http://ijnms.net/index.php/ijnms
e- ISSN: 2686-2123
p- ISSN: 2686-0538
ORIGINAL RESEARCH

WALKING EXERCISE AS A CHOICE IN LOWERING BLOOD PRESSURE IN HYPERTENSIVE PATIENTS: SYSTEMATIC REVIEW

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ABSTRACT

Hypertension is a health condition that affects 26% of people worldwide. The World Health Organization (WHO) in "Global NCD Target Reduce Hight Blood Pressure" explains that an increase in blood pressure causes the death of 9.4 million people and is a major risk factor for global death. Uncontrolled hypertension results in various complications, even death in a person. Therefore, complex pharmacological and non-pharmacological therapy management is needed to repair various organs. Walking exercise is a non-pharmacological method to control blood pressure. Objective: To determine the effect of walking exercise on changes in blood pressure in hypertensive patients. Methods: Search for articles through PubMed, Science Direct, and EBSCO databases. The article inclusion criteria used were: 1) research studies using quantitative methods, 2) studies conducted on patients with hypertension based on hypertension criteria according to two, 3) study with walking exercise intervention as an independent intervention or intervention combined with other interventions. The appraisal study used the critical appraisal skills program (CASP), and the synthesis method used modified PICOS. Result: 17 journals were analyzed. The results of a review of 17 journals showed that walking exercise was effective in reducing blood pressure in hypertensive patients. Conclusion: A walking exercise which is done routinely can reduce systolic and diastolic blood pressure in hypertensive patients. Walking exercise can be included as an independent nursing intervention through health education to control blood pressure in hypertensive patients.

Keywords

walking exercise, blood pressure, and Hypertension

INTRODUCTION

Hypertension is a condition, where a person has systolic blood pressure ≥ 140mmHg and diastolic blood pressure ≥ 90nmmHg (Haldar, 2013). Hypertension is a health condition that affects 26% of people worldwide (Busse & Miranda, 2018). World Health Organization (WHO) in "Global NCD Target Reduce Hight Blood Pressure" explained that an increase in blood pressure caused the death of 9.4 million people and was a major risk factor for global death. Several conditions, such as alcohol consumption, being overweight, lack of physical activity, high sodium intake, contribute to the increase in the incidence of hypertension globally. So it is necessary to monitor or control blood pressure on a

regular basis with several therapy and counseling programs (WHO, 2016)

Hypertension is the most important risk factor for cardiovascular disease. Increasing blood pressure from normal limits can increase the risk of kidney, heart and blood vessel disorders, vision loss, permanent disability, stroke, and death. (Mirdha & Dr. Mishra, 2015). Uncontrolled blood pressure causes various problems in several organs of the body. The progressive increase in systolic and diastolic blood pressure can cause an increase in the load on the left ventricle. The increased ventricular load can result in left ventricular hypertrophy and increased O2 requirements so that in a long time there can be a decrease in function in the cardiovascular system (Patil et al., 2017). Hypertension also affects decreasing microvascular structure and function. One of them is a decrease in the microcirculation in the retina. The increase in blood pressure results in the narrowing of the arterioles in the retina, resulting in decreased blood circulation in the retina. This situation can lead to blindness in a person. Retinal constriction is also found in clients with stroke and kidney disease (Chua et al., 2019).

Blood pressure is increasingly uncontrolled and results in various complications, even death in a person. Therefore, complex pharmacological and non-pharmacological therapy management is needed to repair various organs, especially the cardiovascular system. Exercise is one of the non-pharmacological methods in controlling the increase in blood pressure. Regular exercise can lower systolic and diastolic blood pressure and reduce the risk of cardiovascular disease. The results showed that increasing exercise capacity was able to reduce the risk of death in patients with hypertension (Farinatti et al., 2016). One of the exercises that can be applied to patients with hypertension is walking exercises. Walking exercises can improve a person's fitness. Based on several research results, it is known that walking exercises carried out regularly can improve the function of the cardiovascular system with blood pressure stability, improve lipid profile, reduce body fat ratio, and improve one's emotional condition. (Othman & Temur, 2018).

