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Research article

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Gymnastics complementary intervention prolans and acupressure extremities of blood pressure systolic and diastolic in patients with hypertension

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ABSTRACT

Background

Hypertension is affected by the blockage and narrowing of the blood vessels caused by lipid that accumulates below the deepest layer (endothelium) blood vessel walls. Prevention by activity (gymnastics prolans) and acupressure extremity can lower systolic blood pressure, diastolic blood pressure. The purpose of this study to analyze the effectiveness of exercise and acupressure prolans extremity of the systolic blood pressure, diastolic blood pressure.

Method

This study uses a quasi-experimental design with pre-test and post-test control group design. The population is hypertensive patients with hyperlipidemia in the clinic Ba,a. Engineering samples using a permuted block random sampling. The sample consisted of 42 respondent. Every group consisted of 21 respondents. Each group was given a 12-day intervention. Systolic blood pressure and diastolic blood pressure measured in the first week, second, third and fourth.

Results

Systolic blood pressure in the intervention group 157.62 mmHg, diastolic blood pressure an average of 101.29 mmHg in the intervention group to test the p-values obtained Repeated measure anova $p=0.0001$.

Conclusion

Gymnastics prolans and acupressure extremities as well as the drug captopril and simvastatin given in hypertensive patients with hyperlipidemia can lower systolic blood pressure, diastolic blood pressure.

Keywords: Hypertension, gymnastics prolans, acupressure, systolic and diastolic blood pressure.

INTRODUCTION

Hypertension is a rise in blood pressure above 140/90 mmHg, or a disease that occurs due to an increase in systolic and diastolic blood pressure above 140/90 mmHg with consistency [1, 2], Hypertension is a major factor in various diseases such as: stroke, kidney disease, coronary heart disease and retinopathy.

Hypertension is the most significant cause of cardiovascular and generally occur anyway and is a major problem in both developed and developing countries and the cause of death number one in the world each year [2],

Hypertension or high blood pressure often also dubbed the silent killer-stationary (the silent killer). In general, people do not know if he suffered from hypertension and is usually

detected when there is a previous examination because they reason other diseases. And unconsciously patients already have serious complications in organs-the vital organs such as the heart, kidneys and brain. The most important thing is to know the causes or risk factors for the prevention of hypertension and hypertension management potent in reducing the risk of cardiovascular disease [3, 4],

According to the WHO about 972 million people or 26,4% of people worldwide suffer from hypertension, numbers this possibility will rise to 29,2% in 2025. Of the 972 million people with hypertension, 333 million are in the developed countries and the remaining 639 are in developing countries, including Indonesia [5], Basic Health Research (Riskesdas) mentions the year 2018, the prevalence of hypertension in Indonesia reached 34,1% by age \geq 18 years. There is an increased prevalence of hypertension based on interviews (if ever in the diagnosis of health workers and taking antihypertensive medication) of 9,5 in 2013 and decreased by 8,8 in 2018, The prevalence of hypertension in NTT Province, according Riskesdas 2018 reached 23,3%. While the prevalence of hypertension for Rote Ndao regency in 2018 reached 20,7%. [6], Factors that influence the occurrence of hypertension include genetic factors, age, sex, obesity and the consumption of salt and alcohol. Increased blood pressure usually affects the blood vessels of the heart. When this longstanding heart failure were preceded by shortness of breath, over time will be a stroke and death because they do not the blood flow smoothly, so that the supply of oxygen below the red blood cells become obstructed. Hypertension is more common in men compared to women, more women because they tend to creaka hypertension after menopause. This is caused by the hormone estrogen drop significantly as a result of endothelial cell damage that triggers plaque in blood vessels, causing various diseases such as cardiovascular disease (CVD) and even stroke.

Men at higher risk to suffer from hypertension than women up to the age of 55 years. Of course this should not be a problem for men. For decrease in the hormone testosterone has little impact on the risk of hypertension, unless accompanied by an unhealthy lifestyle, obesity and smoking. Hypertension on leave without handling lead to complications and

health problems, such as coronary heart disease, stroke and retinopathy. Hypertension is affected by the blockage and narrowing of caused by lipid that accumulates below the deepest layer (endothelium) blood vessel walls [7]. The main cause of atherosclerosis is a lipid which resulted in the emergence of a disease such as kidney failure, stroke and heart attack.

