Physical Activity On Hypertension Incidence In Elderly In Sambung Village, Undaan District, Kudus District

Emma Setiyo Wulan[1], Heriyanti Widyaningsih[2], Ilma Yuni Ambarawati[3]
Nursing Study Program ITEKES Scholar Utama Kudus
Jl. Ring Raya Kudus-Pati KM 5 Japan Mejobo Kudus District
Email : emmawulan8@gmail.com

ABSTRACT

The World Health Organization says around the world around 972 million people or 26.4% of people worldwide have hypertension, this figure is likely to increase to 29.2% in 2025. With a prevalence of 37.57%, Central Java had the fourth-highest prevalence of hypertension in 2018. Hypertension is a health problem that is quite dangerous in the world, hypertension is a major risk factor that leads to cardiovascular disease. Non-communicable diseases that often occur in the elderly based on the Riskesda in 2018 are hypertension with a prevalence of 45.9% at ages 55-64 years, 57.6% at ages 65 years, 74% and 63.8% at ages ≥ 75 years . The aging process that occurs in the elderly has an impact on limitations in carrying out activities so that it can affect the independence of the elderly and they become easily dependent on the help of others. This study's objective was to ascertain how physical activity and the prevalence of hypertension in the elderly in Continu Village, Undaan District, Kudus Regency correlated with one another. By using the quantitative method of correlation. The sample used was 109 respondents. While the sampling technique used is *Purposive Sampling* and The GPAQ Questionnaire (Global Physical Activity Questionnaire) is the tool that is utilized. The Spearman test is used in this investigation.According to the study's findings, 29 respondents (75.8%) had grade 1 hypertension more frequently after engaging in vigorous physical exercise. The p value was 0.00 based on the results of the Spearman test. The results of this study show a correlation between older adults' physical activity levels and the prevalence of hypertension in Connect Village, Undaan District, Kudus Regency.

Keywords: Physical activity, hypertension, elderly

BACKGROUND

Increasing age in individuals is a physiological process that will occur in humans, in the aging process a person will experience problems both physically and mentally. Physical changes in the elderly include changes from the cellular level to all organ systems, including the respiratory, auditory, visual, cardiovascular, body regulatory systems, musculoskeletal, gastrointestinal, urogenital, endocrine and integumental systems. Physical function impairment is indicated by decreased muscle mass and strength, a rise in body fat percentage, a decrease in mental function, and a decrease in maximal heart rate (Carolina et al., 2019). Meanwhile, psychological changes in the elderly occur due to changes in the roles and physical abilities of parents in carrying out activities, both activities for themselves and in social activities.

One of the characteristics of an advanced or developing nation is a nation that has a high degree of health with a quality of life. Indonesia is a developing country but Indonesia itself still has many diseases which are health problems, one of which is hypertension (Sinaga, 2016). Based on the 2010 Global Status Report on Non-communicable Diseases from WHO,

it shows that 40% of developing countries have hypertension. Africa is the region with the highest prevalence of hypertension with a percentage of 46%, then Southeast Asia with a percentage of 36% and the Americas with a percentage of hypertension incidence of 35%. According to WHO data, 972 million individuals globally, or 26.4% of the population, have high blood pressure. In 2025, this percentage is probably going to rise to 29.2%. According to Yonata and Satria (2016), of the 972 million people with hypertension, 333 million live in developed nations, and the remaining 639 million do so in developing nations, including Indonesia. Based on the Kudus District Health Office (2018) stated that hypertension sufferers in Kudus reached 20,224 people,whit hypertension being the highest disease in Kudus Regency. Meanwhile, the elderly population who has hypertension is as many as 150 people (Undaan Health Center, 2021). Hypertension is the highest disease in Kudus Regency. Meanwhile, the elderly population who has hypertension is as many as 150 people (Undaan Health Center, 2021). Hypertension is the highest disease in Kudus Regency. Meanwhile, the elderly population who has hypertension is as many as 150 people (Undaan Health Center, 2021).

Because it raises the risk of developing cardiovascular conditions like heart attacks, heart failure, strokes, and renal failure, hypertension is a significant global health concern. The two main causes of death worldwide in 2016 were ischemic heart disease and stroke (WHO, 2018). Hypertension is commonly regarded as a very deadly non-communicable disease (Silent Killer) because it is a fatal condition without any complaints or symptoms as a warning to its sufferers (Atmaza, 2019). Mulyadi et al. (2019) claim that the heart's ability to pump blood, which results in a decrease in contraction and volume, and the loss of blood vessel elasticity brought on by the diminished effectiveness of peripheral blood vessels for oxygenation are the causes of hypertension in the elderly. These changes affect the elasticity of the aortic wall. The factors that affect blood pressure in the elderly include age, gender, education level, physical activity, genetic (heredity) characteristics, nutritional intake, smoking behaviors, and stress (Sumarni et al., 2016).