This study aimed to conduct a systematic review of the effect of walking exercise on blood pressure in hypertensive patients. In this study, the authors identified a research publication journal about the use of walking exercises in hypertensive patients. The results of this systematic review are expected to apply to health services, especially nursing. This systematic review is presented in the form of articles consisting of; abstract, introduction, methods, results and discussion, conclusions, and bibliography.

MATERIALS AND METHODS

The literature study in this article is a systematic review. The effect of walking exercise on changes in blood pressure in hypertensive patients will be reviewed, including how the sample is taken and the variables measured. Reviewers conducted database searches and article screening independently by following the requirements in fulfilling the inclusion criteria

1. Inclusion criteria

1) Study Characteristics

Research publications that are included in the inclusion criteria in this systematic review are quantitative research types with randomized control trial (RCT) and quasi-experimental approaches that provide independent walking exercise interventions, or walking exercises in combination. The limitation of publication is research in the last 10 years of publication (2010- 2020).

2) Respondent Characteristics

This systematic review focuses on the use of research journals with the criteria of respondents in patients with hypertension based on WHO hypertension criteria, patients in the age range (17 years-80 years), patients in stable condition.

3) Intervention type walking

Intervention walking exercise is a regular walking exercise, whether done in the form of an independent intervention or combination with other interventions.

2.Exclusion Criteria

Literature exclusion criteria were researched with the qualitative method of research, as well as quantitative research on the use of walking exercise therapy for respondents who did not have hypertension. An outcome study that did not include blood pressure as the independent variable.

***3.*Literature search strategy**

Systematic review This is done by tracing published articles in the database: Pubmed, ScienceDirect, and Ebsco with the keywords Walking exercise OR Exercise training AND Hypertension OR Blood Pressure AND randomized control trial OR Quasy Experiment. Literature search strategy using the PICOS method and creating research questions.

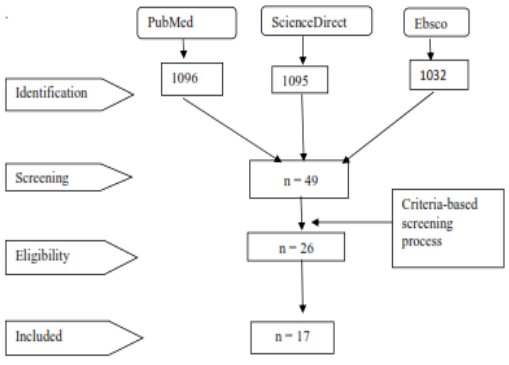

Figure 1. Flow Chart of the Review Process.

Quantitative studies must meet the PICOS criteria, in which the population used is hypertension patients based on WHO criteria. The patient is stable. The intervention used was a walking exercise. Comparison or comparison in the study consists of at least 1 group, namely the intervention group or the placebo group and the intervention group, the resulting outcomes are systolic and diastolic blood pressure. All studies use English. From the total journals, there were 26 journals and after further examination, 17 international journals were selected for review.

Research question: "Is walking exercise effective in lowering blood pressure in hypertensive patients? If so, will it have a significant impact? "

1.Study Quality Assessment Methods

The process of analyzing articles is carried out according to the criteria using the critical appraisal tool for the randomized control trial research design. The review of articles is carried out by one person, namely the reviewer using the critical appraisal skills program (CSAP) measurement tool. The resulting data were analyzed and then extracted and synthesized according to the objectives.

2.Data extraction method

The data obtained from the literature that meets the inclusion criteria are then reviewed one by one in a way arranged in a table to facilitate the review process. The table contains the author's name and research year, research design, experimental and control groups, intervention, and measurement results. The extraction process is carried out by one person, namely the reviewer. The data extraction results are attached.