The development of people's behavior more freely along with the lifestyle and economic status increases, it makes people more oblivious to a healthy lifestyle including diet. Now diet, contain cholesterol and eat more often with the intensity of the portion of food is increasing, stress is difficult to control, smoking, obesity and physical activities like sports much less enjoy doing [8],

Starting from the complex problems of hypertension and the presence of barriers to treatment are pharmacologically due to purchasing power has declined and has a fairly expensive, so the anticipation of these problems need to be given a new innovation to the community that treatment of non-pharmacological very suitable (gymnastics prolanis and acupressure extremities) can be a good alternative choice, both in terms of the economy and its impact. As already explained that acupressure extremity and gymnastics prolanis can lower blood pressure in hypertensive patients, Which is expected to perform in non-pharmacological treatment of hypertension in patients with blood pressure can be decreased⁹, Non-pharmacological treatment, weight loss, exercise and activities that are organized and carried out with a healthy lifestyle one of which is a complementary therapy that uses natural ingredients, such as acupressure, meditation, aromatherapy, herbal and nutritional therapy [4, 9],

Physical activity or sport (gymnastics) causes major changes to the system circulation and breathing in which both take place simultaneously as a homeostatic response. Exercise is often used in patients with hypertension is aerobic exercise. Many forms of aerobic exercise that can be taken by patients with hypertension include jogging and aerobic gymnastics. Regular exercise can lower systolic and diastolic pressure in people with mild hypertension [10,11], Physical exercise is very influential for persons with hypertension in

improving the body's immunity after regular exercise, preventing obesity, normalizes blood pressure and improve employability. Aerobic exercise can help improve hemostatic system and blood pressure [10]. One of the government's program of gymnastics Prolanis (Management for Chronic Disease Program) is a form of aerobic physical exercise. Gymnastics is also included government programs run by the organization of the Social Security Agency (BPJS). Prolanis a health care system and a proactive approach are implemented in an integrated manner involving participants, health facilities and BPJS (Agency for the Implementation of Social Security) Health within the framework of the maintenance of health for participants who bears a chronic disease in order to achieve optimal quality of life with health care costs effectively and efficient [10], Prolanis this program can improve the quality of life for people with chronic diseases such as hypertension.

Gymnastics or exercise increases the need for oxygen in the cell energy formation process, resulting in increased heart rate, cardiac output and stroke volume increases. Thus the increase in blood pressure. After rest dilated or stretched blood vessels and blood flow down temporarily, about 30-120 minutes. Then back on the blood pressure before exercise. If you exercise regularly and continuously, the blood pressure reduction lasts longer and is more elastic blood vessels. Mechanism drop in blood pressure after exercise can relax the vessels-arteries. So with the widening of blood vessels drop in blood pressure [12],

The first-level health facilities (FKTP) in this case the end of the health centers spear implementation of chronic disease prevention and management of hypertension. Prolanis activities include: medical consultation, gymnastics prolanis or education club Prolanis, monitoring the health status of the form of checks every month (GDP/GDPP), routine examination of 3 to 6 months (HbA1c), routine examination 6 monthly blood chemistry (micro albuminuria, urea, creatinine, total cholesterol, LDL cholesterol, HDL cholesterol and triglycerides), then there is a home visit activity, drug services, mentoring specialist, and a reminder (via SMS gate way).

In dealing with chronic diseases such as hypertension need to use complementary therapies such as gymnastics prolanis, acupressure, yoga and cupping. acupressure is a simple therapy, no side effects because they do not perform invasive techniques and easily done [13], Acupressure is derived from the science of acupuncture in which one form of physiotherapy or massage at specific points of the body surface that able to provide the healing process [14],

Acupressure benefits include help in managing stress, calm the nervous tension and promote relaxation of the body. This therapy uses acupressure technique conducted finger at the point associated with hypertension. Massage-massage on a certain point in acupressure therapy may stimulate nerve impulses so as to expedite the flow of blood, relaxes spasms, and lower blood pressure [14], Pharmacologic treatment of hypertension by using a diuretic, beta bloker, vasodilators, angiotensin potassium, converting enzyme inhibitors and angiotensin II receptor blocker angiotensin [15],

