30-MINUTE LEISURE WALK’S EFFECTIVENESS ON THE PRESSURE OF BLOOD AND PULSE ON HYPERTENSION

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ABSTRACT

Background: Today’s lifestyle shift is really alarming. Many people alter their lifestyles without considering the effects that may result or the long-term effects of unhealthful lifestyle modifications. These lifestyle modifications involve both food and exercise.

Aim: In the Puskesmas area in Pasar Minggu District, the goal of this study is to ascertain the impact of a 30-minute leisurely stroll on changes in blood pressure and pulse in hypertension patients.

Method: This study is quantitative and uses a quasi-experimental approach to compare the performance of two groups. The 30-minute leisurely walking intervention was tested before and after in this study to see how it affected blood pressure and pulse in order to avoid hypertension. Blood pressure and pulse in the control group were also cross-sectionally analyzed.

Findings: Blood pressure and pulse in the control group, or those who did not participate in the activity, did not significantly differ from each other after 30 minutes of walking.

KEYWORDS

leisure walk, blood pressure, pulse, hypertension

INTRODUCTION

The change in lifestyle today is very concerning, many individuals change their lifestyle without thinking about the impact that will occur or the long-lasting impact of unhealthy lifestyle changes. The lifestyle changes include physical activity and food. The impact of this lifestyle change is the beginning of the development of Non-Communicable Diseases. Non-Communicable Diseases are chronic diseases, not transmitted from person to person (Marbun et al., 2021). NCDs have a long duration and generally develop slowly. The four main types of NCDs according to WHO are cardiovascular disease (coronary heart disease, stroke), cancer, chronic respiratory diseases (asthma and chronic obstructive pulmonary disease), and diabetes (WHO, 2015). In Indonesia the data for NCDs are asthma, COPD, cancer, DM, hyperthyroidism, hypertension, coronary heart disease, heart failure, stroke, chronic kidney failure, kidney stones, and joint/rheumatic diseases. The average cause of the development of this disease is a change in a person's lifestyle (Kemenkes RI, 2012).

Hypertension is a condition when blood pressure in blood vessels increases chronically (Astutik & Mariyam, 2021; Williams & Thompson, 2013). It can happen because the heart works harder to pump blood to meet the body's oxygen and nutritional needs (Sulung & Poluan, 2018). Hypertension ranks 6th on the list of Non-Communicable Diseases in Indonesia (Kemenkes RI, 2012).

The prevalence of hypertension in Indonesia obtained through measurements at the age of ≥18 years was 25.8 percent, the highest in Bangka Belitung (30.9%), followed by South Kalimantan (30.8%), East Kalimantan (29.6%) and West Java (29.4%). The prevalence of hypertension in Indonesia obtained through a questionnaire diagnosed by health workers was
9.4 percent, who were diagnosed by health workers or were taking medications by 9.5 percent. So, there are 0.1 percent who take the medicine themselves. Respondents who had normal blood pressure but were taking hypertension medication were 0.7 percent. Hence, the prevalence of hypertension in Indonesia is 26.5 percent (25.8% + 0.7%) (Kemenkes RI, 2012).

Hypertension in Indonesia is not the first cause of death but the number of morbidity and hospitalization rates, is still quite high, the number of deaths in hospitals due to hypertension was 6.69% in 2010. Meanwhile, the number of hypertension patients hospitalized decreased from 2009 by 2.42% to 1.91%. However, new cases in the outpatient unit of hypertension occupied the first position, namely 3.13% in 2010, decreasing from 2009 of 3.66% (Kemenkes RI, 2012).

The high prevalence of hypertension in Indonesia and in the world makes health workers think of a management to reduce the incidence of hypertension. In the treatment of antihypertensive can reduce the risk by 30% - 40%, reduce ischemic heart disease by 20% - 25% and cardiovascular-related diseases by 25%, but in addition to management antihypertensive treatment for lifestyle changes such as physical activity is also carried out. For someone who is not active in doing physical activity will have a 30% - 50% greater risk of developing hypertension (Iellamo & Volterrani, 2010).

It is important for everyone to increase their interest and strength training to treat risk factors and hypertension (Ambardini, 2015). The main recommendations and secondary prevention of hypertension are with dynamic resistance training, for example aerobic, walking, swimming and cycling (Ardiana, 2021). Training with a low resistance of 40-50% expressed as moderate intensity with many repetitions can be recommended.

