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ASSOCIATION BETWEEN SYSTOLE, DIASTOLE, SEX, AGE, BLOOD, AND URINE PROFILE IN OLDER ADULTS WITH HYPERTENSION

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ABSTRACT

Background: Reduced heart rates, decreased oxygen extraction, arterial stiffening, vasoconstriction, increased systolic blood pressure, myocardial thickness, decreased diastolic filling rate, rhythmic rate variations, and action potential prolongation were the key cardiovascular abnormalities linked to aging. The pathophysiology of the disease can be one of many risk factors. **Objective** This study aims to ascertain the relationship between systole, diastole, sex, age, blood, and urine profiles in an elderly with Hypertension. **Methods:** A descriptive observational study was carried out. This study was finished in 2017 in the RW 1 area of the Gisikdrono Urban Communities in the West Semarang region. 54 elders were registered at the Gisikdrono Elderly Integrated Health Post. **Results:** The logistic regression study found three significant associations between diastole systolic and leucocyte sedimentation with Hypertension. **Conclusion:** The logistic regression study found three significant associations between diastole systolic and leucocyte sedimentation with Hypertension. For the net study, various hormones are another pathological marker that can be included in hypertension screening

Keywords : *Older Adult, Hypertension, Blood, Urine, Blood Pressure*

INTRODUCTION

In older adults, Hypertension is linked to adverse cardiovascular outcomes, including heart failure, stroke, myocardial infarction, and mortality. By 2025, it is anticipated that one-third of the world's population will have Hypertension because of an aging population and rising obesity rates. High blood pressure, often known as Hypertension (HTN), affects millions of individuals (BP). A BP of 140/90 mmHg (millimeters of mercury) or higher is considered high. HTN affects about 970 million individuals worldwide. According to estimates, 1.56 billion adults will deal with it by 2025.[1] Age-related rises in BP levels and the high frequency of HTN in the elderly contribute to the general rate being comparable for men and women, despite age-related variations. When they are 65 or older, high blood pressure impacts women more than men. In comparison to Caucasians (31% of women and 33% of men), Mexican Americans (29% of women and 30% of men), and African Americans, who are more prone to acquire high blood pressure and do so earlier in life (47% of women and 43% of men), are the following two racial groups. 90% lifetime risk of HTN exists in individuals 55 and older with normal blood pressure. Most patients with high blood pressure do not know the cause. Primary or necessary HTN would include this. Secondary HTN is high blood pressure with a particular etiology; only a tiny percentage of persons have it. Ninety percent of those with high blood pressure have primary HTN.[1]

Although primary Hypertension cannot be cured, it can be controlled with the right medicine (including lifestyle changes and medications). Genetic factors may significantly influence the emergence of primary HTN. This type of high blood pressure typically appears gradually over a long period.[2] Following recent recommendations, people 60 years of age and older should have more lenient blood pressure goals (150/90 mmHg) than people younger than this.[3]

According to a previous study by a different researcher, age-related changes to the cardiovascular system mainly involved a decline in heart rates, oxygen extraction, arterial stiffening, vasoconstriction, systolic blood pressure elevation, myocardial thickening, reduced diastolic filling rate, rhythmic rate changes, and prolongation of the action potential. Alterations to the autonomic nerve system (ANS) were found to be directly related to aging. Autonomic nerves and ganglia showed changes. Significant alterations were also recorded from skeletal muscle sympathetic nerves. Researchers suggested that ageing might raise baseline levels of norepinephrine and lower heart rate variability: ageing-related arterial stiffness and increased wall

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thickening impact Cardiac structure and function. Age-related increases in systolic blood pressure are widely established. Increased cardiac myocyte size brought on by additional sarcomeres contributes to hypertrophy. Additionally, fewer myocytes make up the myocardium as people age, and all heart components grow stiffer.[4]

Adults (65 years of age) who are not institutionalized, live in the community, and have average systole of less than 130 mm Hg are advised to take medication to lower their systole. Clinical judgment, patient preference, and a team-based method to assess risk are all reasonable considerations when deciding how much blood pressure should be reduced and which antihypertensive medications to prescribe for older persons (>65 years of age) who have hypertension, a significant number of co-morbid conditions, and a short life expectancy. To avoid dementia and cognitive decline, lowering blood pressure makes sense.[5]

METHODS

A descriptive observational study was carried out. This study was finished in 2017 in the RW 1 area of the Gisikdrono Urban Communities in the West Semarang region. 54 elders were registered at the Gisikdrono Elderly Integrated Health Post. Samples were gathered through purposeful sampling. Twenty-seven seniors who met the exclusion criteria and were at least 60 years old were included (have no dementia, can speak, can communicate). To collect primary data, elderly persons were physically inspected and questioned. The researcher reserved the information-for-consent ethical principle. Anonymity, secrecy, honesty, and non-malfeasance are all components of informed consent. The Research Ethics Committee approved the ethical Clearance of the Faculty of Medicine, Diponegoro University No.22/EC/FK-RSDK/I/2017.

