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MEASUREMENT OF SELF-REPORTED PHYSICAL ACTIVITY WITH CARDIOVASCULAR RISK IN RURAL ADULTS IN JOMBANG DISTRICT, EAST JAVA PROVINCE

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ABSTRACT

Cardiovascular disease was the leading cause of death globally in 2019. The risk of CVD include cholesterol and blood sugar levels, blood pressure, and Body Mass Index (BMI). Physical activity is one of the protective factors of cardiovascular disease. This study investigates the relationship between self-reported physical activity and cardiovascular risk among rural adults in Indonesia. The research, conducted using an observational cross-sectional design with accidental sampling, included 93 adults aged 12-59 years. Physical activity was assessed using the Global Physical Activity Questionnaire (GPAQ), while cardiovascular risk was determined using the Framingham 30-Year Risk Score. The majority of respondents were female, late adults, high school graduates, employed, and had an income below Rp 2,000,000. Results revealed an association between physical activity and cardiovascular risk, indicating that individuals with higher physical activity levels had a lower risk of cardiovascular disease, and vice versa. However, no significant correlation was found between physical activity and traditional cardiovascular risk factors, such as cholesterol levels, blood sugar levels, BMI, and blood pressure among rural adults in Jombang, Indonesia. The study underscores the importance of adopting a healthy lifestyle, particularly through increased physical activity, during adulthood to mitigate the risk of cardiovascular disease in this population.
Keywords: *physical activity, cardiovascular disease, adult, Framingham risk score*

ABSTRAK

Penyakit kardiovaskular merupakan penyebab utama kematian secara global pada tahun 2019. Risiko CVD meliputi kadar kolesterol dan gula darah, tekanan darah, dan Indeks Massa Tubuh (BMI). Aktivitas fisik merupakan salah satu faktor pelindung penyakit kardiovaskular. Studi ini menyelidiki hubungan antara aktivitas fisik yang dilaporkan sendiri dan risiko kardiovaskular pada orang dewasa pedesaan di Indonesia. Penelitian dilakukan dengan menggunakan desain observasional cross-sectional dengan pengambilan sampel aksidental, melibatkan 93 orang dewasa berusia 12-59 tahun. Aktivitas fisik dinilai menggunakan Global Physical Activity Questionnaire (GPAQ), sedangkan risiko kardiovaskular ditentukan menggunakan Framingham 30-Year Risk Score. Mayoritas responden adalah perempuan, dewasa akhir, lulusan SMA, bekerja, dan berpenghasilan di bawah Rp 2.000.000. Hasil penelitian menunjukkan adanya hubungan antara aktivitas fisik dan risiko kardiovaskular, yang menunjukkan bahwa individu dengan tingkat aktivitas fisik yang lebih tinggi memiliki risiko penyakit kardiovaskular yang lebih rendah, dan sebaliknya. Namun, tidak ditemukan korelasi signifikan antara aktivitas fisik dan faktor risiko kardiovaskular tradisional, seperti kadar kolesterol, kadar gula darah, BMI, dan tekanan darah pada orang dewasa pedesaan di Jombang, Indonesia. Studi ini menggarisbawahi pentingnya menerapkan gaya hidup sehat, khususnya melalui peningkatan aktivitas fisik, selama masa dewasa untuk mengurangi risiko penyakit kardiovaskular pada populasi ini.
Kata kunci: *aktivitas fisik, penyakit kardiovaskular, dewasa, Framingham risk score*

INTRODUCTION

Physical activity is one aspect of health that needs attention. Physical activity is an activity to move the limbs, which aims to maintain physical health and quality of life. Examples of physical activity are running, cycling, exercising, and yoga. Physical activity can be done at home or the workplace (Cardinal, 2016; World Health Organization, 2018). Regular physical activity will provide many benefits to our health, such as regulating body weight and strengthening the heart and blood vessel system (Ministry of Health, 2018a). The rapid development of technology causes lifestyle changes by decreasing physical activity. Technology overgrowing causes individuals to do more activities with their smartphones, laptops, and desktops, causing sedentary activities that result in physical

inactivity (Erwin, 2016). Low physical activity causes less energy expenditure, resulting in an imbalance between the energy obtained from food and the energy released from the body, disrupting the body's metabolic processes. Disrupted body metabolic processes cause health problems (Elder et al., 2016).