Being physically active is the most important to prevent or control high blood pressure (Cristanto et al., 2021). It doesn't take much effort to become physically active because it takes only 30 minutes with moderate physical activity on almost every day of the week examples of kegiatan i.e. walking, cycling, sweeping leaves and gardening.

From the results of a study of 41 healthy women who were given the intervention to walk and run for 15 to 20 minutes with a distance of 1600 meters for 5 months, it showed results that a significant decrease in blood pressure and pulse was obtained before the implementation of the intervention with after the implementation of the intervention. It is because both walking and running cause activity from the sympathetic nerves that provide stimulation to the acceleration center of the heart so that blood vessels that were vasoconstriction can become wide and increase blood flow so that the pressure can be lowered, namely systolic pressure of 10.4 mmHg and diastolic pressure of 6.8 mmHg (Munieskhar et al., 2014).

There are quite a lot of hypertension sufferers in Pasar Minggu District itself, Hypertension itself is included in the 10 NCDs (Non-Communicable Diseases) in Pasar Minggu District, and is ranked 2nd after Upper Respiratory Tract Infections (ARI) with a total number of sufferers per year 2014, namely13,483 or 8.74% (Data from Puskesmas Pasar Minggu District, 2014). The role of nurses is to provide education to people with hypertension so that they can change the expected lifestyle, in order to get an increase in heart work and improve the quality of life.

This study aims to determine the effect of a 30-minute leisure walk on changes in blood pressure and pulse in hypertensive patients in the Puskesmas environment of Pasar Minggu District.
METHOD

This research is a quantitative study with a quasi-experimental design which is carried out with two groups comparison, namely where a study is carried out with two groups; one group was given treatment and another group as control was later observed. The purpose of this study is to see whether there is an influence between independent variables on dependent variables using intervention groups and control groups. The research was designed with pretest and post test to determine the effect of the 30-minute leisurely walking intervention on blood pressure and pulse to prevent hypertension, as well as analyze blood pressure and pulse in the control group cross-sectionally. In this study, it used an effect test, a paired difference test and an independent difference test between respondents who were given a 30-minute leisurely walk treatment, as well as a control group on blood pressure and pulse in hypertensive patients.

The population in this study was primary hypertension sufferers who were in the Pasar Minggu sub-district which consisted of 9 urban villages. The sample was calculated based on the number of populations that have not been calculated before, that is, by using the formula:

\[ N = 50 + 8X \]

Information:
N: Sample size  
X: Number of independent variables in the study

Based on this formula, the results are obtained:
N = 50 + 8 x 5 (Number of independent variables i.e. 30-minute leisure walk)  
= 90 respondents

However, the possibility of reduced samples is anticipated so that the precision of the study is maintained. The sample was divided into 2 groups, namely the intervention group and the control group, namely with a comparison formula according to Pollitt (2001) which was 75%: 25%, namely 75 respondents as interventions and 25 respondents as control groups.

This research was conducted in the wilayah environment of the Puskesmas Pasar Minggu District, South Jakarta. Puskesmas Pasar Minggu Subdistrict is a reference Puskesmas from 9 Puskesmas Subdistricts under the scope of Pasar Minggu District, which is the only Puskesmas in the Pasar Minggu District area that has complete medical support equipment. The research was conducted from April 2015 to August 2015.

The data analysis strategy used in this study is divided into several stages, namely preanalysis phase, preliminary phase assessment, preliminary action, principal analysis, interpretive phase (Mak, 2018).

RESULTS AND DISCUSSION

Bivariate Analysis Results of Paired Different Tests and Independent Different Tests

The results of the analysis of different tests in pairs and different tests in pairs using paired t-tests were carried out to determine the differences in blood pressure and pulse in the control group simultaneously before and after the intervention (Before-After).
**First Day Blood and Pulse Measurements of the Intervention Group with the Control Group**

The results of the analysis of paired different tests and independent different tests can be seen in table 1.

