



THE IMPACT OF DECREASED PHYSICAL ACTIVITY AGAINST INCREASED RISK FACTORS FOR CARDIOVASCULAR DISEASE IN PEOPLE AGED 40-50 YEARS DURING THE PPKM PERIOD IN KAMPUNG MELAYU, EAST JAKARTA

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Abstract

The implementation of Community Restrictions (PPKM) is an effort by the Indonesian government to prevent the chain of transmission of Covid-19 that occurred in 2021. PPKM makes changes in lifestyle and physical activity. The benefit of physical activity for health is to prevent an increase in risk factors for chronic diseases such as cardiovascular disease. This study used risk factors for cardiovascular disease age, sex, lifestyle, diet, BMI, current blood glucose, total blood cholesterol, and blood pressure. Knowing the impact of decreased physical activity against increased risk factors for cardiovascular disease which can be controlled and which cannot be controlled at the productive age of 40-50 years. This study used the observation method on 50 participants from RW 01 Kampung Melayu, East Jakarta who were randomly selected. The study participants measured blood glucose levels, total cholesterol, blood pressure, BMI, and physical activity measurements during the PPKM period. Testing the correlation of the impact of physical activity with increased risk factors was conducted using the Wilcoxon signed rank test. Decreased physical activity occurred predominantly in all categories of participants caused by changes in lifestyle, sleep patterns, diet, and uncontrolled workload, causing increases in blood glucose levels, total cholesterol, BMI, and blood pressure. Statistical tests prove that there is a significant correlation between decreased physical activity and increased risk factors for cardiovascular disease. This study proves that there is an increase in cardiovascular disease risk factors associated with decreased physical activity and lifestyle changes in residents of RW 01 Kampung Melayu, East Jakarta.

Keywords: Cardiovascular Disease, Covid-19, Life's Style, Physical Activity, PPKM.

Abstrak

Pemberlakuan Pembatasan Masyarakat (PPKM) merupakan upaya pemerintah Indonesia untuk mencegah rantai penularan Covid-19 yang terjadi selama tahun 2021. PPKM membuat perubahan pola hidup dan aktivitas fisik. Manfaat aktivitas fisik bagi kesehatan ialah mencegah peningkatan faktor risiko penyakit kronis seperti penyakit kardiovaskuler. Faktor risiko penyakit kardiovaskuler yang digunakan pada penelitian ini adalah usia, jenis kelamin, pola hidup, pola makan, IMT, glukosa darah sewaktu, kolesterol darah total, dan tekanan darah. Mengetahui pengaruh penurunan aktivitas fisik terhadap peningkatan faktor risiko penyakit kardiovaskuler yang dapat dikendalikan dan tidak dapat dikendalikan pada usia produktif 40-50 tahun. Penelitian ini menggunakan metode observasi pada 50 peserta warga RW 01 Kampung Melayu, Jakarta Timur yang dipilih berdasarkan kriteria inklusi yang telah ditentukan. Peserta penelitian dilakukan pengukuran kadar glukosa darah, kolesterol total, tekanan darah, IMT dan pengukuran aktivitas fisik selama masa PPKM. Pengujian korelasi hubungan aktivitas fisik dengan peningkatan faktor risiko dilakukan menggunakan Wilcoxon signed rank test. Hasil: Penurunan aktivitas fisik terjadi secara dominan pada seluruh kategori peserta yang disebabkan oleh perubahan pola hidup, pola tidur, pola makan, dan beban kerja yang tidak terkontrol sehingga menyebabkan peningkatan kadar glukosa darah, kolesterol total, IMT, dan tekanan darah. Uji statistik membuktikan bahwa terdapat korelasi yang signifikan antara penurunan aktivitas fisik terhadap peningkatan faktor risiko penyakit kardiovaskuler. Penelitian ini membuktikan bahwa terjadi peningkatan faktor risiko penyakit kardiovaskuler berhubungan dengan penurunan aktivitas fisik dan perubahan gaya hidup pada warga RW 01 Kampung Melayu, Jakarta Timur.

