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OVERVIEW OF BLOOD PRESSURE AND BLOOD SUGAR LEVELS IN ELDERLY PEOPLE AT THE SINDUADI VILLAGE

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ABSTRACT

This study aims to describe the status of blood pressure and blood sugar levels among elderly people at the Sinduadi Health Center. A descriptive quantitative method with a cross-sectional design was used, involving 97 elderly respondents selected through total sampling. Data collection included direct measurement of systolic and diastolic blood pressure as well as random blood glucose levels. The results showed that the average age of respondents was 67.36 ± 6.55 years, with an average systolic blood pressure of 133.63 ± 16.66 mmHg and diastolic blood pressure of 75.12 ± 11.50 mmHg. The mean blood glucose level was 140.03 ± 70.83 mg/dL. Most respondents were classified as pre-hypertensive (49.5%), followed by hypertensive (30.9%) and normal (19.6%), while for blood glucose, 62.9% were normal, 22.7% pre-diabetic, and 14.4% diabetic. The findings indicate that elderly people at the Sinduadi Health Center tend to experience increased blood pressure and blood glucose levels with age. This pattern emphasizes the importance of routine monitoring of blood pressure and blood sugar levels and the implementation of health education programs for lifestyle modification to prevent the progression of non-communicable diseases such as hypertension and diabetes mellitus among the elderly population.

Keywords

Elderly, Blood Pressure, Blood Glucose, Prehypertension, Prediabetes

INTRODUCTION

Aging is an inevitable biological process characterized by progressive decline in physiological function, which ultimately increases susceptibility to noncommunicable diseases (NCDs) such as hypertension and diabetes mellitus. Older adults (≥ 60 years) often experience vascular, metabolic, and hormonal changes that trigger increased blood pressure and impaired blood glucose. This risk is of particular concern in Indonesia, as the burden of NCDs continues to increase among the elderly population.

In Indonesia, the prevalence of hypertension among the elderly is substantial. A study in four major Indonesian cities identified that in elderly men, determinants such as body fat mass, body mass index (BMI), and waist circumference were significantly correlated with systolic blood pressure. (Kamso and Purwantyastuti, 2006) Meanwhile, in a broader study, it was found that sodium intake, saturated fat, total cholesterol, the ratio of total cholesterol to HDL, and physical activity were determinants of blood pressure in elderly people with normal weight, while in elderly people who were overweight, potassium and calcium intake and BMI were the dominant factors. (Kamso et al., 2007)

Similarly, glucose metabolic disorders are a growing threat. A trend study in Indonesia shows that the prevalence of diabetes increased from around 10.7% in 2013 to around 11.8% in 2018 before declining slightly to 11.3% in 2023. (Muharram et al., 2025) For the elderly, nutritional status and BMI have also been shown to have a significant relationship with fasting blood sugar levels. For example, a study in Surakarta found that the majority of elderly people had a BMI ≥ 25 kg/m² and there was a significant relationship between nutritional status and fasting blood sugar levels ($p = 0.012$).

The context of public health services at the grassroots level, such as at integrated service posts (Posyandu), is important because screening and monitoring the health of the elderly at Posyandu can provide an overview of the blood pressure and blood sugar profiles of the elderly population. However, in many Posyandu, data related to the blood pressure and blood sugar profiles of the elderly are still limited or have not been systematically documented.

Based on this background, this study aims to describe the blood pressure and blood sugar status of elderly people visiting the Sinduadi Posyandu, in order to obtain basic data that can be used as material for evaluation and recommendations for promotive-preventive interventions for the elderly in the area.

METHOD

This study is a quantitative study with a cross-sectional design that aims to describe the status of blood pressure and blood sugar in elderly people at the Sinduadi Health Center. A cross-sectional design was chosen because it is suitable for assessing the description or prevalence of physiological conditions at a single point in time, and is widely used in similar studies examining the relationship between age and hypertension in the elderly in various regions of Indonesia (Sari & Utami, 2020).

