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The Influence of Self-Efficacy and Self-Control on Dietary Behavior of Adolescents at Risk of Non-Communicable Diseases

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ABSTRACT
The Covid-19 pandemic has posed significant risks to individuals with heart disease, as they are at a higher risk of severe complications if exposed to the virus (Indonesian Association of Cardiovascular Specialists, 2020). Exposure to infections, including Covid-19, can exacerbate cardiovascular conditions such as coronary heart disease and chronic heart failure (RI, 2019). Identifying risk factors for cardiovascular diseases is crucial for prevention, with models such as the Jakarta cardiovascular score aiding in risk detection. Health promotion plays a key role in managing modifiable risk factors and preventing behaviors that contribute to long-term heart disease (Handayani, 2010). This study aimed to assess the effectiveness of early detection and health promotion on changes in attitudes and lifestyles of residents at risk of heart disease after the Covid-19 pandemic. A quasi-experimental design was employed with 30 respondents from a group of 1, conducted in the working area of the Puskesmas of Pasar Minggu District, Jakarta. The results indicated a change in attitude of 0.8 points, from 88.13 before the intervention to 88.95 after the intervention, with a p-value of 0.004, showing a statistically significant difference. Additionally, respondents' lifestyles improved by 5.5 points, from 66.03 before the intervention to 71.62 after the intervention, with a p-value of 0.004, also demonstrating a significant difference. These findings suggest that early detection and health promotion significantly impact improving attitudes and lifestyle changes in individuals at risk of heart disease.
Keywords: heart disease, early detection, attitude and lifestyle

Introduction

The era of globalization is an era where everything develops rapidly, including technology. Technological advances in this era cause information to be received easily and quickly. This easily accepted information can lead to lifestyle changes (WHO, 2020; Nurmala et al., 2018). The lifestyle, in which there is a pattern of food consumption and physical activity, tends to imitate the *westernized* style that is considered the lifestyle of modern society, namely lack of physical activity and high consumption of foods containing fat, sodium, and sugar, as well as low consumption of foods containing fiber (Khan et al., 2018; Ridwanmo et al., 2020; Rumambi et al., 2018; Tiksnadi et al., 2018).

Cardiovascular disease, especially coronary heart disease (*CHD*), is a disease that causes global health problems around the world, including in Indonesia. *CHD* remains the number one cause of death in the world (Brunier, 2020; Kemenkes RI, 2019; PERKI, 2020). Epidemiological data in Indonesia show that 26.4% of deaths are caused by *CHD*. This figure is expected to increase, and in 2020 the death rate is projected to reach ten times the previous number.

Epidemiological data in the United States show that 185,000 deaths annually are caused by *CHD* (Brunier, 2020; Handayani, 2010; Kementerian Kesehatan RI, 2018.). A survey of the *Regristration System* (*SRS*) sample in 2014 in Indonesia showed that *CHD* was the highest cause of death at all ages after stroke, at 12.9%. Additionally, based on the results of the survey on the use of the *National Health Insurance* budget in 2014, *CHD* also ranked at the top in claims submitted by health providers in Indonesia.

Heart disease has a very high morbidity and mortality rate, including spending more than 50% of the *Social Security Administration Agency* (*BPJS*) funds in the last four years. Based on the results of the 2013 *Basic Health Research* (*Riskesdas*), the prevalence of coronary heart disease based on a doctor's diagnosis is 0.5%, while based on a doctor's diagnosis or symptoms it is 1.5%. Meanwhile, the prevalence of coronary heart disease in *West Java* based on diagnosis and diagnosis/symptoms respectively is 0.5% and 1.6%. *CHD* not only has an impact on mortality, but also on morbidity and limitations in the quality of life of sufferers. *Riskesdas* data from 2018 show that the incidence of heart disease in Indonesia is increasing year by year, with a prevalence of 1.5%. This means that 15 out of 1,000 people in Indonesia suffer from heart disease (Ministry of Health of the Republic of Indonesia, 2018).

The average hospital report during the pandemic shows that 16.3 percent of patients treated in the *Covid-19* isolation room turned out to have congenital diseases (*comorbidities*) or coincident cardiovascular diseases (Indonesian Association of Cardiovascular Specialists, 2020). Before the pandemic, it was reported that the average mortality rate in hospitals due to heart attacks was 8 percent, but during the pandemic, this figure increased to 22–23 percent. In addition to acute complications, *COVID-19* infection is also associated with an increased risk of long-term *KV*.