Kata kunci: Aktivitas Fisik, Covid-19, Gaya Hidup, Penyakit Kardiovaskuler, PPKM.

INTRODUCTION

Social activity restriction, known as the PPKM period, is an effort by the Indonesian government to prevent the chain of transmission of Covid-19 from occurring during 2021 (Karnavian, 2021). The current PPKM activity was to limit activities in several business sectors



so that many workers have to carry out activities from home (online) or known as Work from Home (WFH) and all activity done at home is 100%. While some business and critical sectors still carry offline activities maximum of 50% (Moegiarso, 2021). Restrictions of social activity outside make changes to the lifestyle of most people, such as eating and sleep patterns, and physical activity. The benefits of physical activity for health are preventing an increase in the incidence of chronic diseases such as cardiovascular disease, osteoporosis, diabetes mellitus, cancer, and hypertension (Ciumărnean et al., 2022).

Cardiovascular disease is a condition of abnormalities in heart function caused by the narrowing of blood circulation in the heart organ, thereby disrupting heart rhythm (Tsao et al., 2022). The effects of cardiovascular disease are inhibition of the distribution of oxygen to all body tissues including the brain and severe chest pain (Tsao et al., 2022). Risk factors for cardiovascular disease are classified into two, that are risk factors that can be controlled and risk factors that cannot be controlled. Risk factors that can be controlled are blood pressure, total blood cholesterol levels, transient blood glucose levels, smoking habits, body weight, physical activity, diet, sleep patterns, and stress. Risk factors that cannot be controlled are age, gender, family history of the disease, and race (Ruan et al., 2018). The death rate caused by cardiovascular disease worldwide in 2021 according to WHO is 17.9 million people or the equivalent of 32% (World Health Organization (WHO), 2021). In Indonesia, the death rate caused by cardiovascular disease reaches 651.481 per year consisting of 331.349 deaths caused by stroke and 50.620 deaths caused by other cardiovascular diseases (Margarini, 2021).

Currently, deaths caused by cardiovascular disease are not only cases that occur in the elderly, according to previous studies and according to data from the Indonesia Family Life Survey (IFLS) explaining that the incidence of cardiovascular disease in people of productive age is found to be 1.30% (Setyo Nugroho et al., 2022a). At a productive age, the organ's function should be in good condition, if there is a case of cardiovascular disease at a productive age, this is due to the ineffectiveness of controlling risk factors, both those that can be controlled and those that cannot be controlled early on (Setyo Nugroho et al., 2022).

Lifestyle changes during the PPKM period such as decreased physical activity followed by changes in eating and sleeping patterns, as well as increased stress in the productive age population 40-50 years, are thought to trigger an increase in cardiovascular disease risk factors. Measurement of physical activity was carried out using the International Physical Activity Questionnaire (IPAQ) score and dividing physical activity criteria into 3 criteria, there are low, medium, and high (Maddison et al., 2007). Assessment of the participant's lifestyle was carried out by direct interview using a questionnaire. Measuring transient blood glucose levels while, total blood cholesterol levels were carried out using the Point of care testing (POCT) method, and blood pressure measurements using a digital sphygmomanometer. BMI measurement by the count of weight and height directly. The research was conducted for 1 day at one of the community units in the Kampung Melayu area, East Jakarta.

Therefore the aim of this study was to examine the impact of decreased physical activity during the PPKM period against increased risk factors for cardiovascular disease. Lifestyle changes that will be measured are physical activity, eating patterns, sleep, and stress events. while cardiovascular disease risk factors were measured by increasing glucose levels, total cholesterol levels, BMI, and blood pressure.

MATERIAL AND METHOD

This research was conducted using the observational method. This design was chosen because we observed the behavior and interactions of research subjects that occur at one time (real-time). This research studied the description of the impact of physical activity and lifestyle



during PPKM on increasing risk factors for cardiovascular disease at the same time in two groups of participants who are undergoing WFH and not.