WHO stated that 28% of adults did not meet the global recommended physical activity (World Health Organization, 2020a). A study found that only 15% of adults in developed countries did regular physical activity, and only 39.4% did high physical activity (Banerjee & Khatri, 2010). Physical activity is one of the risk factors for several chronic diseases, including cancer, diabetes, and cardiovascular disease (Banerjee & Khatri, 2010; World Health Organization, 2020a). Low physical activity is also a factor in 30% of cardiovascular disease (WHO, Global Strategy on Diet, 2019). Cardiovascular disease occurs when there is impaired function of the heart and blood vessels, including coronary heart disease, heart failure, and stroke (Martiningsih & Haris, 2019). Cardiovascular disease caused 17.3 million deaths in 2008. Cardiovascular disease in 2019 was the first disease to cause deaths globally, which is 16% of the total deaths in the world (8.9 million deaths). Cardiovascular disease in 2030 is estimated to cause the death of approximately 23.6 million people (World Health Organization, 2020b). A study conducted in the United States showed that men who did physical activity not according to WHO recommendations found 52.7% suffered from cardiovascular disease while men who did physical activity according to WHO recommendations found 45.5% suffered from cardiovascular disease. A study on women who did physical activity not according to WHO recommendations found 42.4% suffered from cardiovascular disease while women who did physical activity according to WHO recommendations found 30.5% suffered from cardiovascular disease. Individuals who do low activity have a higher risk of cardiovascular disease (Kubota et al., 2016).

Many low-income countries are known to have low levels of physical activity (Hazel, 2017). Indonesia is a low-income country with low levels of physical activity (Ministry of Health, 2018b). The 2018 Riskesdas found that Indonesia's average proportion of physical activity for the aged between 11-65 years is less physically active (33.5%) (Ministry of Health, 2018a). Lack of physical activity in adults can have dangerous long-term or short-term consequences. Physical activity is a risk factor for cardiovascular disease. Research conducted in 34 provinces of Indonesia explained that physical activity has a relationship with the risk of cardiovascular disease. Individuals who do low physical activity have a higher risk of cardiovascular disease (Adisasmito et al., 2020). East Java Province in 2013 was the province that had the highest number of coronary heart disease sufferers in Indonesia, as many as 375,127 people (Ministry of Health, 2013). Patients with coronary heart disease in East Java Province in 2018 were the second most in Indonesia, with 151,878 (Ministry of Health, 2018b). Patients with heart failure in 2013 in East Java Province are known to be the second most common in Indonesia, amounting to 86,568 people (0.3%) (Ministry of Health, 2013).

Physical activity can affect cholesterol levels, blood sugar levels, Body Mass Index (BMI), blood pressure, and cardiovascular disease risk factors. High blood pressure is the most common disease in Jombang Regency since 2014-2016. Diabetes mellitus is in the top 10 diseases in Jombang, with 11,936 cases (Jombang District Public Health Office, 2018). This study aims to analyze measurement of self-reported physical activity with cardiovascular risk in rural adults in Indonesia. The study was conducted to assess cardiovascular risk using the Framingham 30-Year Risk Score. Research related to cardiovascular disease is done in Indonesia, but the research that describes cardiovascular risk in the next thirty is still not widely studied in Indonesia. Research related to cardiovascular risk assessment needs to be studied in-depth to prevent non-communicable diseases.

METHOD

This study applies a quantitative, analytical observational method using a cross-sectional research design. This study was conducted in the Car Free Day area, Jombang, East Java, in 2019. The population in this study were all male and female adults aged 21-59 years who came by to the Car Free Day area in rural areas in Indonesia. A total data 93 people were obtained as the study sample using the accidental sampling technique, meaning the study sample was obtained by an unexpected meeting with the researcher.

Primary data was collected through health measurements and interviews with respondents. Health measurements include measuring blood pressure, blood sugar, total cholesterol levels, body weight and height, and cardiovascular risk using the Framingham 30-Year Risk Score. Other data such as age, gender, smoking history, history of hypertension therapy, and physical activity was quantified using self-reported data from the Global Physical Activity Questionnaire (GPAQ). The Framingham 30-Year Risk Score was proven to be used to calculate cardiovascular risk in the next 30 years with a sensitivity value of 84%, specificity of 72%, the positive predictive value of 54%, and the negative predictive value of 92% (Masson et al., 2011). The measurement results were grouped into three cardiovascular risk categories, namely low cardiovascular risk (<12%), moderate cardiovascular risk (12-40%), and high cardiovascular risk (>40%) (Masson et al., 2011).