3. Data Synthesis

Making a Systematic Review is done by analyzing research journals based on predetermined inclusion and exclusion criteria, namely hypertensive patients. The research design analyzed was the Randomized Control Trial and Quays Experiment. The type of intervention carried out on the respondent was light exercise therapy, namely walking exercise. The intervention is independent, namely only walking exercise or a combination of other therapies. Article research is carried out using the PICOS framework approach, by providing a time frame or limit for the review of articles, namely 2010-2020. Publication tracking strategies in the database: Pubmed, ScienceDirect, and Ebsco with the keywords Walking exercise OR Exercise training AND Hypertension OR Blood Pressure AND randomized control trial OR Quasy Experiment. The article was carried out with data extraction in the form of making a table to make it easier to study the journal with details, namely: author's name and research year, research design, experimental and control groups, intervention, and measurement results. The method used to criticize journal articles used is the Critical Appraisal Skills Program (CASP) instrument. This instrument identifies literature through screening questions. This method is to reduce the existing bias in this systematic review study. The form of synthesis that will be presented in the systematic review is identification, screening, eligibility, and included. The method used to critique journal articles used is the Critical Appraisal Skills Program (CASP) instrument. This instrument identifies the literature through screening questions. This method is to reduce the existing bias in this systematic review study. The form of synthesis that will be presented in the systematic review is identification, screening, eligibility, and included. The method used to criticize journal articles used is the Critical Appraisal Skills Program (CASP) instrument. This instrument identifies literature through screening questions. This method is to reduce the existing bias in this systematic review study. The form of synthesis that will be presented in the systematic review is identification, screening, eligibility, and included.

RESULTS

Characteristics of the Systematic Review Literature

Based on the review results of 17 journals, data collection was carried out in the United Nation of America as many as 2 journals, North Korea 1 journal, Brazile3 journals, India 2 journals, Pakistan 1 journal, China 1 journal, Japan 1 journal, Turkey 1 journal, Poland 1 journal, Italy 1 journal, and Indonesia 1 journal. The total of all respondents in the literature is 1360 respondents. The research design consisted of 15 journals with randomized control trial and 2 journals with *quasi-experiment*

1.Intervention walking exercise

Review results From 17 research journals, walking exercise is applied by several methods. The walking exercise was done alone at the respondent's house with a duration of 30 minutes per exercise with a frequency of 3 times per week. The walking exercise begins with stretching exercises (Farinatti et al., 2016). In another study, walking exercise techniques were performed at home for 15-20 minutes per day for 5 weeks. In addition to walking exercises, hypertensive patients are also advised to consume a hypertensive diet based on the recommended DASH diet(Paula et al., 2015). In a study conducted by Othman, S. T H., & Temur., B., in 2018 suggested that the treatment technique was carried out on respondents, namely by guiding walking exercises in a park with a frequency of 3 times per week for 2 months (Othman & Temur, 2018).

Research conducted by He, Li, *at al* applies aerobic exercise and walking exercise with a duration of 60 minutes. Exercises carried out for 12 weeks with a frequency of training 3 times per week. Exercises are carried out in the hospital corridor along the 30 meters. Each exercise of the respondent was accompanied by a health worker and was carried out in stages(He et al., 2018). Meanwhile, Simona M., et al in their research applied walking exercises that were carried out every day for respondents. The exercise is carried out gradually, with a duration of 15 minutes to 30 minutes during the first month. Whereas in the 2nd, 3rd, and 4th months the duration of the exercise increases and remains to be 50-70 minutes. In his research, the respondents were divided into 3 groups, namely the slow walking exercise group (4 km/hour), moderate walking exercise (4-5 km/hour), and fast walking exercise> 5 km/hour (Mandini et al., 2018).

Research conducted by Mirdha M., & Mishra applied fast walking exercises with a duration of 30 minutes per day, with a frequency of 6-7 exercises per week. After that, the respondents are advised to take part in the next training session, namely the yoga pranayama technique and Shavasana (Mirdha & Dr. Mishra, 2015). While research conducted by Ohta Y., at al applied walking exercises at home which were carried out every day by respondents with a duration of 30-60 minutes with a target of 100,000 steps for 4 weeks (Ohta et al., 2015).

Walking exercises performed on the Sushma T. research, *at al* is a 30-minute walking exercise. Before starting the exercise, the respondents followed a 5-minute warm-up procedure. After the exercise is over, respondents are advised to follow the cooling procedure for 5 minutes. Apart from that, the respondents also followed training procedures for boat breathing, anuloma-villoma, and deep slow breathing for 15 minutes (Sushma et al., 2011).