BP was measured twice from the right brachial artery with a standard mercury sphygmomanometer in the sitting position after 5 minutes of rest.[7] If blood pressure >140/90 mmHg was noted, a third reading was taken after 30 min. The lowest of the three was taken as blood pressure.[8] Anamnesis, physical examination, and blood and urine samples were taken after informed consent for each participant. Statistical analysis

Descriptive statistics were used to examine the characteristics of the study and the prevalence of Hypertension. Logistic regression models were run separately for women and men to estimate the association between all covariates and Hypertension.

RESULT AND DISCUSSION

Hypertension in elderly

Twelve senior people (44,44%) with grade 1 or 2 hypertension, eleven (40,7%) with prehypertension, and four (14,8%) with normal blood pressure were found. Averaging 132/83 mmHg, blood pressure was checked in the first month. The average blood pressure was 127/82 mmHg after a thorough personal examination and counseling in the fifth month. According to JNC 7, BP should be classified as being normal, elevated/prehypertensive, or having stages 1 or 2 of hypertension.[9]

In Indonesia, hypertension was the most prevalent ailment (57.6% of the older population).[10] As a result of primary health research conducted in 2013, we discovered that the prevalence of hypertension in this study (44,44%) was greater than the reported national prevalence of hypertension in 2013 (25.8%). Additionally, the majority exceeded the provincial prevalence of hypertension (27.1%) stated by the Ministry of Health in 2014, Riskesdas 8,7% in 2016[11], but less than the Ponorogo 68% study's prior findings.[12] According to Raggi, geriatric hypertension prevalence in three European nations was 23.1%.[13] Hypertension was a common condition in Sri Lanka with a frequency of 30.6%, and it was strongly correlated with senior people's quality of life.[14] Hypertension is also classic risk factor for heart disease and stroke that is prevalent everywhere.[10]

Systole and diastole in elderly

We found normal diastole in 16 (60%) elderly and abnormal diastole in 11 (40%) elderly, with 13 (48%) elderly with normal systole and 14 (52%) others with abnormal. According to certain theories, hemodynamic alterations and various processes contribute to age-related Hypertension. While diastolic blood pressure increases until the fifth or sixth decade, when it appears to fall gently, systolic blood pressure has been shown to increase

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gradually with age. This pattern is thought to be after ageing-related collagen deposition, calcification, elastin fibre breaking and degradation, and an increase in the stiffness of big vessels. Reduced organ perfusion occurs as big vesicles become less distensible, resulting in a decrease in diastolic blood pressure and an increase in pulse pressure and pulse wave velocity. [15]

Sex, age in elderly

We identified 21 (77, 8%) female elders and 6 (22, 2%) male participants. We collected 6 (22,2%) elderly participants between the ages of 60 and 65, 8 (29,6%) elderly between the ages of 66 and 70, 6 (22,2%) elderly between the ages of 71 and 75, 5 (18,5%) elderly between the ages of 76 and 80, and 2 (7,4%) older persons over the age of 81, with an average age of 70,5 years. Indonesia's health indicators are improving, as seen by the rise in life expectancy from 66,3 years in 2000 to 69,1 years in 2015.[16] South Korean women's life expectancy at birth in 2030 has a 90% likelihood of being higher than 86,7 years, which corresponds to the greatest international life expectancy in 2012, and a 57% chance of being higher than 90 years.[17] According to the Framingham Heart Study, by the age of 70, around 65% of men and almost 75% of women had hypertension, up from the 60s' approximate prevalence of 60%.[18] Senior hypertension patients have lower cardiac output, higher peripheral resistance, wider pulse pressure, lower intravascular volume, and decreased renal blood flow when compared to younger people with comparable blood pressure. When treating older individuals with antihypertension, these age-related pathophysiologic alterations must be taken into account.[18]