Research that has been tested and has emperik evidence regarding prolanis gymnastics and acupressure performed by Saktia (2014) with title the effect of acupressure therapy in hypertensive patients in mind health clinic in Surakarta synergy "The results of this study concluded that acupressure therapy effect on hypertension with the results of analysis Wilcoxon test showed p-value =0.008 to p-value of <0.05 [4]. Other studies say about prolanis exercise influence on blood pressure with a sample of 22 respondents, divided into two intervention and control groups before and after the acupressure therapy. The results showed there is a significant difference between the systolic blood pressure at the beginning and end of the exercise 2 times/week ($p = 0,003 < \alpha = 0,001$); between diastolic blood pressure at the beginning and end of the exercise 2 times/week ($p = 0,002 < \alpha = 0,001$) [10],

Based on the description above, the researchers wanted to examine more about "complementary intervention prolanis gymnastics and acupressure are effective against systolic and diastolic blood pressure in hypertensive patients."

METHOD

This type of research is quasi experiment with using a pretest-posttest control group design. Pretest conducted in the intervention

group and the control group. Was given treatment in the intervention group and the control group was given three times a week for 1 month (12 times) then do the posttest.

RESEARCH RESULT

Characteristics of respondents

Table. 1 Characteristics of respondents by sex, education, occupation, intervention and control groups at

Variables	Group				p-value
	Intervention		Control		
	n	%	n	%	
Gender					
Man	7	33.3	10	47.6	0.346
woman	14	66.7	11	52.4	
Education					
SD	4	19.0	2	9.5	0.769
SMP	4	19.0	3	14.0	
High School	10	47.6	12	57.1	
Bachelor	3	14.3	4	19.0	
Work					
Farmer	11	52.4	8	38.1	0.415
Entrepreneur	2	9.5	5	23.8	
PNSs / TNI / Polri	8	38.1	8	38.1	
Coffee Drinking Habits					
Yes	13	61.9	15	71.4	0.513
Not	8	38.1	6	28.6	
Smoking Habits					
Yes	6	28.6	9	42.9	0.334
Not	15	71.4	12	57.1	
Age	mean	SD	mean	SD	
	52.05	6.64	50.86	7.43	0.344

Tabel.1 shows the distribution of respondents by sex of male respondents were 7 respondents (33.3%) and 14 female respondents (47.6%) in the intervention group, while the control group of 10 male respondents (47.6 %) and women as much as 11 respondents (52.4%), the majority of respondents education is at the level of high schools in the intervention group of 10 respondents (47.6%), and the control group were 12 respondents (57.1%), whereas respondents work mostly farmers in the intervention group were 11 respondents (52.4%) in the control

group of farmers and civil servants respectively 8 respondents (38.1%). Coffee drinking habits in the intervention group were 13 people (61.9), while the control group 15 (71.4). habit smoking intervention group 6 (28).

Based on the average characteristics of respondents Table 4.1 above can be seen that the average age of the respondents in the intervention group was 52, 05 years with a standard deviation of 6,644. Whereas in the control group the average age of respondents was 50.58 with a standard deviation of 7,425.

Systolic blood pressure in the intervention group and the control group

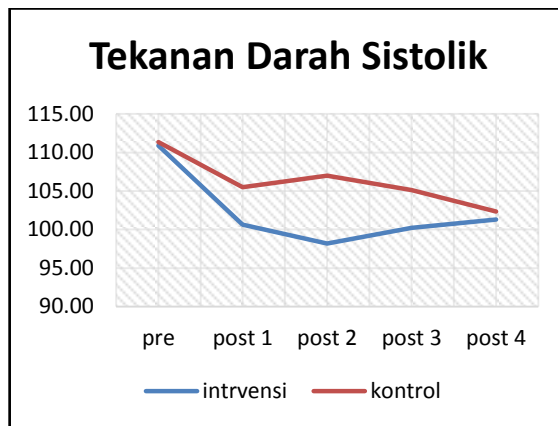
Table 2. Average - Average systolic blood pressure before and after treatment the intervention group and the control group in hypertensive patients with hyperlipidemia (N = 42)