Physical activity was used as the independent variable, with self-reported measurements. The Global Physical Activity Questionnaire (GPAQ) was used to assess respondents' self-reported levels of physical activity. Measurements with GPAQ were classified using MET (Metabolic Equivalent). The GPAG classification with MET was categorized as follows: low physical activity (MET<600), moderate physical activity (600<MET<3000), and high physical activity (MET>3000) (WHO, 2012). Data analysis was carried out in the descriptive and bivariable analysis. The data analysis method in this research involves a descriptive approach and bivariable analysis. Descriptive analysis was used to describe the frequency and percentage of research variables, including Body Mass Index (BMI), blood pressure, cholesterol levels and blood sugar levels in adults. BMI, which measures the relationship between body weight (BW) and height (TB), was analyzed in the following categories: 1) underweight if BMI ≤18.5 kg/m2, 2) normal, if BMI 18.5-25 kg/m2 m2, 3) overweight, if BMI is 25-27.5 kg/m2, and 4) obese, if BMI is ≥27.5 kg/m2. Blood pressure is measured using a Sphygmomanometer, with the following result categories: 1) Hypotension, if <90/60 mmHg, 2) Normal, if 90-120/60-80 mmHg, 3) Prehypertension, if 121-139/81-89 mmHg, and 4) Hypertension, if >140/90 mmHg. Cholesterol levels, measured with a measuring stick, were analyzed as normal (≤200 mg/dL) or high (>200 mg/dL). Meanwhile, blood sugar levels, also measured using a measuring stick, are categorized as normal (≤200 mg/dL) or diabetes (>200 mg/dL). Bivariable analysis was carried out using the Spearman test with a significance level of 5% (α=0.05) to evaluate the relationship between these variables.

This study had been approved by the Health Research Ethics Commission, Faculty of Nursing, Universitas Airlangga, with the ethics number 1385-KEPK. All respondents in the study filled out an informed consent form, and respondents were informed about the objectives, procedures, risks, and benefits related to the study.

RESULTS AND DISCUSSION

The majority of respondents were female (52.7%), in the late adult age category (83.9%), high school graduate (51.6%), and an employee (64%). Respondents who work as private employees were 27

people (29%). The majority income of respondents (33.3%) were <Rp 2,000,000. The data were presented in Table 1.

Variable	Total	Percentage(%)
Gender		
Male	44	47.3
Female	49	52.7
Age		
Early adult (21-30 years)	15	16.1
Late adult (31-59 years)	78	83.9
Current education		
Elementary school degree	4	4.3
Primary school degree	11	11.8
High school degree	48	51.6
Bachelor degree	30	32.3
Work status		
Unemployment	29	31.2
Employment	64	68.8
Type of work		
Unemployment	29	31.2
Open a shop/stall/trade	11	11.8
PNS/TNI/Polri/Civil Apparatus	12	12.9
Private employee	27	29.0
Factory/Industrial Workers	1	1.1
Farm workers	1	1.1
Service worker	8	8.6
Others	4	4.3
Income (IDR)		
<2.000.000	31	33.3
2.000.000 - <4.000.000	29	31.2
4.000.000 - <6.000.000	21	22.6
6.000.000 - <8.000.000	5	5.4
8.000.000 - <10.000.000	2	2.2
No income	5	5.4

Table 1. The characteristic of respondent in rural areas, 2019

The results of physical activity measurement using the Global Physical Activity Questionnaire (GPAQ) based on the Metabolic Equivalents (METs) values were work, travel, and sports activities. The domain with the highest average physical activity value was work activity with 1992.91 METs minutes/week. The domain with the lowest average physical activity value was sports activity with 550.32 METs minutes/week. The travel activity domain had an average value of 703.05 METs minutes/week. The total average of METs in adults in Jombang was 4,280.90 METs min/week. The total value of METs with the lowest physical activity was 0, and the highest physical activity was 29,040. More details can be seen in Table 2.