The research will be carried out on June 2022, and the samples of this research are participants aged 40-50 years old. All participants' activity during the PPKM period is measured in IPAQ score, transient blood glucose, and total blood cholesterol is measured in the POCT method, blood pressure measurements using a digital sphygmomanometer, and BMI measurement by the count of weight and height directly. This research was conducted for 1 day at one of the community units in the Kampung Melayu area, East Jakarta.

Data analysis in this study was carried out using SPSS version 26, data normality was tested using Kolmogorov-Smirnov and testing the impact of physical activity and transient blood glucose levels, total blood cholesterol levels, blood pressure and BMI using the Wilcoxon signed rank test.

RESULT AND DISCUSSION

Participant data was taken in research activities. Measurement of physical activity data was carried out using the IPAQ score. Lifestyle data measurement is done by questionnaire. Data on cardiovascular disease risk factors such as blood glucose values, blood cholesterol values, and blood pressure were carried out by direct examination of the participants. The research results are presented in tabular form and the results have been processed statistically using SPSS. The results of the research are in Table 1-5 below. Here are the results of his research.

Table 1. Participant data based on gender and type of work

Parameters	N	Statistic (P=0,05)
Gender		
Women	22	0,068
Men	27	
Job		
Unemployed	15	0,616
Self-employed	13	
Office Employees	22	

Table 1 is participant data based on gender and type of work that explain the participant were 22 males and 27 females with a job distribution consisting of 15 unemployed participants who didn't have the job that provides money, 13 participants who were self-employed (entrepreneurs), and still worked like usual during to PPKM period, and 22 participants who work as an employee, but 8 participants worked at critical sector office so they still came to their office along PPKM Period, and 14 participants were doing WFH.

The research was conducted on June 18 2022 at RW. 01 Gang Anwar, Kampung Melayu, East Jakarta, obtained 67 people, but participants who matched the criteria in this research were participants who were aged 40-50 years, either had a job either as a self-employed (entrepreneur) or an office employee, and an unemployed so they could be correlate with physical activity and risk factors for cardiovascular disease.

Gender differences exist in several diseases, according to previous research men have a higher risk of exposure to cardiovascular disease than women (Bots et al., 2017), but currently, both men and women have the same risk of increasing risk factors of cardiovascular disease because currently men and women have relatively similar lifestyles, eating patterns and activities, this is what causes both of them to have the same increased risk of cardiovascular disease risk factors. Research in China in 2019 proved that men and women have different tendencies toward types of cardiovascular disease. According to that research, women tend to



have cardioembolic strokes, while men have a higher tendency to have lacunar strokes, carotid stenosis, and abdominal aortic aneurysms (Gao et al., 2019). In this study, most of the participants, both men, and women had a risk of cardiovascular disease, but in statistical testing, there was no significant impact of cardiovascular risk factors in both men and women. Apart from age, this research found to have no significant correlation between physical activity, type of work, and risk factors for cardiovascular disease. This research proves that during the PPKM period, all participants that worked from home (WFH), participants who were entrepreneurs (self-employed), and participants who did not have work had the same risk of increased risk factors for cardiovascular disease, this was caused by lifestyle changes such as decreased physical activity and changes in diet. Restrictions on community activities outside the home have resulted in the cessation of the activities of most residents of RW 01 Kampung Melayu Subdistrict, who usually have free activities outside such as walking, running, and other physical activities.

Table 2. Distribution of Participants Based on Physical Activity During the PPKM Period

Physical Activity Category	Amount (Participant)
Low	22
Medium	17
High	11

Table 2 describes the distribution of research participants based on routine physical activity in one week during the PPKM period. IPAQ divides into three activity categories, there are low, medium, and high. High physical activity is a level of physical activity equivalent to about one hour of moderate to vigorous physical activity per day. Vigorous physical activity includes exercising with heavy exercise, lots of movement, and other sports consistently for 30 minutes a day for 3-7 days so the MET value ratio for high physical activity is 1.500-3.000 MET/minute per week. Moderate physical activity is a physical activity that is done for at least half an hour every day, such as walking for at least 30 minutes per day for 3 to 5 days, so the MET ratio value for moderate activity is 600 MET/minute per week. Meanwhile, MET values under the two categories of medium and high are included in the category of low physical activity (Maddison et al., 2007). 22 participants had low physical activity, 17 participants had moderate physical activity, and the remaining 11 participants had high physical activity. Physical activity data were obtained from direct interviews with participants, the contents of the questionnaire led to activities carried out every day during the PPKM period, lifestyles such as diet, types of food, and sleep patterns lived during the PPKM period. The calculation of physical activity scores is obtained from the IPAQ guide so that physical activity data can be divided into three categories, namely low, medium, and medium (Dharmansyah & Budiana, 2021).