<table>
<thead>
<tr>
<th></th>
<th>TD hr 1 Post Test - TD hr 1 Pre Test</th>
<th>Pulse hr 1 Post Test - Pulse hr 1 Pre Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z</td>
<td>-.218&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-1.000&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Asymp. Sig. (2-tailed)</td>
<td>.827</td>
<td>.317</td>
</tr>
</tbody>
</table>

*Source: Primary Data Analysis, 2015*

From Table 1 it can be concluded that between the blood pressure of the first day of the pre-test and the post test there was no significant result between blood pressure and pulse with a p value for blood pressure 0.827 (>0.05) and a p pulse of 0.317 (>0.05).

From the results of RCT by several studies showed that after physical exercise there was a decrease in blood pressure in systolic and diastolic, this study summarized 15 researchers, 5 of whom showed insignificant results between blood pressure before exercise and after exercise, 10 other researchers showed that although there was a very small difference of 0.02 – 0.03 mm after post-workout but these results were very significant and had meaningful implications for health. heart, but this depends on the type of physical exercise chosen.

<table>
<thead>
<tr>
<th></th>
<th>Blood Pressure</th>
<th>Pulse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mann-Whitney U</td>
<td>333.000</td>
<td>513.000</td>
</tr>
<tr>
<td>Wilcoxon W</td>
<td>633.000</td>
<td>2166.000</td>
</tr>
<tr>
<td>Z</td>
<td>-4.225</td>
<td>-3.899</td>
</tr>
<tr>
<td>Asymp. Sig. (2-tailed)</td>
<td>.000</td>
<td>.000</td>
</tr>
</tbody>
</table>

*Source: Primary Data Analysis, 2015*

From table 2, it can be seen that there is a difference between the blood pressure of the first day of the intervention group compared to the first day of the control group, namely the p value = 0.000 (<0.05) and a significant difference between the pulse of the first day of the intervention and the control with a value of p = 0.000 (<0.05).

Blood pressure will drop after one exercise session, from 12 study subjects in hypertensive patients and patients with normotence, the results of blood pressure measurements showed maximum exercise tests, hypertensive patients experienced a decrease in blood pressure ± 3.5 mmHg in systolic and ± 6.5 mmHg in diastolic pressure, while in respondents with normotence decreased ± 3.1 mmHg in systolic pressure and ± 2.1 mmHg in diastolic pressure. It showed differences in the control group who did not perform physical exercise, they had no change in blood pressure either systolic or diastolic.

The results of another study on 9 normotensive women and 7 hypertensive women showed that there was a decrease in cytolic blood pressure in hypertensive women, namely 63.1 mmHg and diastolic pressure of 61.8 mmHg, in women with normotensive there was a systolic
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decrease of 62.7 mmHg and a diastolic decrease of 61.6 mmHg. It was significant compared to the control group i.e. women who did not practice physical exercise.

**Blood Pressure and Pulse Measurements of the Last Day of the Intervention Group with the Control Group**

The results of the analysis of the paired different test and the independent difference test on the measurement of blood pressure and pulse on the last day were intervened then compared with the last day of the control group can be seen in tables 3 and 4.

<table>
<thead>
<tr>
<th>Table 3. Results of the Last Day of Pre and Post Test Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TD Pre – Post Test</strong></td>
</tr>
<tr>
<td>Z</td>
</tr>
<tr>
<td>Asymp. Sig. (2-tailed)</td>
</tr>
</tbody>
</table>

*Source: Primary Data Analysis, 2015*

From Table 3, it was found that the results of the test analysis of the difference between blood pressure on the last day of the intervention group before the intervention and after the intervention there was no significance can be seen from the value of p = 0.796 (>0.05). Thus, there was no significant pulse between before and after the intervention with a value of p = 0.317 (>0.05)

<table>
<thead>
<tr>
<th>Table 4. Results of Intervention Analysis with Last Day Control</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TD</strong></td>
</tr>
<tr>
<td>Mann-Whitney U</td>
</tr>
<tr>
<td>Wilcoxon W</td>
</tr>
<tr>
<td>Z</td>
</tr>
<tr>
<td>Asymp. Sig. (2-tailed)</td>
</tr>
</tbody>
</table>

*Source: Primary Data Analysis, 2015*

From table 4, the results of the analysis were obtained, namely the difference in blood pressure and pulse on the last day after the intervention on blood pressure measurement, namely p = 0.578 (>0.05) and on measuring the pulse with a value of p = 0.255 (>0.05) there was no significant result between blood pressure and pulse on the last day with the control group.