Physical activity	Mean	Minimum	Maximum	Standard Deviation
METs min/week				
Work activity	3.027,53	0	25.680	6.071,30
Travel activity	703,05	0	5.040	997,08
Heavy sport activity	269,03	0	2.880	549,32
Total METs min/week	4.280,90	0	29.040	6.341,73

Note : METs = Metabolic Equivalents

Table 2. Distribution of Physical Activity of adults based on METs in rural areas,2019

The result of physical activity of adults in rural areas in Indonesia. About 21 people (22.6%) had low physical activity, 40 people (43%) had moderate physical activity, and 32 people (34.4%) had high physical activity. The majority adults in rural areas in Indonesia had moderate physical activity. More details can be seen in Table 3.

Physical activity	Total	Percentage(%)
Low (<600 MET)	21	22.6
Moderate (600-2999 MET)	40	43.0
High (≥3000 MET)	32	34.4

Note : METs = Metabolic Equivalents

Tabel 3. The Distribution of Physical Activity in Rural Adults in Indonesia, 2019

The results showed that the majority (43%) of adults in the Jombang Regency had moderate physical activity. This study result was in line with research in Boston, the United States in 2005, which showed that most respondents (45.7%) had moderate physical activity (Sponholtz & Vasan, 2018). This study result was also in accordance with research in Brazil about physical activity and cardiovascular risk, and the result showed that the majority of respondents (39.9%) had moderate physical activity (Pitanga et al., 2018). Physical activity was an activity to move the body and release energy to improve body health. Individuals also need to pay attention to the intensity and duration of physical activity (Tiksnadi et al., 2019). Individuals with excellent and regular physical activity were more protected from health problems, such as cardiovascular disease (Oyeyemi & Adeyemi, 2013).

An overview of cardiovascular risk factors and cardiovascular risk of adults in the Jombang Regency, the data were presented in table 4. About 52 people (55.9%) had a high level of cholesterol, 33 people (35.55%) had normal BMI, 32 people (34.4%) had normal blood pressure, and 87 people (93.5%) had normal blood glucose levels. The Framingham 30-Year Risk Score measured cardiovascular risk, and 48 respondents (51.6%) had moderate cardiovascular risk. The Framingham 30-Year Risk Score described the cardiovascular risk in the next 30 years, so this study showed that most adults in Jombang Regency had moderate cardiovascular risk in the next 30 years.

Variables	Total	Percentage(%)
Cholesterol level		
Normal cholesterol level	41	44.1
High cholesterol level	52	55.9
Body Mass Index (BMI)		
Underweight	3	3.2
Normal	33	35.5
Overweight	18	19.4
Obesity	39	41.9
Blood pressure		
Hypotension	1	1.1
Normal	32	34.4
Pre-hypertension	31	33.3
Hypertension	29	31.2
Blood Glucose Level		
Normal	87	93.5
Diabetes	6	6.5
Cardiovacular Risk		
Low	24	25.8
Moderate	48	51.6

High	21	22.6

Table 4. The Distribution of Cardiovascular Risk Factors and Cardiovascular Risk in Rural Adults in Indonesia in 2019

The majority of adults in the Jombang Regency, 48 people (51.6%), had moderate cardiovascular risk. This study was in line with research in Boston, United States in 2005, which showed that the average respondent had a moderate cardiovascular risk (Sponholtz & Vasan, 2018). Adults in the United States did prevention and control of cardiovascular risk factors, and early prevention could reduce the cost of cardiovascular disease treatment (Clark et al., 2014). This study result was also in accordance with a research done in Argentina. The study was conducted on three populations: men <40 years, men> 40 years, and women <70 years, and the result showed that they had moderate cardiovascular risk, with the percentage of 51%, 58%, and 66%, respectively (Masson et al., 2011).

Table 5. showed the relationship between physical activity and cardiovascular risk. The study result showed that 12 adults in rural areas in Indonesia (57.1%) who had low physical activity had moderate cardiovascular risk. The results of the Spearman test obtained p-value = 0.007 ($p<0.05$), which means that there was a relationship between physical activity and cardiovascular risk. It was categorized as a moderate relationship with a coefficient value of -0.280. The coefficient value was negative, which means that the relationship between the two variables was not unidirectional, which means the lower the physical activity a person did, the higher the cardiovascular risk. The results showed that physical activity was related to cardiovascular risk in the next 30 years calculated with the Framingham 30-Year Risk Score.