Paired data testing *		Test Data Not Paired **			
Group	Systolic	Mean ± SD	p-value	Δ mean	p-value
Intervention	pre	168.71±5,702	0.0001	-11.09	0.0001
	Post 1	163.81±54,094			
	Post 2	160.95±5.296			
	Post 3	160.57±3,340			
	Post 4	157.62±3,748			
Control	pre	167.62±5536	0.0001	-8.76	0.0001
	Post 1	160.71±3,437			
	Post 2	160.33±3,838			
	Post 3	159.10±2,625			
	Post 4	158.86±2,104			

Table 2. Anova test results repeated measure systolic blood pressure showed that the p-value is 0.0001 intervention group (p<0.05) means gymnastics prolans and acupressure effectively lower extremity systolic blood pressure. P-value is 0.0001 the control group (p<0.05) prolans gymnastics effective means against the systolic blood pressure, but viewed from the mean between intervention and control groups at week

4 effective intervention group with a mean of 157.62

The test results showed that systolic data discrepancies p-value was 0.0001 (p<0.05) means There is a difference in the intervention group exercises and acupressure extremity prolans effectively lower blood pressure than the control group.



Graph. 1 Average systolic blood pressure before and after treatment in the intervention group.

The graph above shows the average systolic blood pressure in both groups experienced a decline noble in the first week and continued to decline in the second week, third and fourth week.

The results of calculation of the mean difference in measurement results indicate

different exercises and acupressure prolans extremities as well as the drug can lower systolic blood pressure in the intervention group at Δ mean -11.09, while the control group experienced a change of Δ mean -8.76.

Diastolic blood pressure in a group

The intervention and control groups.

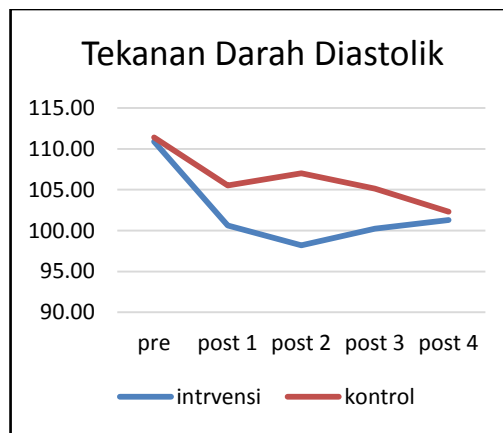
Table 3. Average - Average diastolic blood pressure before and after treatment in the intervention group and the control group in hypertensive patients with hyperlipidemia (N = 42)

Test Data Paired *			Test Data Not Paired **		
Group	Diastolic	Mean ± SD	p-value	Δ mean	p-value
Intervention	pre	110.90±5262	0.0001	-9.61	0.030
	Post 1	100.62±5996			
	Post 2	98.19±5154			
	Post 3	100.24±5,709			
	Post 4	101.29±4,291			
Control	pre	111.38±6,021	0.0001	-9.57	
	Post 1	105.52±5,437			
	Post 2	107.00±5,206			
	Post 3	105.14±4,486			
	Post 4	102.33±4.305			

Table 3. Repeated measure anova test results diastolic blood pressure showed that the intervention group p-value was 0.0001 (p<0.05) means extremity exercises and acupressure prolans effectively lower diastolic blood pressure. p-value is 0.0001 the control group (p<0.05) prolans gymnastics effective means to lower diastolic blood pressure, whereas seen

from the mean value of the more significant intervention group (101.29)

The test results showed that diastolic data discrepancies p-value was 0.030 (p<0.05) means that there is a difference in the intervention group exercises and acupressure extremity prolans effectively lower blood pressure than the control group.



Graph 2 Average systolic blood pressure before and after treatment in the intervention group.

Graph 2 above shows the average diastolic blood pressure in both groups experienced a decline noble in the first week and continued to decline in the second week, third and fourth week.

The results of calculation of the average difference in results, showed differences prolans exercises and acupressure extremities as well as the drug can lower systolic blood pressure in the intervention group of Δ mean -9.61, while the control group experienced a mean change of Δ -9.7 .

DISCUSSION

Effectiveness gymnastics prolans and acupressure extremity of the systolic blood pressure and diastolic blood pressure

Research conducted in patients with hypertension grade II proved that exercise and acupressure extremity prolans 3 times a week for 4 weeks and provision of medicines can lower captopril on systolic and diastolic blood pressure. A total of 21 respondents 21 respondents intervention group and the control group showed a decrease in systolic blood

pressure and diastolic blood pressure between the groups. The observations were made every week, namely pre-test on day 1, the first a 1 week post-test, post-test 2 in the second week, post-test 3 in the third week and post-test 4 week four.