Physical activity is an activity/activity that causes an increase in the use of energy or calories by the body. Physical activity in daily life can be categorized into work, sports, household activities or other activities, but the aging process that occurs has an impact on the limitations of the elderly in carrying out activities that affect their independence of the elderly so that they elderly become easily dependent on the help of others. The limitations of the elderly in carrying out physical activities also cause a decrease in their level of health (Chiquita, 2017).

The results of an initial survey conducted by researchers in the village of Connect, Undaan District, Kudus Regency with10 respondents who experienced hypertension in the elderly with blood pressure checks obtained an average result of 180/100 mmHg, while with the interview technique, the elderly said they often consumed hypertension drugs obtained from the health center and obtained results as many as 5 people doing light physical activities such as sitting, walking slowly, and cooking, 2 people doing moderate physical activities such as mopping floors and cycling, and 3 people doing heavy physical activities such as gardening or farming.

RESEARCH METHODS

This type of research used a quantitative correlation. The population in this study amounted to 150 respondents, so a sample of 109 respondents was obtained by using a purposive sampling technique and the instrument used was the GPAQ (Global Physical Activity Questionnaire) questionnaire. The incidence of hypertension in the elderly and the distribution of physical activity frequency and percentage are both described by the study's

univariate analysis. The goal of the bivariate analysis in this study was to ascertain the association between the prevalence of hypertension and physical activity. The Spearman test is the statistical analysis method employed.

RESULTS AND DISCUSSION

Results

Univariate analysis

Table 1
Physical Activity Frequency Distribution

Physical Activity	Frequency	Percentage
Heavy	35	32.1
Currently	45	41.3
Light	29	26.6
Total	**109**	**100.0**

According to Table 1, the frequency distribution of the findings of 109 respondents to a survey on physical activity in the elderly showed that 45 respondents (41.3%) had the highest results in the moderate group, while the lowest results in physical activity in the mild category, with 29 respondents (26.6%) .

Table 2
Frequency Distribution of Hypertension Events

Hypertension events	Frequency	Percentage
Grade 1 hypertension	54	49.5
Grade 2 hypertension	45	41.3
Grade 3 hypertension	10	9.2
Total	**109**	**100.0**

According to table 2, which shows the frequency of results from 109 respondents based, regarding the prevalence of hypertension in older people. The 54 respondents who reported having 1st degree hypertension had the highest results (49.5%), while the 10 respondents who reported having 3rd degree hypertension had the lowest results (9.2%).

Bivariate Analysis

Table 3
Relationship between Physical Activity and Hypertension in Elderly: A Cross-tabulation

PHYSICAL ACTIVITY	HYPERTENSION EVENTS						Total		*P-value*
	Grade 1 hypertension		Grade 2 hypertension		Grade 3 hypertension				
	N	%	N	%	N	%	N	%	
Heavy	26	23.9	9	8.3	0	0.0	35	100	
Currently	25	22.9	17	15.6	3	2.8	45	100	
Light	3	2.8	19	17.4	7	6.4	10	100	
Total	54	49.5	45	41.3	10	9.2	109	100.0	**0.000**
Correlation Coefficient -0.505									

Based on table 3, it was discovered that 109 respondents had a cross-tabulation that showed 26 respondents (23.9%) had heavy physical activity and the incidence of hypertension in the first degree hypertension category. There is a correlation between physical activity and the occurrence of hypertension among the elderly in the Connect Village, according to the study's results using the Spearman test, which showed a significant value (p 0.00) that was lower than the value (p 0.05). As a result, H0 was rejected. Kudus Regency, Undaan District. The correlation coefficient value shows a value of -0.505 which is negative with a fairly strong category, so it means that the direction of the relationship between the two variables is not unidirectional or opposite, meaning that the more strenuous the activity carried out by the respondent, the lower the degree of hypertension in the respondent.