Other data used in this research were physical activity scores, lifestyle, and laboratory results such as transient glucose levels, total blood cholesterol, body mass index (BMI), and blood pressure which are risk factors that can be controlled. Measurement of physical activity in this study was carried out using the International Physical Activity Questionnaire (IPAQ) score, which is an instrument for monitoring physical activity in adults which are the age range of 15-69 years that can be used by all countries. The IPAQ score is obtained from the multiplication between the time of physical activity and the type of physical activity called MET (Metabolic Equivalent) minutes per week, so it is assumed that 1 MET is equivalent to 1 Kcal/kg/hour (Maddison et al., 2007). To get an IPAQ score variable, it is necessary to by 3.3



for low physical activity, 4 for moderate physical activity, and 8 for high physical activity (Maddison et al., 2007).

Direct interviews were used to determine the participants' physical activity in this research. The questions in the interview referred to three categories of physical activity. In this study, participants with high physical activity participated in strenuous exercises such as lifting heavy weights (workout), aerobics, soccer, badminton, and fast cycling for 30 minutes regularly a week. Moderate activity is participants who exercise such as walking regularly, swimming, and leisurely cycling for at least 30 minutes routinely for 7 days. Low physical activity is carried out by participants who rarely exercise, either walking regularly for at least 30 minutes per day or sitting for 7-8 hours per day. All activities undertaken by participants that are more than 10 minutes will be counted, but activities that are less than 10 minutes are not counted. Before calculating the MET value, convert all physical activities to minutes, then assign a value to each activity. Regular walking for at least 10 minutes multiplied by 3.3, moderate activity multiplied by 4, vigorous activity multiplied by 8, then multiplied by the total minutes of physical activity that has been done and the number of days the activity was carried out. The results of participant interviews regarding physical activity are described in Table 2.

During the PPKM period, all dominant activities were carried out at home, which caused a lot of physical activity to decrease, if the number of calories that enter the body every day during PPKM is not regulated with daily calorie needs and daily physical activity then it will be at risk experience an increase in calories that are not used in the body so that they are at risk of experiencing weight gain which is one of the factors that cause cardiovascular disease. According to Stefania's research, et al stated that working from home or WFH can hurt health which can increase risk factors for cardiovascular disease (di Fusco et al., 2021). Physical activity plays a role in preventing cardiovascular disease, a decrease in physical activity at the age of 35-65 years is a big risk of contracting cardiovascular disease. (Shakoor et al., 2023). WHO recommends doing at least 150 minutes of physical activity per week for ages 8-64 years. Moderate physical activity has been shown to improve body fitness, especially the cardiorespiratory system (Rehman & Ahmad, 2020; Shakoor et al., 2023)

Table 3. Distribution of participants based on lifestyle during the PPKM period

Life Style Parameters	Amount	
	Yes	No
Active Smoker	12	42
Passive Smoker	23	27
Consumption Of Alcohol	8	42
Junk food Consumption	28	22
High-Calorie Food consumption	39	11
Sleep Disorder	29	21
Stress	28	22

Table 3 explains that during the PPKM period, 39 participants consumed high-calorie foods, while 28 participants often consumed junk food. A total of 12 participants were active smokers while 23 participants were passive smokers, both of whom have the same increased risk of cardiovascular disease (Khorammdad et al., 2019). There is one participant who regularly consumes alcohol per week, regular consumption of alcohol can also increase the risk of cardiovascular disease (Larsson et al., 2020). During the PPKM period, 29 participants experienced changes in sleep patterns, this was due to the workload during WFH being more than working in an office, causing longer working hours than before WFH, and caused by stress during the pandemic. The greater workload made most of the WFH participants experience stress, 20 participants were workers and 8 others were housewives.



