local Health Departments, and other organizations in the United States are aiming to expand public access to the Diabetes Prevention Program lifestyle intervention. The goal of this study was to evaluate participant involvement, diet and physical activity monitoring, and weight loss between those who received the intervention on-site and those who received it virtually through telehealth. The number of intervention sessions attended by telehealth and on-site participants did not differ statistically significantly. Between the telehealth and on-site groups, there were no statistically significant differences in mean weight loss or BMI reduction. In addition, there were no statistically significant differences in the percentage of telehealth and on-site individuals who met the 5% or 7% weight loss [19]. Another study found that telemedicine has the ability to change diabetes control and prevention practices, particularly Type 2 and gestational diabetes. Similarly, retinopathy screening and monitoring can discover symptoms early so they can be managed or cured. Overall, the study found strong and consistent evidence of improved glycemic control and successful screening and monitoring of diabetic retinopathy in people with type 2 and gestational diabetes [20].

Tropical fruits have the capacity to modify important biochemical markers that can help manage metabolic illnesses including cholesterol and blood sugar [21]. Tropical fruits such as papaya, [22], [23] watermelon, [24] and bananas [25], [26] can lower cholesterol levels.

Conclusions

ATM can be implemented for health checking and education in healthy living community movement programs. The study suggests that ATM will increas the implementation of healthy living community movement at Poltekkes Kemenkes Palu. Increase the participation of Poltekkes Kemenkes Palu staff in healthy community movement activities. Furthermore, study could be continued by developing designs and other variables, such as changes in respondent behavior.

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