Discussion

The results of the research table 1 show that physical activity in the moderate category gets the most results, namely 45 respondents (41.3%), while the heavy category of physical activity got the results of 35 respondents (32.1%) and the least physical activity in the light category got the results of 29 respondents (26.6%). The results of this study are in accordance with research conducted by Afni et al (2018) which stated that the majority of respondents had moderate physical activity, namely 28 respondents (70%) and 12 respondents had heavy physical activity (30%). Physical activity is any skeletal muscle-produced motion of the body that involves the use of energy. Exercise is a type of physical activity that is repetitive, organized, and structured with the goal of preserving physical fitness (Welis & Rifki, 2013). This study is consistent with research done by Saputri (2018), which revealed that 33 respondents (or 39.3%) of the 84 respondents (or 100%) obtained the majority of the elderly engaging in moderate physical activity.

Someone with less physical activity can affect a person experiencing an increase in blood pressure, because People who are not physically active tend to have a higher heart rate than people who are physically active with the same blood pump volume. The heart muscle in people who rarely do physical activity will work more often and harder with each contraction, the greater the pressure exerted on the arteries, the more blood pressure will increase (Karim et al, 2018). This is supported by the opinion (Andria, 2013) which reveals that someone who is less active or exercising tends to have a higher heart rate so that the heart muscle has to work harder in each contraction. The harder and more frequently the heart muscle pumps blood, the greater the pressure imposed on the arteries.

The results of the study in table 2 show that the incidence of hypertension in the elderly with the 1st degree hypertension category gets the most results, namely 54 respondents (49.5%), while the incidence of hypertension in the elderly with the degree 2 hypertension category got 45 respondents (41.3%) and the incidence of hypertension in the elderly is at least in the category of grade 3 hypertension getting the results of 10 respondents (9.2%). Respondents were categorized as grade 1 hypertension, namely respondents who had a systolic blood pressure of 140-160 mm Hg and 90-100 mm Hg diastolic. This is due to the fact that participants can manage their hypertension by engaging in enough physical activity to lower blood pressure. The findings of this study are consistent with research by Afriza et al. (2020), which found that 42 respondents (50%) had a majority of stage 1 hypertension results, which is defined as hypertension that is present at the time of examination when systolic blood pressure is between 140 and 159 mmHg and diastolic blood pressure is between 90 and 99 mmHg.When the big blood vessels reform and harden, the aorta loses some of its elasticity, which can lead to hypertension in the elderly. An increase in peripheral resistance is the result of the compensating process, which raises blood pressure. As we get older, baroreceptor

function will decrease and the presence of atherosclerosis is also a cause of hypertension in the elderly (Gasowski and Piotrowicz, 2017).

According to the study's Spearman test results, Ha is accepted because the p value is 0.00, which is less than 0.05. among Connect Village, Undaan District, Kudus Regency, there is a correlation between physical activity and the prevalence of hypertension among the elderly. The correlation coefficient value shows a value of -0.505 which is negative, so it means that the direction of the relationship between the two variables is not unidirectional or opposite, meaning that the more strenuous the activity carried out by the respondent, the lower the degree of hypertension in the respondent. The closeness of the relationship from the value of the correlation coefficient is categorized as quite strong because the range of values in the strong category is (0.50-0.75), which means that the closeness of physical activity to the incidence of hypertension in the elderly in the Connect Village, Undaan District, Kudus Regency is quite strong.

From the results of the data analysis in Table 3, it can be seen that the majority of respondents have heavy physical activity. Based on this study, it can also be seen that the majority of respondents with degree 1 hypertension have strenuous physical activity, and hypertension degrees 1 and 2 tend to be suffered by respondents with moderate physical activity. So that it can be said that the more strenuous physical activity performed by people with hypertension, the lower the degree of hypertension they suffer. This is in accordance with research conducted by Yusuf et al (2018) which states that there is a relationship between physical activity and systolic and diastolic blood pressure, the higher the physical activity performed, the lower the blood pressure in hypertension sufferers.

The risk of hypertension can rise as a result of inactivity. Hasanudin et al.'s (2018) findings that physical exercise significantly influences the stability of hypertension lend credence to this opinion. People with a greater heart rate frequency likely to not be engaged in any energetic activity. The heart muscle has to work harder during each contraction as a result. The pressure on the artery walls increases when the heart muscle contracts more, increasing peripheral resistance and causing an increase in hypertension. This research is in line with research conducted by Yulistina et al (2017) which stated that there was a significant relationship between hypertension and physical activity where the lower the physical activity performed, the higher the risk of developing hypertension at the age of menopause. This is supported by Marleni (2020) who revealed that physical activity has an effect on hypertension. The higher the physical activity, the smaller the risk of developing hypertension. Someone with light activity has a tendency of around 30-50% to develop hypertension compared to someone with moderate or heavy activity.