Rehana Mushtaq R., and Khan ZT, conducted a study to lower blood pressure in hypertensive patients. In this study, respondents in the treatment group applied walking exercises on a treadmill with a frequency of 4 times per week, with a duration of 60 minutes of exercise. Exercise walking on a treadmill begins with a 10-minute warm-up session, a 40-minute walking workout, and 10 minutes of cool down(Mushtaq & Khan, 2010). Meanwhile, Busse P., & Miranda J., J in their research applied walking exercises with a duration of 30 minutes without stopping. Exercise is done 3 times a week (Busse & Miranda, 2018).

2.Measuring instrument

The clinical symptoms analyzed by this systematic review were changes in systolic and diastolic blood pressure. Changes in blood pressure were measured using a sphygmomanometer. Based on the results of a review of 17 journals using a sphygmomanometer to measure changes in blood pressure. Changes in blood pressure were measured before and after the walking exercise treatment. Respondents first had their blood pressure measured both systole and diastole and identified according to the inclusion criteria. After that, the respondents were treated with walking exercises. The second blood pressure measurement is carried out after the treatment stage is completed within the specified period. A post-test was performed to determine any changes in systolic and diastolic blood pressure.

3.Effect of walking exercise on changes in blood pressure

The results of the journal analysis show that walking exercise can effectively control

blood pressure in hypertensive patients. Based on the analysis of 17 journals that have been reviewed, it is known that 16 research journals prove that walking exercise techniques have a significant effect on reducing blood pressure in systole and diastole (P <0.05). Meanwhile, 1 journal stated that walking exercise techniques did not significantly affect the decrease in systolic and diastolic blood pressure (P> 0.05).

Table 1. Analysis of research journals

No.	Researcher	*Aim*	Respondent Criteria	The walking exercise method	Results of changes in blood pressure after the intervention
1.	(Farinatti et al., 2016)	Analyze the influence of a home-based exercise program upon blood pres-sure, blood metabolic profile, and physical fitness	1) The intervention was performed in patients with hypertension who had discontinued pharmacological therapy for the past 6 months. 2) The hypertensive patient is stable, has no bone disorders, and is not diagnosed with diabetes, myocardial infarction, heart failure, ischemic heart disease, or unstable angina in the previous two years;	Exercise method: Exercise walking relaxed accompanied by a stretching stage. Frequency: exercise 3 times per week. Duration: 30 minutes per session. Duration of training: 16 months.	There was a significant change in systolic and diastolic blood pressure between the intervention group and the control group (p-value <0.05). The results showed that there were significant differences in the mean difference between the intervention group and the control group at the first 8 months and the second 8 months (p-value <0.05).
2.	(Paula et al., 2015)	evaluate the effect of the DASH diet associated with increased walking on ABPM	1) The intervention was carried out in hypertensive patients with blood pressure 140/90 ≤ mmHg - <180/120 mm Hg). 2) body mass index (BMI) 3) ≤ 40 kg / m2, and serum creatinine <176 mmol / L. 4) Has no physical disabilities.	Exercise method: Exercise walking leisurely done at home independently. Exercise frequency 5 times per week. Duration of 15-20 minutes per session. exercise is done regularly for 4 weeks. Besides, respondents also received the DASH diet program.	The results showed that there was a significant difference in changes in systolic blood pressure (p-value 0.021), as well as differences in changes in diastolic blood pressure (p-value 0.013) between the control group and the intervention group.
3.	(De Moura Rebo	evaluated the effects of	1) Patients had a mean	Exercise method:	There was a significant