Physical Activity	Cardiovascular Risk						Total		p-value	R
	Low		Moderate		High					
	n	%	n	%	n	%	N	%		
Low	1	4.8	12	57.1	8	38.1	21	100		
Moderate	10	25.0	23	57.5	7	17.5	40	100		
High	13	40.6	13	40.6	6	18.8	32	100	0.007	-0.280

Note: R = correlation coefficient

Table 5. The Correlation between Physical Activity and Cardiovascular Risk (Framingham 30-Year Risk Score) in Rural Adults in Indonesia 2019

Physical activity in rural adults in Indonesia found that there is a relationship with cardiovascular risk. The study results were in line with a study done in England, which stated that physical activity correlated with cardiovascular risk (p-value = 0.01). The results showed that physical activity carried out according to recommendations reduced the risk of cardiovascular disease (Patterson et al., 2020). A study in Korea also found a between physical activity and cardiovascular disease risk (p-value = 0.046, coefficient = -0.151). The results showed that physical activity had a direct effect on cardiovascular risk. The results showed a negative , meaning doing high physical activity, the lower the cardiovascular risk obtained (Kim et al., 2020). Physical activity was a protective factor of cardiovascular risk disease. A study conducted for 5.5 years showed that individuals with high physical activity did not experience weight gain and had low cardiovascular risk. Even though they gain weight, respondents with high physical activity had normal blood pressure and low cardiovascular risk. It might be because physical activity released nitric oxide, resulting in a decreased blood pressure. Individuals with high physical activity had lower cardiovascular risk (Dickie et al., 2014). As a result, regular physical activity can help to prevent cardiovascular disease and other chronic diseases (Wattanapisit, 2017).

A study conducted in America showed that many studies have stated that physical activity was related and influenced the risk of cardiovascular disease. Individuals with low physical activity were two times more prone to experienced cardiovascular disease than individuals with high physical activity. Lack of physical activity means less energy expenditure in the body. It caused metabolic disorders

because less energy was burned, causing fat accumulation in the body, affecting cholesterol levels, blood pressure, blood sugar levels, and Body Mass Index (BMI). Physical activity affected cardiovascular risk factors because physical activity released Nitric Oxide, which helps the blood vessels became elastic. The study showed that regular physical activity influences cardiovascular risk (Winzer et al., 2018).

Studies from several countries showed that physical activity correlated with cardiovascular risk. However, physical activity did not significantly affect each cardiovascular risk factor and did not show any association with each cardiovascular risk factor. Calculation of cardiovascular risk factors by measuring the Framingham 30-Year Risk Score showed that physical activity correlated with cardiovascular risk in the next thirty years. The study results were in line with a study in the UK that showed that physical activity was not associated with each cardiovascular risk factor. The results stated that physical activity had a relationship with cardiovascular risk assessment based on cardiovascular risk factors. Individuals with low physical activity showed a higher cardiovascular risk value (Patterson et al., 2020).

Physical activity can increase the risk of cardiovascular disease according to Framingham 30-Year Risk Score. Framingham 30-Year Risk Score society has variations in cholesterol, body mass index, blood glucose levels, and blood pressure. This shows that these factors if calculated, the risk of cardiovascular disease appears in the next few years. But in this study, physical activity was not related to cholesterol, body mass index, blood glucose levels, and blood pressure. This suggests that physical activity associated with each risk factor does not indicate cardiovascular risk. The risk of cardiovascular disease will be seen when the calculation of several cardiovascular disease risk factors. The data relationship between Physical Activity and Cardiovascular Risk Factors in Rural Adults in Indonesiawere presented in Table 6.