In addition to explaining the participant's physical activity during the PPKM period, this research also looked at the participants' lifestyles during the PPKM period. According to research by Giuntella, et al, during the Covid-19 pandemic, there was an influence on daily life, especially in productive age, there were significant changes in physical activity, sleep time, and mental health (Giuntella et al., 2021). This research took some data about lifestyle during the PPKM period at the productive age of RW 01 residents which is described in Table 3.

Consumption of high-calorie and junk food if not balanced with appropriate physical activity, could lead to an increased risk of cardiovascular disease (Kazi et al., 2020). The nutritional composition of junk food is not balanced for the needs of the body's activities per day. In addition to smoking habits, drinking alcohol, and consuming high-calorie foods and junk foods, disturbed sleep patterns can also increase the risk of cardiovascular disease (Laksono et al., 2022). During the PPKM period, most participants experienced, sleep patterns and stress changes. Previous research stated that stress caused by work, individual social isolation, and loneliness, can increase the risk of heart disease, therefore stress management is needed to prevent an increased risk of cardiovascular disease (Steptoe & Kivimäki, 2012).

Table 4. Distribution of study participants based on cardiovascular disease risk factors

Parameter	N= 50					
	Normal	Abnormal	Min	Max	Average	SD
Transient blood glucose (Normal: <180 mg/dL)	18	32	79	327	177.56	60.77
Total blood Cholesterol (Normal: <200 mg/dL)	24	26	107	318	206.48	48.38
Systole (Normal: 120 Mm/Hg)			96	184	136.62	19.82
Diastole (Normal: 80 Mm/Hg)	19	31	60	117	83.18	13.20
BMI (Normal: :18,5-22,9 Kg/m ²)	16	34	18	32,5	24.4	3.68

Table 4 explains that most participants have abnormal BMI, namely 34 people and 16 people had normal BMI, with a minimum BMI value of 18 kg/m² and a maximum value of 32.5 kg/m². This table also explained that as many as 32 participants had high blood glucose levels, and 4 of the 32 participants had a history of Type 2 Diabetes Mellitus before the PPKM period so 28 participants experienced a significant increase in blood glucose during the PPKM period. Other risk factors are blood cholesterol and blood pressure, table 4 states that as many as 26 participants experienced increased cholesterol at productive age, the minimum value for total blood cholesterol was 107 mg/dL and the maximum value was 318 mg/dL. Correlating with an increase in blood pressure, 31 participants experienced an increase in blood pressure out of a total of 50 participants, the minimum systolic value was 96 Mm/Hg and the maximum was 184 Mm/Hg then the minimum diastole value was 68 Mm/Hg and the maximum value was 117 mmHg.

The effect of physical activity on risk factors for cardiovascular disease is proven by examining transient blood glucose levels at the time, total blood cholesterol, and blood pressure in 50 participants. Table 4 describes the distribution of study participants based on risk factors for cardiovascular disease. In 2020 research proved that during the quarantine period in Italy, several people experienced an increase in body weight caused by decreased physical activity and excess food consumption during the Covid19 quarantine period (Mattioli et al., 2020). Obesity is a condition of being overweight that poses a health risk, normal BMI is less than 24, Overweight BMI is more than 25, and an obese BMI is more than 30. Being overweight is one of the increased risk factors for cardiovascular disease and diabetes mellitus (Mattioli et al., 2020; Önmez et al., 2020), in this research it was proven that an increase in BMI also correlates with an increase in blood glucose, cholesterol, and blood pressure. The minimum blood glucose