	redo et al., 2010)	supervised aerobic exercise training on physical functioning, blood pressure, quality of life, and laboratory data in hemodialysis patients	age of 47.6 ± 11.4 years 2) Hypertensive patients with systolic blood pressure ≤ 200 mmHg 3) diastolic blood pressure ≤120 mmHg 4) The patient is stable 5) The patient has musculoskeletal disorders	starting with stretching for 10 minutes of aerobic exercise and continued with 6 MWT (6 minutes of walking exercise) with 30 meters on a flat area. Frequency: 3 times per week Duration of exercise: 12 weeks	change in systolic blood pressure of 12 mmHg, and a change in diastolic blood pressure of 5 mmHg when compared with the control group. Besides, from 18 patients, 8 patients were known to no longer receive anti-hypertensive drug therapy, 1 patient received a reduction in the dose of antihypertensive drugs, and 9 patients received pharmacological therapy with a fixed-dose.
4.	(Othman & Temur, 2018)	investigate the effects of walking and running exercises	1) Patients were in the age range of 48.05 ± 2.30 years	Exercise method: doing exercise walking leisurely and	There were significant changes in systole and diastole blood pressur
		over some blood parameters	2) The patient is in stable condition	jogging for 90 minutes. Frequency: 3 times per week Duration of exercise: 8 weeks	e after the intervention (p 0.00). Based on the results of the study, it was found that the difference in pre-post test systole blood pressure was 28.31 mmHg, while the difference in pre-post test diastolic blood pressure was 7.401 mmHg.
5.	(Heet al., 2018)	Whether aerobic exercise programs with different intensities could reduce the magnitude of BP rise.	1) Patients in the age range of 50-60 years 2) The patient is in stable condition 3) Blood pressure 140mmHg ≦ SBP <160mmHg, and / or DBP <99mmHg	Exercise method: Exercise brisk walking for 60 minutes Frequency: 3 times per week Duration of exercise: 12 weeks	The results showed that there were differences in changes in blood pressure between the control group and the intervention group. The difference in changes in systole blood pressure was significant with p = 0.035.

					Meanwhile, changes in diastolic blood pressure were considered insignificant.
6.	(Mandini et al., 2018)	assess the effects of walking on the blood pressure in sedentary adults with differing degrees of systolic blood pressure (SBP).	1) Patients with SBP> 140 mmHg 2) The patient is in stable condition	Exercise method: walking exercise starts with moderate intensity, which is 15 to 30 minutes. The distance and walking speed are progressively increased according to the respondent's ability to reach 50-70 minutes for each training session. Frequency: 5-6 times per week Duration of exercise: 6 months	After the intervention, it was found that there was a significant decrease in systolic blood pressure. In the group of respondents with SBP> 160 mmHg there was a decrease of 21.3 mmHg, in the group with SBP 150-159 mmHg there was a decrease of 11.8 mmHg, the group with SBP 140-149 mmHg there was a decrease of 7.5 mmHg. The decrease in diastolic blood pressure was observed after the intervention for 6 months. The decrease in DBP was more significant in the group with DBP> 160 mmHg.
7.	(Mirdha & Dr. Mishra, 2015)	Knowing the effect of walking exercise and relaxation on hypertension control	1) Hypertensive patients with an age range of 30-65 years 2) The patient received constant pharmacological therapy during the intervention 3) BMI 20-30	Methods of exercise: doing yoga pranayama relaxation techniques and asanas guided by an instructor and 30 minutes of brisk walking. Frequency: 5-6 times per week Duration of training: 4 months	The results showed that there were significant differences in blood pressure changes between the intervention group and the control group (p-value <0.01). The decrease in mean SBP in the intervention group after 2 months was 11.46 mmHg, after 4 months there was a decrease in the mean

					SBP of 18.2 mmHg. While the change in mean DBP in the intervention group after 2 months of treatment was 4.74 mmHg, after 4 months there was a mean DBP was 8.14 mmHg.
8.	(Ohta et al., 2015)	examine the effects of daily walking as a regular mild exercise on office, home, and ambulatory BP in hypertensive patients	1) Hyperten sive patients with a mean age of 60 ± 9 years 2) Hyperten sive patients with blood pressure> 140/90 mmHg	Exercise method: practice walking leisurely every day for 30-60 minutes to reach 10,000 steps. Frequency: 7 times per week Duration of exercise: 4 weeks.	There was a significant change in blood pressure reduction in the intervention group, namely (p <0.05). Daily walking exercise can reduce systole blood pressure by 5-10 mmHg.
9.	(Sushma et al., 2011)	Explain the effect of walking exercise on changes in blood	1) Hyperten sive patients in the age range of 35-65 years	Exercise method: walking exercise begins with a 5-	Aerobic isotonic exercise walking was able to reduce systole