Sphygmomanometer In this study, a digital sphygmomanometer of the *Easy Touch* brand was used. This device has been tested and proven to be accurate for blood pressure measurements, in accordance with applicable medical device testing standards.

The glucometer used in this study was the Easy Touch model, which has a high level of accuracy that has been proven through clinical testing. This glucometer is compatible with Easy Touch test strips, ensuring consistency and reliability of blood sugar measurement results.

Measurement Procedure:

1. **Blood Pressure Measurement:** Before measurement, participants were asked to rest for 5 minutes in a comfortable sitting position. The arm should be parallel to the heart, with the sphygmomanometer placed on the participant's upper arm. The measurement process was carried out by following the instructions for using the Easy Touch digital device.
2. **Blood Sugar Measurement:** Blood sugar levels are measured after participants have not eaten or drunk anything (fasting) for at least 8 hours prior to measurement. Participants are asked to wash their hands with soap and water before taking a blood sample from their fingertip. The Easy Touch glucometer is used in accordance with the standard procedures recommended by the manufacturer, and the measurement results are recorded immediately.

In this study, participants who met the inclusion criteria were those aged 60 years or older, who were conscious and willing to provide written consent to participate in the study. In addition, participants must be able to communicate well and follow the instructions given during the measurement procedure. Participants who were not experiencing acute illness or medical conditions that could affect blood pressure or blood sugar measurements at the time of measurement were also included in the inclusion criteria.

Meanwhile, participants who were excluded from the study (exclusion criteria) were those who were unwilling to participate or did not provide written consent, as well as those who had acute illnesses such as severe infections that could affect the measurement results. In addition, participants who had fasted for more than 12 hours at the time of blood sugar measurement were also excluded, as this condition could affect the accuracy of blood sugar level measurements. Participants who were unable to cooperate or had difficulty following the measurement procedure were also excluded from the study.

The reason for excluding participants who had fasted for more than 12 hours was to ensure the validity of the blood sugar measurement results, as prolonged fasting can alter metabolic conditions and produce data that is not representative of normal blood sugar levels.

Because this study design uses a cross-sectional approach, it is not possible to draw causal conclusions between blood pressure and blood sugar levels. A cross-sectional design can only describe the relationship between the two variables at a single point in time, without determining the direction of the relationship or the cause and effect between them.

Therefore, although this study provides a useful overview of blood pressure and blood sugar levels in older adults, further research with a longitudinal or experimental design is needed to determine the causal relationship between blood pressure and blood sugar levels and the factors that influence them.

The study was conducted at the Sinduadi Elderly Health Center, within the working area of the local Community Health Center, in August 2025. The population in this study was all elderly people who were registered and actively participated in activities at the Sinduadi Elderly Health Center. The population and sample size in this study was 97 respondents, with a total sampling technique used.

This research had gone through a process of ethical feasibility research and had been approved by the Medical and Research Ethics Committee STIKES RS Dr. Soetomo number KEPK/YRSDS/072/XII/2025

RESULTS

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Based on the results of descriptive analysis of 97 elderly respondents at the Sinduadi Posyandu, the age range was between 59 and 87 years, with an average of 67.36 ± 6.55 years. The majority of respondents were aged between 63 and 72 years (25th–75th quartile). This shows that most of the elderly who participated in Posyandu activities were in the early to middle old age category.

Table 1. Descriptive Statistics of Research Variables in Elderly People at Sinduadi Community Health Center (n = 97)q

variable	Min-Max	Mean	SD
Systolic blood pressure (mmHg)	87-190	133,63	16,66
Diastolic blood pressure (mmHg)	52-110	75,12	11,50
Gula darah sewaktu (mg/dL)	47-479	140,03	70,83
Age (years)	59-87	67,36	6,55

The analysis results show that most elderly people at the Sinduadi Community Health Center have an average systolic blood pressure of 133.63 mmHg and an average diastolic blood pressure of 75.12 mmHg, which indicates a tendency toward prehypertension or mild hypertension. The average blood sugar level was 140.03 mg/dL, with variations indicating the possibility of prediabetes or diabetes in some participants. The average age of participants was 67.36 years, indicating that most participants were in the elderly category. These findings underscore the importance of routine monitoring of blood pressure and blood sugar to prevent the development of hypertension and diabetes in the elderly.

