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ANALYSIS OF FACTORS INFLUENCING BLOOD PRESSURE IN ELDERLY POSYANDU PARTICIPANTS IN NGANJUK DISTRICT

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Hypertension is one of the major health problems in the elderly and can increase the risk of cardiovascular disease. Identification of factors that affect blood pressure in the elderly is important to support prevention and control efforts. This research aims to determine the factors that influence blood pressure in elderly Posyandu participants in Nganjuk Regency, East Java. This study used a descriptive analytical design with a cross-sectional approach. The sample consisted of 78 elderly and pre-elderly people who were registered as active participants of the integrated health post in 2024. Blood pressure data were obtained from the documentation of the integrated health post for 3 months, and other variables were collected through secondary data. Data analysis was carried out using the Pearson correlation test and ordinal logistic regression with the help of Stata 17 software. The result of this study are show most respondents (56.41%) were in the hypertension category. The results of the correlation test showed that only the variable of active participation in Posyandu was significantly related to blood pressure ($r = -0.225$; $p = 0.047$). The results of ordinal logistic regression showed that active participation in Posyandu was a significant protective factor against high blood pressure (OR = 0.239; $p = 0.031$). Other variables such as age, gender, waist circumference, and exercise habits did not have a significant effect ($p > 0.05$). it could be concluded that active participation in Posyandu has a significant relationship with more controlled blood pressure in the elderly. Strengthening the role of Posyandu in hypertension control programs in the community is needed.

Keywords: blood pressure, elderly, Posyandu, hypertension, risk factors

INTRODUCTION

Blood pressure is an important indicator in assessing health status, especially in the elderly. Hypertension is a significant public health problem, particularly in the elderly, where it poses a major risk for cardiovascular, renal, and cerebrovascular diseases. Physiological changes associated with aging, such as decreased arterial elasticity and increased peripheral resistance, contribute to elevated systolic blood pressure.

According to World Health Organization (WHO) data, around 1.28 billion adults worldwide suffer from hypertension, and most are unaware of it, especially in developing countries with limited early detection systems (WHO, 2018). In Indonesia, Basic Health Research (Riskesdas) data shows that the prevalence of hypertension continues to increase, especially in the age group ≥ 45 years (Health Research and Development Agency, 2018). This is a serious concern, including in Nganjuk Regency, East Java, which has a fairly large elderly population and is active in elderly posyandu activities. Elderly posyandu acts as a forum for preventive and promotive health services that are carried out routinely at the village and sub-district levels, including blood pressure monitoring.

Elderly Posyandu in Nganjuk Regency is the spearhead of community-based health services. This activity aims for early detection, routine blood pressure monitoring, and education on the relationship between lifestyle and the risk of

hypertension. However, variations in blood pressure seen in each Posyandu indicate other factors that may not have been optimally explored. Based on the results of routine monitoring, there were significant variations in blood pressure among participants, which could not be explained solely by age and various other factors such as nutritional status, physical activity, stress, smoking habits, salt consumption, and history of illness and treatment, which are suspected to also affect blood pressure in the elderly. In addition, social factors such as family support and education level can also influence individual health behavior.

This study was conducted in 2024 involving 78 elderly posyandu participants in Nganjuk Regency who were in the pre-elderly to elderly age range. The purpose of this study was to analyze various factors that influence blood pressure in this group. The results of this study are expected to provide a real contribution to the development of more effective intervention strategies at the community level, as well as become the basis for strengthening the elderly posyandu program in efforts to prevent and control hypertension in local areas. Encourage the improvement of the elderly posyandu program with a local evidence-based approach, so as to reduce the prevalence of hypertension and improve the quality of life of the elderly in Nganjuk Regency.

METHODS

Study design

This study is a quantitative study with an observational analytical approach and cross-sectional design, which aims to analyze the factors that influence blood pressure in elderly posyandu participants in Nganjuk Regency. The study was conducted from January to March 2024, with the location of data collection at the elderly posyandu in Mlorah village, Rejoso district, Nganjuk Regency, East Java

Population and sample

The population in this study were all active elderly posyandu participants who routinely participated in activities during that period. The sampling technique used the purposive sampling method, with the following inclusion criteria: pre-elderly (45–59 years) to elderly ($\geq$ 60 years), Inclusion criteria were: active participation in Posyandu for the past 3 months, complete blood pressure documentation, and willingness to participate. A total of 78 respondents were selected using purposive sampling.