		pressure	2) Hyperten sive patients with criteria of mild, and moderate, without complications of other diseases	minute warm-up method, 30 minutes of relaxing walking exercise, 5 minutes of cooling down. After that, the respondents were asked to do ship breathing exercises, anuloma-villoma, and slow deep breathing for 15 minutes. Duration of exercise: 3 months	blood pressure and diastolic blood pressure in the experimental group, there was a significant difference between the control group and the experimental group (p <0.001). A decrease in blood pressure occurred in respondents with stage 1 hypertension (SBP 140-159 mmHg, DBP 90-99 mmHg) and stage 2 (SBP 160-179 mmHg, DBP 100-109 mmHg).
10.	(Zeigler et al., 2015)	To determine if the acute use of a walking workst	1) Prehyper tensive patients aged 25-65 years 2) Prehyper tensive	Exercise method: exercise daily walking 7 hours	The systolic and diastolic blood pressure decreased by 3-4

		ation reduces ambulatory blood pressure (ABP) in prehypertensive men and women.	patients with SBP 120-139mm Hg, DBP 80-89 mmHg.	during work and 6 hours after work Frequency: 5-6 times per week	mmHg during the exercise period. After the intervention was completed, all respondents were able to reach systole blood pressure <120mmHg, while DPB seemed to decrease after treatment, however, 14% of respondents still had DBP> 90mmHg.
11.	(Park et al., 2011)	Knowing the effect of healthy aging and happy aging programs that are integrated with health education and exercise programs for elderly people with hypertension	Elderly hypertensive patients with age ≥ 65 years A patient diagnosed with hypertension ≥ 1 year	Exercise method: Evaluate the ability to walk casually by warming up 15 minutes, and cooling down 5 minutes. Frequency: 2 times per week	The healthy aging and happy aging program integrated with health education and exercise were significantly effective in reducing systole blood pressure in elderly people with hypertension

				Duration of exercise: 12 weeks	(P 0.004).
12.	(Mushtaq & Khan, 2010)	Knowing the effect of exercise on the risk of health problems	1) Hypertensive patients with systolic blood pressure> 160 mmHg 2) and diastole> 95 mmHg.	Exercise method: exercise walking on a tread mill for 50-60 minutes with the stages of warm-up time (5-10 min), fat-burning period (10 min), aerobic exercise (15 min) the main performance with tread mill exercise (15 min) and a cool-down period (10 min). Frequency: 4 times per week Duration of exercise: 10 weeks	Interventions carried out on respondents were able to significantly reduce systole blood pressure (P 0.023) in all ethnicities, except for Baloch. Meanwhile, diastolic blood pressure decreased significantly in all ethnic groups (P, 001).

13.	(Silva et al., 2015)	Knowing the effect of walking exercise on hypertensive patients	1) Hypertensive patients with mean age 55.2 ± 15.49 years 2) The patient is in stable condition	Exercise method: practice walking for 60 minutes in each session. Respondents walked around the area as far as 367.05 m Frequency: 5 times per week Duration of exercise: 2 months.	The walking exercise intervention was able to reduce systole blood pressure significantly (p <0.05), with an average reduction of 12.7 mmHg. Diastolic blood pressure also decreased significantly after the intervention (P <0.005), with a mean reduction of 4.9 mmHg.
14	(Kucio et al., 2017)	Analyzing the application of Nordic walking in hypertensive and obese patients	1) Hypertensive patients with obesity 2) Hypertensive patients with blood pressure <139/89 mmHg 3) The patient is male	Method of exercise: Running exercise that begins with the warm-up method for 10 minutes, in the first week the respondents in the control group do walking exercises at a speed of 3km / hour 30 minutes. In the 2-4 week, the walking speed is increased to 5 km / h for 40 minutes. Frequency: 5 times per week Duration of exercise: 4 weeks.	The Nordic walking intervention did not show a significant difference in blood pressure reduction between the intervention group and the control group (P> 0.05)
15	(Bakar et al., 2020)	Analyzing the effect of walking exercise on blood pressure and quality of life of elderly patients with hypertension	1) Hypertensive patients aged 60-74 years 2) Hypertensive patients without comorbidities	Exercise method: The walking exercise begins with a 5-minute warm-up procedure, then does a 20-minute walking exercise, and closes with a 5-	After the intervention, there was a significant difference in systolic blood pressure reduction between the control group and the intervention group (P = 0.00), and a significant differe