Changes in systolic blood pressure in the intervention group can be seen from the mean value before treatment in the intervention group amounted to 168.71 mmHg after the intervention during the 4-week mean value has been changed into 157.62 mmHg, which means that there are differences in systolic blood pressure before and after intervention.

The mean value of the diastolic blood pressure before treatment in the intervention group amounted to 110.90 mmHg after the intervention for 12 times or for 4 weeks value mean transformed into 101.29 mmHg, which means there is no difference in diastolic blood pressure before and after the intervention.

In the control group there is a change in systolic blood pressure seen from the mean value before being given treatment equal to 167.62 mmHg, after the exercise intervention prolanis and drugs (captopril) for 4 weeks the mean value has been changed into 158.86 mmHg, mean differences in systolic blood pressure before and after the intervention. Whereas the mean value of the diastolic blood pressure before treatment on the control of 111.38 mm Hg after 4 weeks intervention mean values unchanged at 102.33 mm Hg, which means that there is a difference in diastolic blood pressure before administration of the drug captopril 12.5 mg.

Measurement of the value of systolic blood pressure and diastolic blood pressure between the intervention group and the control group there were significant differences ($p = 0.001$), in which the intervention group get gymnastics prolanis and acupressure extremity additional drugs captopril and simvastatin while the control group received therapy gymnastics prolanis and drug captopril and drug simvastatin.

Results of the study with repeated measure Anova test based on observation for 4 weeks (12 days) to look at the effectiveness of systolic blood pressure and diastolic blood pressure. The mean systolic blood pressure between the intervention group showed Δ mean -11.09, $p = 0.0001$ and the control group showed Δ mean-8.76 with $p=0.0001$. There are significant

differences in the results of the statistical test $p=0:05$. The intervention group showed significant compared to the control group $p=0.0001$). Mean diastolic blood pressure between the intervention group and the control group showed a significant difference with the results of the statistical test $p=>0.05$. The intervention group showed significant compared to the control group ($p=0.0001$)

The treatment given to each of the groups was conducted over 12 days, group gymnastics prolanis interventions and acupressure extremities as well as the drug captopril mg 2x12.5 effectively lower systolic and diastolic blood pressure compared with the control group who only get exercise and medication captopril 12.5mg prolanis

This study is in line with research conducted by Lutfiasih Rahmawati (2018), states that prolanis exercise can lower blood pressure in hypertensive patients. Results of the analysis showed that systolic blood pressure on average before the gymnastics prolanis 140 mmHg and after prolanis gymnastic therapy there was a decrease to 130 mmHg, while diastolic blood pressure before exercise therapy prolanis 84 mmHg diastolic blood pressure decreased after exercise therapy prolanis to 77 mmHg [7,1],

Another study conducted by Totok Hernawan (2017) says that there are significant differences in blood pressure values At respondents after gymnastics hypertension. This is shown by the difference in systolic blood pressure value before the gymnastics hypertension that is equal to 151.43 mmHg, the lowest pressure of 140 mmHg, 180 mmHg highest, the median standard deviation of 150 mm Hg and 11.46 mm Hg. Furthermore, the average diastolic blood pressure before exercise hypertension amounted to 95.36 mmHg, the lowest pressure of 80 mmHg, the highest standard deviation of 110 mm Hg and 8.81 mm Hg. Once granted gymnastics earn hypertension in average systolic blood pressure of 130.36 mm Hg, low pressure 110 mmHg, 160 mmHg highest, the median standard deviation 130 mmHg and 14.52 mmHg. Diastolic blood pressure of 82.14 mmHg, the lowest pressure of 70 mmHg, captopril works by way angiotensin aldolteron suppression of the renin system, renin is the enzyme produced by the kidneys and work on globulin plasma to produce angiotensin I, which is inactive. (ACH)