value in this study was 79 mg/dL and the maximum value was 327 mg/dL. Diets with lots of fatty meat consumption, and artificially sweetened drinks, lack of physical activity are some of the causes of increased blood glucose levels (Rehman & Ahmad, 2020b). Apart from being caused by the factors of the participants' daily habits, the increase in blood glucose levels was also due to the awareness of the participants on dominant health focused on increasing the body's resistance so as not to contract Covid19 by consuming several multivitamins, while the awareness to check blood glucose, total blood cholesterol and blood pressure independently at home or do a medical check-up at a health facility (Lim et al., 2021; Rehman & Ahmad, 2020). Research in 2020 states that an increase in decreased physical activity during the Covid19 pandemic can increase the risk of obsession and increase blood glucose which is the beginning of an increased risk of cardiovascular disease. (Lim et al., 2021; Önmez et al., 2020). The results of this study stated that most of the participants who experienced a decrease in physical activity during the PPKM period also experienced an increase in blood glucose levels.

Similar to an increase in blood glucose, an increase in total cholesterol and blood pressure is also caused by changes in lifestyle, decreased physical activity, and consumption of foods that lack nutrition. Similar research in Slovenia stated that most of their people experienced a decrease in their HEI (Health Eating Index) and physical activity during the quarantine period when compared to the period before the Covid 19 outbreak, although they still maintained increased consumption of fruit, vegetables, protein from animal meat, and seafood to supplement daily energy, and it turns out that the habit of reducing healthy food consumption still occurs after the quarantine period ends and is followed by a decrease in physical activity during the quarantine period, this causes an increase in blood glucose, total cholesterol, LDL and blood pressure after the quarantine period (Jontez et al., 2021; Mattioli et al., 2020). From this study, we can conclude that it is very important to maintain a balanced diet, lifestyle, and daily physical activity to prevent increased risk factors for cardiovascular disease.

Table 5. Statistical of the impact of physical activity and several risk factors for cardiovascular disease

Parameter	Statistic	
	Z	P = 0,05
Transient blood glucose	-5.087 ^b	
Total blood Cholesterol	-5.420 ^b	
Systole	-6.154 ^b	P=0.000
Diastole	-6.155 ^b	
BMI	-6.154 ^b	

Table 5 describes the results of the correlation test between physical activity and cardiovascular disease risk factors, namely blood glucose, cholesterol, and blood pressure using the Wilcoxon signed rank test and the results obtained were $P < 0.05$, meaning that there was a significant correlation that decreased physical activity over a long period can lead to increased risk factors for cardiovascular disease.

Based on a correlation test between physical activity and cardiovascular disease risk factors using the Wilcoxon signed rank, there was a significant correlation that decreased physical activity over a long period can lead to increased risk factors for cardiovascular disease. A similar study conducted in Turkey in 2020 had the same opinion, that is, several people experienced changes in their lifestyle and diet during the Covid-19 quarantine period which led to an increase in cardiovascular disease risk factors. The increase in risk factors during the Covid-19 quarantine period was fairly rapid and significant. Another reason that can support this opinion is the community's limitations in visiting health facilities, including hospitals, clinics, and pharmacies due to restrictions on activities outside the home and anxiety about Covid-19 infection, which causes people to experience a decrease in awareness to carry out



independent health checks, increased stress on the community during the quarantine period is also a contributing factor to the increased risk of cardiovascular disease (Önmez et al., 2020).

CONCLUSION

During the PPKM period, there was an increase in risk factors for cardiovascular disease that can be controlled, such as glucose levels, total cholesterol, blood pressure, and BMI this is caused by decreased physical activity that occurs in participants. Risk factors for cardiovascular disease that cannot be controlled are age and gender. In this study, the participants were of productive age with a range of 40-50 years. There is no impact of age and gender with an increase in cardiovascular disease factors, this is because both men and women experience lifestyle changes evenly so there is no significant difference. so that it can be concluded that the increase in cardiovascular disease risk factors, such as increased glucose levels, total cholesterol levels, and blood pressure caused by lifestyle changes. In addition to lifestyle changes, there was a decrease in participants' awareness of carrying out health checks at health facilities during the PPKM period. So it can be concluded that there is an impact of physical activity and an increased risk of cardiovascular disease.

SUGGESTION

Further research is needed to add research data such as data on heart and kidney function, to find out more about the effect of limiting physical activity during the PPKM period on health.

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