				minute coold own. Frequency: 5 times per week	nce in diastolic blood pressure changes between the intervention group and the control group (P = 0.0031).
16	(Mandini et al., 2020)	Analyzing the effect of walking exercise for 1 year on the reduction of blood pressure in hypertensive patients	1) Hyperten sive patient with age 63.9 ± 8.3 years. 2) Hyperten sive patients with systolic blood pressure ≥ 130 mmHg	Exercise method: exercise walking on the ground for 15-30 minutes. Frequency: 5 times per week Duration of exercise: 12 months.	After doing walking exercises for 1 year, there was a significant decrease in systolic and diastolic blood pressure (P = 0.0001 and P = 0.037). Systole blood pressure decreased to <140 mmHg. Diastolic blood pressure also decreased significantly to <80 mmHg. Decreases in systolic and diastolic blood pressure also occurred in respondents who were resistant to antihypertensive drugs.
17	(Latosik et al., 2014)	Analyzing the effect of Nordic walking exercise for 8 weeks on blood pressure systole	Hypertensive patient w / systolic blood pressure (SBP) ≥ 140 mmHg and diastolic blood pressure (DBP) <90 mmHg	Exercise method: Nordic walking exercise is done in an open area with a 10-12 minute warm-up phase, a 45-minute work phase, closed with 10 minutes. Duration of exercise: 8 weeks of supervised exercise.	Supervised Nordic walking exercise has been shown to reduce systole Blood pressure in Hypertensive Postmenopausal Women. There was a significant difference in the reduction in systole blood pressure between the intervention group and the control group (P <0.05).

DISCUSSION

This systematic review identifies a light exercise technique to control blood pressure in hypertensive patients. The type of exercise analyzed is walking exercise. *Walking exercise* is a body movement that involves the movement system, namely bones and muscles. This movement can stretch and flex the muscles of the body, so

that muscle strength increases. When doing physical exercise, such as walking, will decrease the activity of the sympathetic nervous system (John Edward Hall, 2014).

Walking exercise has proven to be able to reduce blood pressure systole and diastole in hypertensive patients. Research conducted by Farinatti, P, at al proved that walking exercises performed by hypertensive patients for 16 weeks were able to reduce systolic and diastolic blood pressure. Based on statistical tests, it is known that there is a significant difference between the treatment group and the control group, with a p-value <0.05 (Farinatti et al., 2016). Walking exercise is one type of physical activity that is included in the primary prevention of controlling hypertensive patients. This exercise is highly recommended to be done regularly(Zhu et al., 2019). Walking sports activities involve several body organs, namely the musculoskeletal system, cardiovascular and respiratory systems. So that walking exercises that are carried out regularly can increase muscle strength and contraction, as well as hemodynamic stability and body metabolism (Cornelissen & Smart, 2013).

Walking exercise is a type of physical activity that can improve the vasodilation process of blood vessels that depend on the endothelial system. Walking exercise interventions can stimulate the release of nitric oxide, causing muscle relaxation and a role in regulating blood pressure and blood circulation in the body. Nitric oxide prevents platelet aggregation and adhesion, as well as aids oxygen transport by relaxing venous walls. Regular walking exercise is a form of non-pharmacological therapy that affects the stimulation of nitric oxide release and increases endothelial function (Bakar et al., 2020). The mechanism of decreasing blood pressure with walking exercise interventions can also occur due to a decrease in sympathetic activity, an increase in vagal tone, causing a decrease in peripheral resistance and norepinephrine by about 30%. And causes the release of vasodilating substances such as endorphins, decreased insulin resistance, and reduction of renin in plasma (Mandini et al., 2020).

Research conducted by Paula. TP, et al proved that the physical exercise walking exercise was able to significantly control systolic and diastolic blood pressure with p-value <0.05. Blood pressure is also better controlled with the application of a healthy life including the DASH diet(Paula et al., 2015). Walking exercise lowers the risk of hypertension and cerebrovascular disease, heart failure, and cardiac dysrhythmias. By doing regular walking exercises, excess energy can occur and reduce the occurrence of plaque on the coronary arteries to prevent myocardial infarction. The myocardium that gets better oxygenation makes the contractions stable so that the systolic and diastolic blood pressure is controlled (Williams & Thompson, 2013).