Haemoglobin, leucocyte, hematocrit, and thrombocyte in elderly

We found that hemoglobin below 12 was 11.1%, between 12 and 14 was 82.2%, and above 14 was 3.7%. Positive correlations were found between haemoglobin levels and blood pressure measurements, both systolic and diastolic. With the between-person impact taken into account, the regression coefficients for systolic blood pressure were 1.3 mm Hg per millimole per liter rise in hemoglobin level for men and 1.8 mm Hg per millimole per liter rise in haemoglobin level for women. When it comes to the within-person effect, the regression coefficients for systolic blood pressure for men and women were 0.7 mm Hg and 0.9 mm Hg per millimole per liter increase in hemoglobin level, respectively.[19]

All older people got normal in leucocyte, hematocrit, and thrombocyte. Leucocyte count and Hypertension are related. However, the underlying mechanisms are not well understood. Leukocyte-endothelial cell adhesion, which is crucial for the emergence and development of atherosclerosis, may be encouraged by increased leucocytes in circulation.[20] Blood pressure increased in correlation with higher amounts of neutrophils, monocytes, and eosinophils but not lymphocytes or basophils.[21]

Urine pH, protein urine, urine reduction, creatinine, and SGPT in elderly

All the elderly got normal urine pH and protein. Normal Creatinine 26 (96,3%) and 1 (3,7%) abnormal creatinine level. Normal SGPT 19 (70,4%) and 8 (29,6 %) abnormal SGPT levels. Normal urine reduction 18 (66,7 %) and 9 (33,3 %) abnormal urine reduction levels. Compared to the previous study in Palembang, 54,3% of the elderly with high creatinine levels had Hypertension.[22] The serum creatinine levels of hypertension patients have significantly changed, and they are likely to develop chronic kidney disease.[23] In both sexes, systolic, diastolic, and mean blood pressure were strongly correlated with SGPT. A growing number of studies link high blood pressure to liver dysfunction. The generation of proteins, blood coagulation, cholesterol biosynthesis, glucose metabolism, and iron metabolism are just a few of the metabolic processes that the liver is crucial for.[6]

Urine sedimentation in elderly

Elderly with normal leucocyte sedimentation 26 (96,3 %) and 1 (3,7 %) abnormal leucocyte sedimentation level. Normal erythrocyte sedimentation 6 (22,2 %) and 21 (77,8 %) abnormal erythrocyte sedimentation levels. Normal epithelium sedimentation 6 (22,2 %) and 21 (77,8 %) abnormal epithelium sedimentation levels. Normal amorf urat sedimentation 7 (25,9 %) and 20 (74,1 %) abnormal amorf urat sedimentation levels. Normal bacterial

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urine 11 (40,7 %) and 16 (59,3 %) abnormal bacterial urine levels. As a result, urinary sediment analysis based on the score of abnormal elements (granular cylinders, cells of the renal tubular epithelium) showed a sensitivity of 76% and a specificity of 86% in predicting the severity of renal damage, which is significantly associated with the increased risk of worsening acute kidney injury due to chronic diseases like diabetes and high blood pressure.[24]

The logistic regression study found three significant associations between diastole systolic and leucocyte sedimentation with Hypertension with adjusted odds ratios (ORs) and 95% confidence intervals (CIs). Our study found that systolic with an odd ratio of 70,00 explained that elderly with abnormal diastole with 70x increased the risk of Hypertension. The odd systole ratio is 15,422, meaning that abnormal diastole will double the risk of elderly Hypertension 15 times, and leucocyte sedimentation with an odd ratio 6 with double the risk 6 times. Regardless of the definition of Hypertension, systolic as well as diastolic Independently, hypertension affected the likelihood of unfavorable cardiovascular events. On the other hand, systolic blood pressure increase had a bigger effect on the results.[25] Hypertension guidelines include systolic and diastolic blood pressure goals.[26] Despite this, it has been suggested that merely measuring systolic blood pressure would result in better treatment for Hypertension based on findings from the Framingham Heart Study.[27] Acute interstitial nephritis's most common urine sediment characteristics include leukocytic cylindric.[28] This can help detect kidney damage, frequently resulting in chronic diseases that develop asymptomatically.[24]

Primary data gathering with in-depth profiling is one of the study's critical assets. The study's main drawback was our inability to recruit sufficient participants. The 2017 American College of Cardiology (ACC)/American Heart Association (AHA) Blood Pressure Guidelines were employed in the current study, which might be considered additional strength.

CONCLUSION

The logistic regression study found three significant associations between diastole systolic and leucocyte sedimentation with Hypertension. For the net study, various hormones are another pathological marker that can be included in hypertension screening.

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