Table 2. Distribution of Blood Pressure in Elderly People at the Sinduadi Health Center (n = 97)

Variable	f	%
Normal	**19**	**19,6**
Pre-hypertension	**48**	**49,5**
hypertension	**30**	**30,9**

The distribution of blood pressure status is shown in Table 2. Most respondents were classified as prehypertensive, totaling 48 people (49.5%), followed by the hypertensive category with 30 people (30.9%), while only 19 people (19.6%) had normal blood pressure. The mean systolic blood pressure was 133.63 ± 16.66 mmHg, and the mean diastolic blood pressure was 75.12 ± 11.50 mmHg. These results indicate that the prevalence of elevated blood pressure is quite high among the elderly at the Sinduadi Health Center.

Table 3. Blood Sugar Distribution among Elderly People at the Sinduadi Health Center (n = 97)

Variable	f	%
Normal	**61**	**62,9**
Pre-Diabetic	**22**	**22,7**
Diabetic	**14**	**14,4**

Based on the results of random blood glucose tests, it was found that most elderly people were normal, with 61 people (62.9%), pre-diabetic, with 22 people (22.7%), and diabetic, with 14 people (14.4%) (Table 2). The average blood sugar level of the respondents was 140.03 ± 70.83 mg/dL, with a minimum value of 47 mg/dL and a maximum value of 479 mg/dL.

Table 4. Distribution of Blood Pressure and Blood Sugar in Elderly People at the Sinduadi Health Center (n = 97)

Blood pressure category	Normal blood sugar	%	Pre-Diabetes	%	Diabetes	%	Total	100
Normal	14	73,3	2	10,5	3	15,8	19	
Pre hypertension	32	66,7	8	16,7	8	16,7	48	
hypertension	15	50,5	12	40,0	3	10,0	30	
total	61	62,9	22	22,7	14	14.4	97	

Based on the results of descriptive analysis of 97 elderly respondents at the Sinduadi Health Center, a picture of blood pressure and blood sugar levels distribution was obtained as presented in Table 4. The results of the study show that most respondents were in the pre-hypertension category, namely 48 people (49.5%), followed by the hypertension category with 30 people (30.9%), and normal blood pressure with 19 people (19.6%). These findings indicate that nearly half of the elderly have elevated blood pressure, which indicates a risk of developing hypertension if there is no proper control of diet, physical activity, and adherence to routine health checkups.

In terms of blood sugar levels (GDS), it was found that most elderly people were in the normal category, namely 61 people (62.9%), while pre-diabetes was found in 22 people (22.7%), and diabetes in 14 people (14.4%). These results illustrate that although most elderly people have normal blood sugar levels, nearly one-third of respondents have above-normal blood sugar levels, indicating the need for early prevention efforts against the risk of diabetes mellitus. When viewed based on the cross-distribution between blood pressure and blood sugar levels, most elderly people with normal blood pressure also had normal blood sugar levels (73.7%), while in the pre-hypertension group, the proportion of elderly people with normal blood sugar levels decreased to 66.7%. In the hypertension group, the proportion of elderly people with normal blood sugar levels was only 50.0%, and a higher proportion of pre-diabetes (40.0%) was found compared to other groups.

These results show a tendency that the higher the blood pressure category, the greater the proportion of elderly people with abnormal blood sugar levels (pre-diabetes or diabetes). This condition can be explained through physiological mechanisms in which increased blood pressure is often associated with insulin resistance and glucose metabolism disorders that commonly occur in old age (Rahmawati et al., 2021; Dewi & Sari, 2022). Therefore, these results emphasize the importance of routine monitoring of blood pressure and blood sugar levels in the elderly as a step toward early detection of the risk of hypertension and diabetes mellitus.