Routine walking exercises can reduce blood lipid levels, increase VO2 max, and provide anti-hypertensive effects. Walking exercise can reduce vagal activity and peripheral resistance. Also, there was a decrease in norepinephrine levels by about 30%. This reduction goes hand in hand with a decrease in blood pressure(He et al., 2018). Research conducted by Simona M., et al. Proved that walking exercises that were carried out routinely for 6 months were able to significantly reduce blood pressure with the results of statistical tests p value <0.001 (Mandini et al., 2018). When walking exercise is done regularly, it will increase the higher energy expenditure. This is in line with the increase in oxygen consumption used for muscle activity, including the myocardium, so that consumption of VO2 max can occur. VO2 max is an indicator that

the human body's organ systems can distribute oxygen to activate muscles as a biomarker of one's health (Rivera-Brown & Frontera, 2012).

Research conducted by Meena M., & Mishra AK, proves that walking exercise can reduce systolic and diastolic blood pressure in patients with hypertension, with a p-value <0.05 (Mirdha & Dr. Mishra, 2015). Walking exercises that are done regularly can increase muscle strength, energy, and exercise capacity. This is related to decreased sympathetic nerve activity (Cardoso et al., 2010). Besides, walking stimulating exercises can provide benefits for the cardiovascular system. Regular exercise can reduce risk factors for diseases that affect the cardiovascular system, such as weight loss in obese patients, lowering low-density lipoprotein cholesterol while high-density lipoprotein cholesterol, increasing insulin sensitivity, and reducing endothelial dysfunction. (Dimeo et al., 2012). Physical activity that is carried out regularly has been shown to reduce the risk of cardiovascular disease in a person. The results showed that moderate exercise was able to reduce the risk of complications from uncontrolled hypertension, such as cerebrovascular disease, heart failure, and dysrhythmias. Based on the results of data collection of research respondents, it is known that there are 20% of deaths from 122 cases of heart failure, and 9% of deaths from 260 cases of dysrhythmias (Williams & Thompson, 2013).

CONCLUSIONS

A systematic review from Exercise Walking as a choice in lowering blood pressure in hypertensive patients found that the application of walking exercise was able to provide positive improvements in hypertensive patients by controlling blood pressure. After regular walking exercises, there was a decrease in systolic and diastolic blood pressure in hypertensive patients. This is certainly very effective when applied to hypertensive patients, namely as a non-pharmacological technique in controlling blood pressure. A walking exercise which is done routinely can control the occurrence of several risk factors for cardiovascular disease, which is the main cause of mortality in the world.

The results of a literature review in several journals in this systematic review show that walking exercise interventions can reduce systolic and diastolic blood pressure in patients with prehypertension to stage 2 hypertension, namely with asystole blood pressure range> 120mmHg- <180 mmHg. Meanwhile, diastolic blood pressure is in the range> 80 mmHg- <120 mmHg. The type of walking exercise therapy that is independently proven to lower blood pressure is if it is done routinely for> 6 months. The results also showed that walking exercise for 4 weeks was able to lower blood pressure when combined with other therapies.

The walking exercise procedures that can be used as a reference are walking exercises that begin with ± 15 minutes of warm-up, 30 minutes of core walking exercises, and ± 10 minutes of stretching or cooling procedures. Walking exercises that are effective in lowering blood pressure are exercises that are done regularly at least 3-5 times/week, with a minimum exercise duration of 30 minutes in each training session.

The nursing implication based on this systematic review is blood pressure control in hypertensive patients. Walking exercise can be applied to providing nursing care to hypertensive patients. This can be included in the nursing care plan by providing health education to patients, namely about how to do walking exercises and their benefits in hypertensive patients. Nurses can evaluate the success of walking exercise and changes in blood pressure.

It is necessary to conduct similar research on the implementation of walking exercise for hypertensive patients by increasing the number of respondents, the frequency of exercise, and the duration of the intervention application. Also, it is necessary to combine other techniques in implementing walking exercises to add a more positive effect on hypertensive patients so that disease complications do not occur due to uncontrolled blood pressure.

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