Data collection

Blood pressure data in this study were obtained through documentation of the results of Posyandu recording for 3 months (January–March 2024), which were carried out by cadres or health workers using a digital blood pressure measuring device. Blood pressure values were categorized based on the American Heart Association (AHA) classification into normal blood pressure, pre-hypertension, and hypertension. The independent variables analyzed included: Age and gender (based on respondent identity data), waist circumference during Posyandu visits, exercise habits (through interviews based on exercise habits), and active participation in Posyandu activities for the elderly. Data collection was conducted through a combination of structured interviews, anthropometric measurements, and secondary data tracing from posyandu records.

Data analysis

All data were then analyzed using Stata software version 17. Statistical analysis included: Pearson correlation test to determine the relationship between independent variables and blood pressure and ordinal logistic regression analysis to identify dominant factors that significantly affect blood pressure. This study has obtained ethical approval from the Health Research Ethics Committee and each respondent signed a consent form after being given an explanation of the purpose and procedures of the study.

RESULTS

This study involved 78 respondents from the pre-elderly and elderly groups who actively participated in posyandu activities in Mlorah Village, Nganjuk Regency. The purpose of the study was to identify factors that influence blood pressure based on documentation data for the past three months.

Table 1 Frequency distribution based on respondents' blood pressure

Blood Pressure Category	Number of Respondents	Percentage (%)
Normal	9	11.54
Pra-hipertensi	25	32.05
Hipertensi	44	56.41
Total	78	100

Based on table 1, the majority of respondents, 44 people (56.41%), are in the hypertension category.

Table 2 Frequency distribution based on respondent characteristics

Characteristics	Number of Respondents	Percentage (%)
gender		
Female	69	88.46
Male	9	11.54
Total	78	100
age (yr)		
45-59	4	5.13
60-69	36	46.15
70-79	32	41.03
≥ 80	6	7.69
Total	78	100
Abdominal circumference		
Normal	11	14.10
Risky	67	83.90
Total	78	100
Exercise Habits		
Routine	71	91.03
Sometimes	7	8.97
Total	78	100
Actively participate in integrated health posts		
Routine	66	84.62
Sometimes	12	15.38

Characteristics	Number of Respondents	Percentage (%)
Total	78	100

Based on table 2, it can be seen that the majority of respondents 69 people (88.46%) are women, based on age group, most respondents are in the elderly group with the distribution of young elderly groups 36 people (46.15%), middle-aged elderly 32 people (41.03%) the rest are pre-elderly and old elderly groups. Based on the results of the abdominal circumference examination, it was recorded that 67 people (85.90%) had a risky abdominal circumference, meaning more than the normal size, based on participation in integrated health posts, most respondents 66 people (84.63%) actively participated in integrated health posts activities, while based on exercise habits, the majority of respondents 71 people (91.03%) reported having regular exercise habits.

Table 3 Results of Pearson correlation test between blood pressure and related factors (n=78)

Variable	Correlation Coefficient (r)	*p-value*	Interpretation
Age	-0.0247	0.8299	Not significant
Gender	0.1138	0.3210	Not significant
Abdominal circumference	0.1031	0.3689	Not significant
Actively participate in integrated health posts	-0.2253	0.0433	Significant negative
Exercise Habits	-0.0091	0.9366	Not significant

Based on the results of the correlation analysis in table 3, it shows that: Participating in integrated health posts has a significant negative relationship to blood pressure with r = -0.2253 and p-value = 0.0473. This means that active participation in integrated health posts activities tends to be related to more controlled blood pressure. Other variables such as gender, age, waist circumference, and exercise habits show p-values> 0.05, which indicates that there is no statistically significant relationship to blood pressure based on the Pearson correlation test.

Table 4 Results of ordinal logistic regression analysis of blood pressure on risk factors (n=78)

Variable	Coefficient (β)	SE	*p-value*	*Odds Ratio* (OR)	99% CI OR	Interpretation
Gender	1.163	0.828	0.160	3.200	0.631-16.214	Not significant
Age	0.110	0.342	0.747	1.117	0.571-2.183	Not significant
Abdominal circumference	1.056	0.646	0.102	2.874	0.811-10.118	Not significant (tends to be high)
Actively participate in integrated health posts	-1.433	0.665	0,031	0.239	0.065-0.879	Significant negative

Variable	Coefficient (β)	SE	*p-value*	*Odds Ratio* (OR)	99% CI OR	Interpretation
Exercise Habits	-0.362	0.876	0.680	0.696	0.125-3.879	Not significant