According to the study's findings, the majority of the senior respondents engaged in moderate to vigorous physical activity. In the elderly, degenerative processes occur so that the elderly experience impaired function of tissues, organs and body systems where the cardiovascular system, nervous system, sensorimotor system, respiratory system and musculoskeletal system will physiologically decrease. According to Sari et al. (2019), changes in the cardiovascular system include thickening and stiffening of the heart valves, reduced blood pumping capacity that results in blood vessel contraction and volume reduction, decreased blood vessel elasticity, and increased peripheral vascular resistance that raises blood pressure. Whereas in the musculoskeletal system there is a decrease in flexibility, muscle and joint strength, and decreased cartilage function, Physical activity that is carried out regularly causes several changes such as the strengthening of the heart muscles so that the capacity becomes large and the contractions become strong and regular because the elasticity of blood

vessels increases due to relaxation and vasodilation of blood vessels. In addition, physical activity also helps improve the efficiency of the heart as a whole (Mubarok, 2015).

Through a process called decreased peripheral resistance, exercise can lower blood pressure. Following physical exertion, alterations in sympathetic nervous system activity and vascular response lead to peripheral deterioration. Reduced sympathetic nervous system activity in peripheral blood vessels leads to lower blood pressure. Blood pressure is significantly lower after exercise thanks in large part to the vascular response. Nitric oxide (NO) will be produced more abundantly and the response of a vasoconstrictor to a vasodilator will change as a result of physical exercise (Thristyaningsih et al. 2011). During physical activity, the muscle fibers slide against each other or are known as shear stress and will increase the wave-like blood flow. This will trigger the formation of a material, namely nitric oxide (NO) as an Endhotelial Derive Relaxing Factor (EDRF) which causes vasodilation of blood vessels. Nitric oxide is a mediator in relaxing smooth muscles in blood vessels (Rai, 2012).

CONCLUSIONS AND SUGGESTIONS

Conclusion

Among Connect Village, Undaan District, Kudus Regency, the prevalence of hypertension in the elderly is correlated with physical activity. When a result of the Spearman test was less than 0.05, a p-value of 0.00 was achieved, and when the findings were strongly correlated, a correlation value of -0.505 was obtained. Ha was approved in this investigation, indicating that there is a sufficiently robust link between physical activity and the occurrence of hypertension in the elderly.

Suggestion

1. Nursing Education
   It is hoped that the results of this study can become a reference for sources of information for nursing students, especially gerontological nursing as material for writing their thesis.
2. Further Researcher
   It is intended that future academics will conduct studies on the lifestyles of the elderly that focus more on the prevalence of high blood pressure.
3. Health services
   The results of this study can be input for health services, especially for the elderly Posyandu and are expected to be able to provide counseling about daily physical activity, so that the elderly can know and understand the consequences of hypertension.
4. Connect Village Seniors
   It is expected that the elderly who have hypertension are recommended to carry out moderate to severe physical activity by carrying out daily activities such as walking moderately and fast, mopping the floor, gardening and participating in elderly exercise activities which are carried out at the elderly Posyandu every month.

REFERENCES

Afriza Devi, Ari Prisiana D and Yulfitriana Amir. 2020. “Relationship between Physical Activity and Blood Pressure in Elderly with Hypertension”. JOM FKp 5 (1) 36-43.

Andria, Kiki Mellisa. 2013. "Relationship Between Exercise Behavior, Stress and Diet with Hypertension Levels in the Elderly at the Elderly Posyandu, Gebang Putih Village, Sukolilo District, Surabaya City." Promkes Journal Vol. 1, (2) 111–17.

Atmaza, Angga. 2019. "Analysis of Clinical Practice of Nursing in Hypertension Patients with Murottal Al-Qur'an Innovation Interventions and Rose Aromatherapy in Hypertension Patients to Reduce Blood Pressure in the Emergency Room at Abdul Wahab Sjahranie Hospital Samarinda."

Carolina, Putria, Yelstria Ulina Tarigan, Bella Novita, Desi Indriani, Efriadi Efriadi, Eteng Pandi Yangan, Mendi Mendi, and Marsiane Afiana. 2019. "Health Education Community Service Maintaining Health and Fitness Through Sports for the Elderly at Posyandu Eka Harapan, Pahandut Village, Palangka Raya." Surya Medika Journal 4 (2): 88–94.https://doi.org/10.33084/jsm.v4i2.609.