**First Day Blood and Pulse Pressure Measurement with Last Day of Intervention**

The results of the analysis of the test in pairs in the intervention group before the intervention on the first day with after the intervention on the last day, can be seen in table 5.

<table>
<thead>
<tr>
<th>Table 5. The First Day Analysis Compared to Last Day</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Blood Pressure</strong></td>
</tr>
<tr>
<td>Z</td>
</tr>
<tr>
<td>Asymp. Sig. (2-tailed)</td>
</tr>
</tbody>
</table>

*Source: Primary Data Analysis, 2015*
From table 5, the results showed that there was a significant difference between the first day before the intervention and the last day after the intervention on blood pressure with a p value = 0.000 (<0.05) but there was no significant difference in the pulse group between the first day and the last day of the intervention group with a p value = 0.083 (>0.05).

From the results of the analysis test with paired different tests in the intervention group with data before and after the intervention, significant results were obtained, namely the value of p = 0.000 meaning that this showed the effectiveness of a 30-minute leisure walk in the intervention group.

This is in accordance with the study conducted by Sohn et al. (2007) after a 30-minute walking intervention showed the results that systolic blood pressure decreased by 9.0% compared to the control group and decreased by 7.42% in diastolic pressure compared to the control group, this researcher argued that walking was the safest to do by patients with hypertension because patients with hypertension had other problems, such as being overweight and other symptoms of hypertension. The effect of doing physical activity on hypertension is slight or small but very significant, a person with hypertension can lower blood pressure by about 3/2 mmHg in those who have normotence and 7/6 mmHg in those who have hypertension.

The American College of Sport Medicine (ACSM, 2010) mentioned that in cross sectional studies in China and Japan that walked to work, it was stated that by walking, the systolic and diastolic pressure would decrease by 3.0/2.4 mmHg at rest time and lower the pressure by 3.3/3.5 mmHg during the day. This study also mentioned that in addition to a decrease in blood pressure, this exercise can also lose weight, body fat and waist circumference.

From the results of the study, it was stated that no significant results between the pulse frequency before the intervention and after the intervention can be seen with a p value = 0.083. However, if you look at the numbers from the primary data taken, there are differences or there is a decrease in numbers or an increase that leads to better, but it is still considered normal.

In a study conducted at Harvest University, it was stated that 27% of people with hypertension had a pulse of >80 times / minute, 15% had a pulse frequency of >85x / minute, for a certain number of patients using a pulse was considered the right way to see hypertension, but the pulse rate was more associated with an increase in cardiovascular or other coronary artery diseases, this study said pulse measurements were taken only to see patient compliance against treatment compared to in the direction that affects blood pressure (Reule & Drawz, 2012).

In another study, it was stated that, after the intervention of walking or running, the pulse will only be seen significantly after 5 years of research, while systolic and diastolic blood pressure decreases at the time after the exercise is done (Munieskhar et al., 2014).

**Blood Pressure and Pulse in the Control Group**

There was no difference between the blood pressure and pulse of the first day of control and the last day of control, the control group continued to carry out daily activities as usual by not doing additional physical exercise activities as in the intervention group.
Table 6. Blood Pressure and Pulse Analysis in the Control Group Before and After the Study was Carried Out

<table>
<thead>
<tr>
<th></th>
<th>Blood Pressure</th>
<th>Pulse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z</td>
<td>-.707&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-2.449&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Asymp. Sig. (2-tailed)</td>
<td>.480</td>
<td>.014</td>
</tr>
</tbody>
</table>

Source: Primary Data Analysis, 2015

From the statistical results of the test of differences in the control group before the study began with after the research was completed, it was seen that there was no significant difference between blood pressure and pulse.

Differences in Blood Pressure and Pulse Before and After Intervention Week I and Week II

The results of the analysis using Wicoxon between the first week of the intervention and the second week of the intervention can be seen in the following table.