Based on the results of the regression analysis in table 4, it can be identified that the statistically significant variable is actively participating in the integrated health post (p-value = 0.031), with an OR value of 0.239 which means that active participation in the integrated health post reduces the risk of hypertension, this shows that respondents who actively participate in the integrated health post have a smaller chance (around 76% lower) of experiencing high blood pressure compared to those who are inactive. The most dominant variable (in terms of effect) is waist circumference, although it has a fairly high OR (OR = 2.874), but is not significant (p-value = 0.102). other variables such as gender, age and exercise habits also do not show a significant effect (p-value> 0.05), although not proven significant, however, the direction of the coefficient shows a tendency for male gender to have a higher odds ratio for hypertension (OR = 3.20) as well as waist circumference at risk tends to increase the risk of hypertension (OR = 2.87).

The results of this study indicate that active participation in posyandu activities is a protective factor against high blood pressure in the elderly and pre-elderly. Meanwhile, although gender, waist circumference, and age did not show statistical significance in the regression model, the direction of the relationship still supports previous findings in the literature that these factors can contribute to an increased risk of hypertension.

DISCUSSION

This study shows that most respondents (56.41%) are in the hypertension category. This finding is consistent with the 2018 Basic Health Research (Riskesdas) report which states that the prevalence of hypertension in Indonesia increases with age, with the elderly group showing the highest proportion (Badan Litbangkes, 2018). This phenomenon can be explained by physiological changes related to aging, including decreased blood vessel elasticity and increased peripheral resistance that triggers an increase in systolic blood pressure (Franklin et al., 1997)

The results of the correlation test showed that active participation in the integrated health post had a significant negative correlation with blood pressure (r = -0.2253; p-value = 0.0473). This was also reinforced through ordinal logistic regression analysis which showed that respondents who were active in integrated health post activities had a lower risk of experiencing hypertension (OR = 0.239; p-value = 0.031). This shows that the existence of integrated health posts as a means of monitoring the health of the elderly has a protective effect against high blood pressure. Previous studies have also found that the involvement of the elderly in community-based health services contributes to increased knowledge, adherence to treatment, and adoption of a healthy lifestyle (Susilo & Hartono, 2021; WHO, 2021).

Although not statistically significant, gender, age, waist circumference, and exercise habits (p-value > 0.05), the direction of the associations showed a pattern that was still clinically relevant. Men were 3.2 times more likely to have high blood

pressure than women (OR = 3.20; p-value = 0.160). This is in accordance with previous findings that men are more susceptible to hypertension in middle age, although the prevalence may reverse in old age due to the decline in protective estrogen in postmenopausal women (Reckelhoff, 2001).

High waist circumference, as an indicator of abdominal obesity, also showed a tendency to increase the risk of hypertension (OR = 2.87; p-value = 0.102). Central obesity is known to be associated with activation of the sympathetic nervous system and the renin-angiotensin system, which contribute to increased blood pressure (Hall et al., 2015). Although not significant in this analysis, this variable needs to be considered in long-term intervention strategies.

Meanwhile, age did not show a significant association (p-value = 0.747), possibly due to the homogeneity of the age range of respondents in the pre-elderly and elderly groups. Likewise, exercise habits were not significant (p-value = 0.680), which could be due to variations in the frequency and intensity of physical activity that were not measured objectively. These findings confirm that active participation in posyandu activities has an important role in controlling blood pressure in the elderly. Community-based interventions such as posyandu have been shown to be effective in increasing awareness, regular monitoring, and encouraging healthy living behaviors (Setiati & Sutanto, 2020). Therefore, strengthening the capacity of posyandu and training cadres are important strategies in controlling hypertension in the elderly population.

However, this study has limitations, including the use of a cross-sectional design that does not allow for causality tracing. In addition, the use of secondary data from posyandu documentation can have variations in blood pressure recording techniques. Several other lifestyle variables that have the potential to affect blood pressure, such as stress, salt intake, and history of comorbidities, have not been included in this analysis model.

CONCLUSION

A single paragraph consists of conclusions and suggestions of future research directions. The conclusion should be the answer to the study problem, without an unequivocal statement. Suggestions should be logical and appropriate.

CONFLICT OF INTEREST

The author declares that there is no conflict of interest related to the implementation, analysis, or publication of the results of this study. The entire research process was carried out independently without any influence from other parties, either financially, personally, or institutionally.

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