Chiquita, DD (2017). Physical activity, health status, social support, and quality of life for elderly men and women.

Eka Yusuf Fund, Hariyono, Ucik Indrawati. 2018. "Relationship of Physical Activity with Degrees of Hypertension in the Elderly". Https://repo.stikesicme-jbg.ac.id/1774/. accessed on 16 April 2022.

Holy County Health Office. (2018). Health Profile of Kudus District.

Gasowski Jerzy and Karolina Piotrowicz. 2017. "Hypertension in Parents: Changes or New Implications in the Existing Paradigm". European Geriatric Medicine 8(4), 289-292.

Hasanudin, Vita Mariyah Adriyani, and Pertiwi Perwiraningtyas. 2018. "Relationship between Physical Activity and Blood Pressure in People with Hypertension in the Tlogosuryo Region, Tlogomas Village, Lowokwaru District, Malang City." Journal Nursing News 3 (1): 787–99.

Ivanali Kesit, Tria Lusiana A, Muthiah M, and Aninda Delsi P. 2021. "Relationship Between Physical Activity in the Elderly and the Level of Balance". Journal of Physiotherapy 21 (1): 51-57.

Karim, Nur Afni. 2018. "Relationship of Physical Activity with Degrees of Hypertension in Outpatient Patients in the Working Area of the Tagulandang Health Center, Sitaro Regency." Journal of Nursing 6(1): 1–6.

Marlene, Lily. 2020. "Physical Activity with Hypertension Levels at the Palembang City Health Center." JPP (Journal of Health Poltekkes Palembang) 15 (1): 66–72.https://doi.org/10.36086/jpp.v15i1.464.

Mubarak, W.I. 2015. Textbook of Basic Nursing. Jakarta: Salemba Medika.

Mulyadi, Arif. 2019. "An Overview of Changes in Blood Pressure in Hypertensive Elderly Doing Elderly Exercise." Journal of Borneo Holistic Health 2 (2): 148–57. https://doi.org/10.35334/borticalth.v2i2.740.

Health Center, U. (2021). health data at Unundaan Kudus Health Center.

Rai, A. 2012. 101 Fitness at the Age of 40 years. Libra, Jakarta.

Saputri Tri Ratih. 2018. "Relationship Between Physical Activity and Blood Pressure in the Elderly in Manahan Village, Surakarta City". Thesis. Surakarta: Muhammadiyah University

Sari, AP, Yusuf, A & Wahyuni, ED. 2019. "Changes in Blood Pressure in the Elderly with Hypertension at UPT PSLU Magetan". Journal of Critical Medical and Surgical Care (CMSNJ), 3(1):1-10.https://doi.org/10.20473/cmsnj.v3i1.12198.

Sinaga, Anni. 2016. "The Relationship between Family Support and Prevention of Hypertension in the Elderly in Sukamaju Village, the UPTD Cikalong Foster Area,

Cimaung District." Journal of Health "Caring and Enthusiasm" 5 (1): 39–46. google scorer.
Sumarni, Rantiningsih, Edi Sampurno, and Veriani Aprilia. 2016. "Junk Food Consumption and Hypertension in the Elderly in Kasihan District, Bantul, YogyakartaKasihan," Indonesian Journal of Nurses and Midwifery 3 (2): 59. https://doi.org/10.21927/jnki.2015.3(2).59-63.
Thristyaningsih, Sri, Probosuseno Probosuseno, and Herni Astuti. 2011. "Elderly Fitness Exercise Affects Cardio Pulmonary Endurance, Nutritional Status, and Blood Pressure." Indonesian Journal of Clinical Nutrition 8 (1): 14-22 https://doi.org/10.22146/ijcn.17726.
Welis W & Rifki M. 2013. Nutrition for Physical Activity and Fitness. Jakarta : Student Library.
WHO. 2018. Global Health Estimates 2016: Deaths by Cause, Age, Sex, by Country and by Region, 2000-2016. Geneva: World Health Organization.
Yulistiana Fera, Sari M. D, and Eunike RR 2017. "Correlation of Food Intake, Stress, and Physical Activity with Hypertension at Menopausal Age". Unnes Journal Of Public Health 6 (1) 35-42.
Yonata, Ade, and Arif Satri Putra Pratama. 2016. "Hypertension as a Trigger Factor for Stroke." Majority Journal 5 (3): 17–21. http://juke.kedokteran.unila.ac.id/index.php/majority/article/view/1030.