Table 7. Wicoxon Test Results on Differences in Blood Pressure and Pulse Before and After Intervention Viewed from Sunday in Group Unintervened

<table>
<thead>
<tr>
<th></th>
<th>Week I Blood Pressure</th>
<th>Week I Pulse</th>
<th>Week II Blood Pressure</th>
<th>Week II Pulse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z</td>
<td>-3.298&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-1.000&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-1.980&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-1.732&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Asymp. Sig. (2-tailed)</td>
<td>.001</td>
<td>.317</td>
<td>.048</td>
<td>.083</td>
</tr>
</tbody>
</table>

Source: Primary Data, 2015

Based on table 7, it can be concluded that:
1) The results of the independent test between blood pressures in week I had a significant value of 0.001 (<0.005) these results indicated that there was a significant change in blood pressure in the first week of the respondents’ intervention;
2) The results of the independent test between the pulse before and the pulse after the first week had a value of 0.317 (>0.005) this result was not significant which means that there was no significant change in the pulse in the first week of the intervention;
3) The results of the independent test between the blood pressure of week I and Week II have a value of 0.048 (>0.005) which means that it is not significant, this shows that the blood pressure in week I with week II when compared will get the same results; and
4) The results of the independent test between the pulse in week I and Week II had a value of 0.083 (>0.005). It showed that there was no significant difference between the pulse of week I and the pulse of week II.
**Multivariate Analysis Results**

Multivariate Analysis in this study used Multiple Linear Regression, which in this analysis was to see the effect of variable X (30 Minutes Leisure Walk) on variable Y (Age, Gender, BMI, Blood Pressure, and Pulse).

**Table 8. Multiple Linear Regression Test Results between Variables X and Y**

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R Square</td>
</tr>
<tr>
<td>Systolic</td>
<td>0.062</td>
</tr>
<tr>
<td>Diastolic</td>
<td>0.088</td>
</tr>
<tr>
<td>Pulse</td>
<td>0.602</td>
</tr>
</tbody>
</table>

*Source: Regression Analysis, 2015*

From the results of the multiple linear regression tests that have been carried out, it was found that the interventions carried out did not provide a significant difference in Systolic Pressure with a value of \( p = 0.939 \) (\( p>0.05 \)), but the intervention gave a significant difference in diastolic pressure \( p = 0.020 \) (\( p<0.05 \)) and at the pulse, namely with a value of \( p = 0.000 \) (\( p<0.05 \)).

Walking gives the volume of the contents of the sekuncup and the volume of the ventricles so that it can cause an increase in NO and dilatation of the arterioles, walking will decrease cardiac output so that it will lower systolic and diastolic pressure, in this study the systolic pressure decreased but the decrease was not significant, but significantly the decrease was in diastolic and pulse pressure.

However, the slightest decrease in blood pressure contributes to reducing the risk of heart disease and stroke. A decrease in blood pressure by 2 mmHg will reduce the risk of heart disease by 4% and stroke by 6%, from this study it is stated that both systolic and diastolic blood pressure will only be seen to decrease significantly in weeks 2, 3, and 4 after fast walking and walking exercises provide better effectiveness against reducing systolic, diastolic and pulse blood pressure compared to diet in people with hypertension.

Walking quickly is one of the physical exercises recommended by cardiologists in America and Europe, it has a good impact on lifestyle changes in people with Hypertension, walking quickly gives a decrease effect on systolic and diastolic blood pressure in hypertensive patients.

From the results of the Pseudo R Square test where this is done to see the amount of contribution given to independent variables (Intervention, Age of Sex, BMI and Smoking History), from these results it can be said that the value of R Square Systolic of 0.062 or 6% the remaining 94% is influenced by other factors. The R value for diastolic is 0.088 or 8.8% the remaining 91.2% is influenced by other factors. Meanwhile, intervention on the pulse has an influence of 0.602 or 60% and 40% is influenced by other factors.

**CONCLUSION**

The characteristics of the majority of respondents were aged 36-45 years 26 (50%), female 31 (57.80%), Body Mass Index (BMI) 28 (54%), and history of passive smoking 26 (50%).
The majority of respondents experienced a decrease in blood pressure before the intervention with after the intervention with a p value = 0.000 but there was no difference in the pulse measurement before the intervention and after the intervention with a p value = 0.083. There was no meaningful difference between blood pressure and pulse in the control group, namely the group that did not do the activity walked 30 minutes.

This study was conducted with several limitations, including a short study time so that the results of the difference in blood pressure in respondents with little hypertension, but this slight difference was very influential in patients with hypertension. From the results of the study, the difference in blood pressure will be seen markedly when respondents are given interventions in week III and week IV as well as at pulse pressure will give more significant results if seen in weeks III and to IV.

REFERENCES