Cardiovascular Risk Factor	R	*p-value*
Cholesterol (mg/dL)	-0.032	0.757
Body Mass Index (kg/m^2)	-0.057	0.585
Blood Glucose Level (mg/dL)	-0.038	0.714
Blood Pressure (mmHg)	-0.034	0.748

Note: R = correlation coefficient

Table 6. Relationship between Physical Activity and Cardiovascular Risk Factors in Rural Adults in Indonesia, 2019

The study result showed that physical activity did not associate with cholesterol levels. Research from the 1999-2006 National Health and Nutrition Examination Survey (NHANES) showed that physical activity did not significantly affect total cholesterol levels in the body. The results showed that total cholesterol levels did not differ between individuals with low and high physical activity. Physical activity had more influence on High-Density Lipoprotein (HDL) and Low-Density Lipoprotein (LDL) cholesterol levels (Pilch et al., 2015). Physical activity (exercise) can increase HDL cholesterol levels (Syahrir et al., 2022). HDL cholesterol was good cholesterol that dissolved LDL in the body, while LDL was the bad cholesterol because it stuck to the walls of blood vessels, which lead to disruption of the blood vessel system. Metabolism in the body could be disrupted when LDL levels in the blood were higher than HDL levels (Skoumas et al., 2003).

Physical activity decreased LDL levels and increased HDL levels because physical activity required a lot of energy formation, so LDL as a cholesterol transporter was not formed, while HDL formation increased. Physical activity, which was done regularly, increased HDL levels and decreased LDL levels in the body to maintain the metabolic system (Pilch et al., 2015). LDL cholesterol levels, HDL cholesterol levels, and total cholesterol levels, and physical activity correlated with all these cholesterol parameters (Arija et al., 2017). Measurement of total cholesterol levels showed the sum of HDL, LDL, and triglycerides levels. The HDL and LDL levels indicated excellent and bad cholesterol in the blood, respectively (Birtcher & Ballantyne, 2004). This study only measured total

cholesterol levels, while HDL and LDL cholesterol levels were not measured. This can affect the results of the study, leading to the absence of a relationship of physical activity with cholesterol, which is a risk of cardiovascular disease.

The study result showed that physical activity did not correlate with Body Mass Index (BMI). It was in line with a study in Ghana, which showed no relationship between physical activity and Body Mass Index (BMI), with a p-value=0.099. It could be because the measurement of physical activity was using the International Physical Activity Questionnaire (IPAQ) questionnaire, a subjective measurement that depends on individuals remembering physical activity done during the past week. The study in Ghana suggested that physical activity measurement should be done with objective measurements such as motion sensors called an accelerometer. The measurement of physical activity with the IPAQ did not fully describe the physical activity carried out by individuals because of some falsehood information (Ofori & Angmorterh, 2019). In other studies it is explained that the relationship between physical activity density and resting heart rate has an inverse relationship, but the relationship is classified as weak (Siahaan et al., 2021).

Several other studies have shown that physical activity has a relationship with body mass index. Research conducted by Idris, physical activity is very important in forming the Body Mass Index (BMI) score (Idris et al., 2023). This is because physical activity was one of the activities carried out as energy expenditure by carrying out activities related to physical exercise. Physical activity that was done regularly with good intensity could control body weight. Low physical activity would cause low energy expenditure, leading to fat accumulation, which caused blockages in blood vessels and increased body weight (Aguilar-Farias et al., 2019). This study also used individual reports of their physical activity carried out in the last seven days to allow physical activity scores not to match actual events. This can affect the results of the study, leading to the absence of a relationship of physical activity with body mass index, which is a risk of cardiovascular disease.

The study result showed that physical activity did not correlate with blood sugar levels. The results showed that physical activity had no relationship with blood sugar levels, possibly because current blood sugar levels did not reflect the body's actual state of blood sugar (Dickie et al., 2014). The study result was different from a study in the United States, which showed a correlation between physical activity and blood sugar levels in the body (p-value=0.039). Physical activity had a non-unidirectional correlation with blood sugar levels; hence high physical activity decreased blood sugar levels. Physical activity such as aerobic exercise increased insulin sensitivity. Insulin got better to absorb glucose and use it as a form of energy. Regular physical activity controled blood sugar levels in the body (Performance et al., 2020).