Risk factors for cardiovascular disease consist of preventable and unpreventable risk factors. Preventable risk factors are those that clearly affect the occurrence of *CHD*. Preventable risk factors include hypertension, smoking, and diabetes mellitus (LeMone et al., 2016). Efforts to prevent cardiovascular disease in the last ten years can be estimated by calculating current cardiovascular scores. The *Jakarta cardiovascular score* is a modification of the *Framingham Score*. The *Jakarta Cardiovascular Score* has a sensitivity of 77.9% and a high specificity of 90%. This score also provides a positive predictive value of 92.2% and a negative predictive value of 72.8% (Tiksnadi et al., 2018). The score is based on gender, age, blood pressure, smoking, diabetes, body mass index, and weekly physical activity.

Health promotion also needs to be considered for residents who are identified as at risk of heart disease in the next ten years (Handayani, 2010). Behavior change can be achieved with various strategies, which are preceded by changes in knowledge and attitudes. This change in knowledge is carried out, one of which is by the *Health Counseling* method (Nurmala, Ira; Rahman, Fauzie; Nugroho, adi; Erlyani, Neka; Laily, Nur; Yulia Anhar, 2018).

The study by LeMone et al. (2016) identifies preventable risk factors such as hypertension, smoking, and diabetes mellitus, which significantly contribute to the occurrence of coronary heart disease (*CHD*). This research provides valuable insights into modifiable risk factors but does not explore in detail how these factors interact within cultural contexts or how lifestyle changes can be integrated into prevention strategies. Meanwhile, Tiksnadi et al. (2018) focused on the *Jakarta Cardiovascular Score*, a modification of the *Framingham Score*, demonstrating high sensitivity and specificity in detecting the risk of *CHD*. However, this study primarily concentrates on the

technical calculation of risks without examining the long-term health promotion interventions that can help modify behavior and prevent *CHD*.

The aim of this research is to analyze the risk factors associated with coronary heart disease, especially after the *COVID-19* pandemic, and to explore the effectiveness of health promotion in changing the attitudes and lifestyles of at-risk individuals. This study is expected to contribute to formulating more effective prevention strategies for heart disease, particularly in terms of behavior change and community-based interventions. The findings will benefit policymakers and healthcare providers in designing more sustainable and evidence-based health promotion programs, as well as raising awareness of the importance of a healthy lifestyle in preventing cardiovascular diseases.

Research Methods

The research design in this study uses a *quasi-experimental* design, with the aim of assessing the effectiveness of early detection of heart disease and health promotion on changes in attitudes and lifestyles of residents at risk of heart disease after the *COVID-19* pandemic. This study uses a *pre-test* and *post-test* design, which involves measurements conducted only before and at the end of the intervention. *Pre-tests* were carried out on the intervention group to obtain baseline data that would be used to determine the effects of the independent variables. *Post-tests* were conducted on both the intervention group and the control group after the intervention was completed. The measurement results of the two groups were then compared. For the attitude and lifestyle variables, an evaluation was conducted with a time range of 30 days between the administration of the *pre-tests* and *post-tests*. This is in accordance with evaluation theory, which states that the interval between the two measurements should be a minimum of two weeks for knowledge and a minimum of one month for behavior.

Results and Discussion

This study was conducted with the aim of determining the effectiveness of early detection of heart disease and health promotion on changes in attitudes and lifestyles of residents at risk of heart disease after the Covid-19 pandemic. The respondents involved in this study amounted to 30 people. In this study, the gender of the respondents was all female. This happened because at the time of data collection it was deliberately not at the same time as the elderly posyandu or PTM posbindu. The purpose of making separate activities is to concentrate more on intervening and filling out the existing questionnaires. This is somewhat beyond the prediction that only those who can attend are women. The planned age distribution is at productive adulthood, which is between 20 and 50 years. The study took all respondents who came at the time. The average age of respondents was 43.33 with a variation of 5.23 years. The youngest age of the intervention group respondents was 34 years old and the oldest was 52 years old.

Table 1. respondents profile

variable	n	%
Education		
1. College	4	13.3
2. SMA		
3. SMP	23	76.7
4. SD	3	10.0
Early detection		

variable	n	%
1. Low	13	43.3
2. Medium	13	43.3
3. Height	4	13.3

Source: processed data

The most dominant distribution of the respondents' education level was 23 high school graduates (76.7%). Junior High School Graduates 10%). There are 13.3% of college graduates. The results of the early detection of cardiovascular disease using Jakarta cardiovascular risk distribution score can be seen from the results between low-risk and moderate-risk respondents having the same number of 13 people (43.3%) each. Only 4 people (13%) of respondents were at high risk. This is likely because many of the average respondents are in the 40-year-old range. The risk of heart disease will increase with age (Tiksnadi et al., 2018). When combined between medium and high risk, of course, this will give an idea that in the age of around 40 years the risk of disease is even greater. This will make the pain rate increase. The government's efforts to overcome this are to change factors that can be changed. (Reamy et al., 2018)

Table 2. Pain Rate

Knowledge	Mean	SD	P value
before intervention	13.47	2.4	0.000
after intervention	15	1.5	

Source: processed data

Based on the knowledge table. It can be seen that the provision of health promotion to the intervention group can increase the knowledge of the respondents by 1.5 points, from 13.47 (before the intervention) to 15 (after the intervention). The results of the T test were obtained p value = 0.000, meaning that statistically there was a significant difference between before and after the intervention.