DISCUSSION

The results of this study show that nearly half of the elderly at the Sinduadi Health Center (49.5%) are in the prehypertension category, and 30.9% are in the hypertension category. Meanwhile, for blood sugar, 22.7% were in the pre-diabetes category and 14.4% in the diabetes category. These findings indicate that the burden of blood pressure and blood sugar disorders in the elderly is quite high, even though the majority are still in the “normal” category for blood sugar.

The fact that the hypertension group had a higher proportion of pre-diabetes (40.0%) compared to the normal blood pressure group (10.5%) or pre-hypertension group (16.7%) indicates a tendency that increased blood pressure may be related to increased blood sugar levels. Although this study is descriptive and does not perform inferential analysis (χ^2 test or regression) to determine the strength or significance of the relationship, this pattern is consistent with several national and international studies showing a relationship between hyperglycemia and hypertension in the elderly.

For example, research in Yogyakarta found that high blood sugar levels correlate with the incidence of hypertension in elderly people at elderly health centers. (Sofiana, Khusna and Pradana, 2019) In addition, a descriptive study in Village Y, Gresik Regency, reported that 50% of elderly people were in the hypertension category, and 22% had blood sugar levels in the diabetes category. (Alayyannur et al., 2020) Studies using national-scale data also show that among the 60 years and older age group in Indonesia, the prevalence of hypertension reaches 63.2%. (Oktamianti et al., 2022) Therefore, the findings at the Sinduadi Posyandu confirm that the elderly are a group vulnerable to two non-communicable diseases (NCDs) simultaneously or consecutively.

Physiologically, the mechanisms linking high blood pressure and increased blood sugar (or insulin resistance) include vascular changes (stiffer arteries), activation of the renin-angiotensin system, and oxidative stress triggers that can damage the blood vessel endothelium. These conditions are common in the aging process and can be exacerbated by unhealthy lifestyles such as high salt intake, low physical activity, obesity, and a diet high in simple carbohydrates and fats. In the context of the elderly, Experiencing metabolic changes, these habits also accelerate the onset of hypertension and blood glucose abnormalities.

From the perspective of community health services, these results emphasize the importance of integrated interventions: not only routine blood pressure measurements, but also regular blood sugar monitoring in the elderly. Strategies for elderly health posts should consider dual screening (blood pressure + blood sugar levels), education on healthy lifestyles (daily light physical activity, a balanced diet low in salt and sugar), and strengthening collaboration between health post cadres and health workers at community health centers. These early detection and follow-up efforts are crucial so that the elderly are not only diagnosed with hypertension or pre-diabetes/diabetes, but also so that the potential for comorbidity between the two can be minimized.

However, this study has several limitations that need to be acknowledged. First, the data presented is cross-sectional in nature, so it cannot show the direction of causality between blood pressure and blood sugar levels. Second, the sample size is relatively small (n = 97) and only from one Posyandu, so the generalization of the results to a wider area is limited. Third, potential confounding variables such as physical activity, diet, obesity, antihypertensive or antidiabetic medication were not further analyzed, so that mechanisms or moderator/mediator factors could not be explored. Further research is recommended using a longitudinal design or multivariate analysis that takes these factors into account.

In conclusion, although this study only describes the distribution, the patterns found indicate that elderly people at the Sinduadi Posyandu are at risk of developing simultaneous hypertension or diabetes. Therefore, the elderly posyandu program needs to be upgraded from mere monitoring to integrated prevention that combines measurement, education, and follow-up. This is in line with national recommendations that early detection and treatment of NCDs in the elderly should be a priority in public health development in Indonesia.

CONCLUSIONS

This study shows that most elderly people at the Sinduadi Health Center have blood pressure in the prehypertension category and blood sugar levels within the normal range, although the proportion of elderly people with hypertension and blood sugar levels above normal (prediabetes and diabetes) is still quite high. This pattern illustrates a tendency for blood pressure to increase along with changes in blood sugar levels in the elderly. These findings emphasize the importance of regular monitoring of blood pressure and blood sugar levels, as well as education on healthy lifestyles for the elderly, as a means of early prevention of non-communicable diseases, particularly hypertension and diabetes mellitus, at the community health service level, such as the Elderly Health Center.

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