"angiotensin Converting Enzyme" will change *angiotensin I* became *angiotensin II* which is active and an endogenous vasoconstrictor and can and can stimulate the synthesis and secretion of aldosterone in the adrenal cortex. Increased secretion of aldosterone will lead to the kidneys to retain sodium and potassium fluid. Work will inhibit ACE captopril, due to the formation *angiotensin II* is inhibited, then the resulting vasodilation, decreased aldosterone secretion so that the kidneys secrete sodium and fluid and potassium. ACE known to play an important role in the formation of *angiotensin II* causes blood vessels to constrict,

Gymnastics is a series of regular movement and directional tone, and planned to do individually or in groups with the aim of improving the functional ability of the body to achieve that goal. Or aerobic exercise is a physical activity that can stimulate the heart and the circulatory and respiratory carried out in the time period long enough to generate improvements and benefits to the body. The sports activities will help your body to stay fit and keep fresh for training the bones to remain strong, pushing the heart to work optimally and help eliminate free radicals that roam in the body [6, 7].

Physical activity such as gymnastics undertaken will enhance physical fitness, thus indirectly exercise can improve heart function and lower blood pressure and reduce the risk of accumulation of fat in the blood vessel walls so that it will maintain its elasticity. Train the heart muscle in the contract so that pumping capability will be maintained [6, 7],

Gymnastics and lightweight sport activity is very beneficial to inhibit the degenerative process/aging. People doing exercise regularly will get a good physical fitness element is comprised of muscle strength, joint flexibility, agility of motion, flexibility, cardiovascular fitness and neuromuscular fitness.

By doing gymnastics, blood circulation will be smooth and increase the amount of blood volume, 20% of the blood found in the brain, so it will happen indorphine process to form the hormone norepinephrine can lead to a sense of joy, the pain is gone, addiction (addiction motion) and relieving depression. By following these exercises minimal effect is felt happy,

always excited, sleep better, the mind remains fresh [6, 8],

Physiology in gymnastic muscle contraction occurs skeletal (order) which will cause mechanical and chemical response. Mechanical response when the muscles contract and relax causing the vein to be optimal valve operation so that blood back into the right ventricle to be increased. Backflow of increased heart affect the increase in left ventricular strain on the heart so that the cardiac output is increased to reach 4-5 times compared to the cardiac output at rest.

Guyton states in that elevated blood pressure will increase the stimulus impulse on baroreceptor center in the carotid artery and aorta. This impulse toward cardiovascular control centers in the medulla oblongata through the sensory neurons that would affect the work of the sympathetic nerves and releases NE (norepinephrine and epinephrine), and the parasympathetic nerves which will release more ACH affecting the SA node will lower blood pressure.

Acupressure or massage performed meridian points in the form of a smooth massage so as not to hurt the respondents, thus causing relaxation of the patient and decrease blood pressure. Where, acupressure stimulation can stimulate mast cells to release histamine as a mediator of vasodilation of blood vessels, so that the increased blood circulation which makes the body more relaxation and ultimately can lower blood pressure.

In line with research from Majid et al (2016), which is contained decreased blood pressure before and after acupressure. The average change is evident from the average blood pressure systole before (157.50 mmHg) decreased to (147.81 mmHg). The average diastolic blood pressure of 96.69 mmHg decreased to 87.94 mmHg after acupressure.

Acupressure can increase blood circulation and Qi, the harmony of yin and yang, and neurotransmitter secretion, thus maintaining the normal function of the human body and provide comfort. Manual stimulation of acupressure has been shown to increase the production of serotonin and endorphins and served to increase the regulation of serum cortisol. *Endorphin* are natural opiates produced in the body, which triggers the calming and uplifting response in the body, has a positive effect on emotional stability,

can lead to relaxation and normalization of body functions[22],. As a result of the release of endorphins, vital signs such as heart rate, breathing rhythm, decreased blood pressure and improves blood circulation [6,3],

CONCLUSIONS

Results of research conducted with 42 respondents with the provision of complementary interventions and acupressure extremities gymnastics prolanis 3 times a week diving 4 weeks showed prolanis exercises and acupressure effective in lowering systolic blood

pressure of 157.62 mmHg and diastolic blood pressure of 101.29 mmHg. Health workers can socialize to the public and do prolanis gymnastics and acupressure limb extremities for patients with grade II hypertension as an alternative treatment for hypertension.

The results of the research can be as basic development of further research by taking into account factors such triggers, dietary salt and fat intake can affect blood pressure.

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