Health Promotion provides knowledge to the community on how to prevent the occurrence of cardiovascular diseases. The increase in knowledge is expected to be followed by changes in attitudes and behaviors (Rumambi et al., 2018a) Respondents' knowledge in the study of heart disease can be seen to be that there are still many in the category of lacking. It is hoped that after getting early detection results and getting health promotion, it can increase knowledge that ends in lifestyle changes that become healthier. The attitude of the respondents in this study has shown a good attitude that reflects the desire to live a healthier life.

Table 3. Attitude

Attitude	Mean	SD	P value
Before intervention	88.13	2.7	0.004
After the intervention	88.95	7.6	

Source: processed data

Based on the attitude table. It can be seen that the provision of health promotion can change the attitude of the respondents by 0.8 points, from 88.13 (before the intervention) to 88.95 (after the intervention. The results of the T test were obtained p value = 0.004, meaning that statistically there was a significant difference between before and after the intervention.

Table 4. Lifestyle Tips

Lifestyle	Mean	SD	P value
Before intervention	66.03	12.9	0.004
After the intervention	71.62	8.5	

Source: processed data

Based on the lifestyle table, it can be seen that the provision of health promotion to the intervention group can change the respondent's lifestyle by 5.5 points, from 66.03 (before the intervention) to 71.62 (after the intervention). The results of the T test were obtained p value = 0.004, meaning that statistically there was a significant difference between before the intervention and after the intervention was carried out. Almost all of them have improved. This is in accordance with the purpose of providing health programs. Good knowledge adds motivation to make lifestyle changes.

Discussion

This study obtained data from early detection results using the Jakarta Cardiovascular score where half of the respondents were at moderate to high risk. The at-risk group is dominated by those at moderate risk. The moderate risk in respondents occurred on average due to the value of the Body Mass Index which was included in the category of overweight and lack of activity. A body that has excess fat will indirectly cause other changes in the body, so the risk of developing heart disease will increase. Risk factors occur in women who have a waist circumference of more than 89 cm and men 102 cm which is very susceptible to heart disease.

Overweight and obese status is associated with a higher risk of developing heart disease overall and heart disease subtypes such as coronary heart disease and heart failure. These findings are similar to previous research from S. Khan (Khan et al., 2018) which showed an increased risk of heart disease in overweight and obese respondents. The difference with this study is that for risk assessment, the Framingham score is not used but uses the Jakarta Cardiovascular score (JKI). The assessment using JKI here is not a cholesterol level check but only a blood sugar check at a time (Ridwanmo et al., 2020). In this study, most of the respondents also seemed to be lacking in physical activity (Ekelund et al., 2019; Guthold et al., 2020). Lack of physical activity leads to a nutritional imbalance in the body where fat remains deposited. The activities carried out are on average just daily routine activities that are not included in it which are devoted to sports (Powell-Wiley et al., 2021; Sattar & Preiss, 2018). The results of the study show that early detection of heart disease risk followed by the provision of health promotion is effective in changing attitudes and lifestyles. This can be seen from the increase in knowledge before and after health promotion. Increased knowledge will be able to change attitudes and subsequently lifestyles as an effort to prevent or develop heart disease in the future (Zhou et al., 2023).

Conclusion

Early detection of heart disease risks is crucial for timely intervention, allowing for proactive measures to be implemented, particularly for individuals with a history of *degenerative diseases*. Identifying risk factors early on enables healthcare providers to tailor preventive strategies, such as lifestyle changes, medication, and regular monitoring, which can significantly reduce the likelihood of cardiovascular events in the future. *Health promotion*, which includes education, behavioral interventions, and the promotion of heart-healthy habits, should be initiated as soon as risks are identified. By raising awareness and providing resources to at-risk populations, such efforts can help mitigate the long-term impacts of heart disease. Furthermore, it is essential that *health promotion* efforts be integrated into routine healthcare services, emphasizing early detection, lifestyle modifications, and regular follow-up. Collaborative efforts from healthcare providers, policymakers, and community organizations can play a pivotal role in

ensuring that heart disease prevention becomes a core component of public health strategies. Future research should explore the most effective communication strategies for delivering heart disease risk information, the role of digital health tools in monitoring and managing risks, and how to sustain long-term behavior change in populations at risk. Additionally, expanding *health promotion* programs to include mental health support, stress management, and personalized care plans could further enhance the overall effectiveness of heart disease prevention.

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