A study in Africa also suggested measuring fasting blood sugar levels because it better describes the actual state of blood sugar levels (Dickie et al., 2014). In this study, blood sugar levels only measured random blood sugar levels without measuring fasting blood sugar levels. Random blood sugar levels were a glucose test that was carried out randomly so that it did not pay attention to when the individual last ate, thus allowing the detected blood glucose to be influenced by respondents who ate before the test. A *fasting blood sugar test* was a glucose test that was done after an individual had fasted overnight. The oral glucose tolerance test was a test that was carried out before and after drinking glucose fluids and was carried out after the individual had fasted overnight so that it better describes the actual condition of glucose in the blood (The Global Diabetes Community, 2019). In this study, the measurement of blood sugar levels was only random blood sugar levels. This can affect the results of the study, leading to the absence of a relationship of physical activity with blood sugar levels, which is a risk of cardiovascular disease.

The study result showed that physical activity did not correlate with blood pressure. The study result was in line with the Iran study (p-value = 0.593), which stated that physical activity did correlate with blood pressure, so it was necessary to pay attention to physical activity measurement tools. Methods and tools for measuring physical activity affected the study result, so the objective measurement was recommended (Heravi et al., 2018). Several other studies have shown that physical activity has a relationship with blood pressure. In a study found that is that there is an effect of ORHIBA physical

exercise on anxiety levels, systolic blood pressure and diastolic blood pressure in hypertensive elderly people (Ni Luh Putu Dian Yunita Sari et al., 2022). Lack of physical activity affects the elasticity of blood vessels and blood vessels cardiac system (Haura Salwa Pherenis et al., 2023), this is also causes the body's organs and blood and oxygen supply to become obstructed, causing many health problems such as being overweight and increasing blood pressure (Putra Apriadi Siregar et al., 2020).

Physical activity done regularly and correctly made the heart work optimally due to increased energy requirements. The increase in the work of the heart increased the venous return, which caused increased arterial-venous blood pressure and the resting phase occurs first. The resting phase decreased the activity of the sympathetic nerves and epinephrine, heart rate, and cardiac output resulted in a decrease in blood pressure (Hegde & Solomon, 2015). This study used individual reports of physical activity by remembering the activities carried out in one week, thus allowing the physical activity score not to match what happened. In this study, the measurement of blood sugar levels was only random blood sugar levels. This can affect the results of the study, leading to the absence of a relationship of physical activity with blood pressure, which is a risk of cardiovascular disease.

Based on the results of research and discussion of this study, recommendations for measuring physical activity and measuring cardiovascular risk become a program that is carried out regularly. Measurement of cardiovascular risk by performing health checks, namely blood pressure, body mass index (BMI), blood sugar levels, and cholesterol levels on a regular basis. The results of these measurements obtained the value of cardiovascular risk in the future using the Framingham 30-Year Risk Score. The target in the activity is adults (21-59 years), especially early adulthood (21-30 years) because in early adulthood is an age that is more receptive to information and high curiosity. Cardiovascular disease has also begun to shift where symptoms begin to appear in early adulthood. It is hoped that with adult age knowing the cardiovascular risk and the level of physical activity that is known now, it can have motivation to change lifestyle even though at a young age there are no symptoms as an effort to maintain body health in the future. The hope is that the decrease in cardiovascular disease is increasingly felt by the public to know the cardiovascular risk that is owned by improving lifestyle, one of which is physical activity.

LIMITATION OF THE STUDY

The limitation included the small study sample, so it did not correctly describe the population. The total cholesterol and blood sugar levels were used as health measurements, but random blood sugar levels did not interpret the actual state of the body's cholesterol levels and blood sugar levels. Measurement of physical activity with the Global Physical Activity Questionnaire (GPAQ) is a subjective measurement based on the incidence of physical activity remembered by the respondent for the past week. It allows the results of physical activity measurements not to match the actual situation. The study was conducted in public facilities so that researchers could not control the seriousness of the respondents in conducting interviews.

CONCLUSIONS AND SUGGESTIONS

Self-reported physical activity in rural adults is associaton between self-reported physical activity and and cardiovascular risk in rural adults, as measured by the Framingham 30-Year Risk Score. However, self-reported physical activity did not connect with cholesterol, body mass index (BMI), blood sugar, or blood pressure levels. It is recommended to emphasize regular health checks for cardiovascular risk factors in rural adults and promote a healthy lifestyle with increased physical activity to prevent cardiovascular disease. Future research with larger sample sizes and objective measures of physical activity could provide further insights into this relationship.

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ETHICAL CONSIDERATIONS

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Conflict of Interest Statement

All authors declare that they have no conflicts of interest.

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