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Original Article

Analysis of Factors Affecting the Incidence of Hypertension in the Productive Age Group at the Muara Beliti Community Health Center: A cross-sectional study

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Abstract

Background
Hypertension is one of the leading non-communicable diseases with increasing prevalence, including among the productive age group. Several risk factors such as age, occupation, body weight, family history, smoking habits, physical activity, and fruit and vegetable consumption are suspected to influence the incidence of hypertension.

Objective
This study aimed to analyze the factors affecting the incidence of hypertension among productive age individuals in the working area of Muara Beliti Public Health Center in 2025.

Methods
This was a quantitative study using a cross-sectional approach. A total of 93 respondents aged 16–64 years were selected using purposive sampling. Data were collected through questionnaires and medical records, then analyzed using Chi-Square and multivariate logistic regression tests.

Results
The results showed significant relationships between age (p=0.031), body weight (p=0.001), smoking habits (p=0.030), physical activity (p=0.016), and fruit and vegetable consumption (p=0.011) with the incidence of hypertension. No significant relationship was found between occupation and family history with hypertension. Multivariate analysis revealed that physical activity was the most dominant factor (p=0.002; OR=4.80; 95% CI=1.80–12.80).

Conclusion
Physical activity is the most dominant factor influencing the incidence of hypertension among the productive age population.Health interventions should prioritize increasing physical activity, promoting healthy eating habits, and controlling other risk factors to reduce the incidence of hypertension among productive age individuals.

Background

Hypertension is one of the most common non-communicable diseases and a leading cause of morbidity and mortality worldwide (WHO, 2021). The global prevalence of hypertension is projected to reach 33% by 2030, indicating that one-third of the world's population will be at risk (NCD Risk Factor Collaboration, 2021). Uncontrolled blood pressure elevation can lead to severe complications such as stroke, heart disease, and kidney failure, imposing a substantial burden on individuals, families, and healthcare systems (Ferdi et al., 2023). Alarmingly, hypertension is no longer confined to the elderly but has increasingly affected individuals in the productive age group (Violita et al., 2024). This demographic, expected to be at the peak of productivity, is now experiencing health deterioration due to this chronic condition. Therefore, understanding the factors influencing the occurrence of hypertension, particularly among the productive age population, is of paramount importance (Akbar, Sahar, Rekawati, & Sartika, 2025).

In Indonesia, the prevalence of hypertension remains high despite various health promotion and prevention efforts. National data show a prevalence rate of 34.1%, making hypertension one of the most common chronic diseases in the country. Among individuals aged 18–59 years—classified as the productive age group—5.9% have been diagnosed with hypertension; however, only 2.53% regularly take medication, and 2.34% attend follow-up visits (Ministry of Health of the Republic of Indonesia, 2024). These figures indicate low awareness and adherence to hypertension management among productive-age individuals, which may lead to reduced work productivity and increased risk of long-term complications (Iskandar et al., 2023).

This trend underscores the need for heightened attention to prevention and control strategies,

as hypertension is increasingly affecting younger age groups (Toar & Sumendap, 2023). Several unhealthy lifestyle factors contribute to this condition, including poor dietary patterns, smoking, excessive stress, physical inactivity, and overweight or obesity. Consequently, it is essential to further explore risk factors relevant to the local demographic and socioeconomic context (Sidabutar et al., 2022).

In South Sumatra Province, hypertension is also a major public health issue. Data indicate that 1,979,134 individuals aged ≥15 years suffer from hypertension, with the highest number of cases recorded in Palembang City (411,518), followed by Musi Rawas District (103,869) (South Sumatra Provincial Health Office, 2023). These figures suggest that Musi Rawas, including the Muara Beliti subdistrict, bears a significant hypertension burden. Given that Muara Beliti has a large productive-age population and an active economic sector, identifying hypertension risk factors in this area is crucial. Understanding the dominant factors influencing hypertension will enable the development of more targeted and effective health promotion and prevention strategies (Adamu et al., 2022).

Previous studies have identified several factors contributing to hypertension incidence (Akbar et al., 2024), including age, occupation, body weight, family history of hypertension, smoking habits, physical activity level, and fruit and vegetable consumption patterns (Ashraful et al., 2022). Advancing age increases hypertension risk due to physiological changes in blood vessels (Avogo, 2023). Occupations associated with chronic stress or low physical activity are also linked to elevated blood pressure. Overweight and obesity are well-established risk factors, contributing to increased blood volume and peripheral resistance (Akbar, Sahar, Rekawati, et al., 2025; Guo et al., 2023).

A family history of hypertension serves as an important indicator, reflecting both genetic predisposition and shared lifestyle behaviors within households (Jehani et al., 2022). Smoking—whether active or passive—has been shown to accelerate vascular damage and elevate hypertension risk (Kartikasari et al., 2022). Low physical activity can reduce cardiovascular fitness and increase insulin resistance, both of which contribute to hypertension. Conversely, adequate fruit and vegetable consumption helps maintain normal blood pressure due to the fiber, potassium, and antioxidants that support vascular and cardiac function (Puteri & Nugraheni, 2023).

Despite the identification of multiple risk factors, few studies have specifically examined these determinants among the productive-age population at the primary healthcare level. Community health centers (puskesmas) play a strategic role in early detection, health education, and monitoring of hypertension patients (Utami et al., 2023). Locally conducted research, such as at Puskesmas Muara Beliti, can provide essential contextual information for developing evidence-based interventions tailored to the community's characteristics. Moreover, such findings can strengthen preventive health policies targeting productive-age individuals (Yeni et al., 2022).

Based on this background, this study aims to analyze the factors influencing the incidence of hypertension among productive-age individuals in the working area of Puskesmas Muara Beliti. The research will comprehensively examine variables such as age, occupation, body weight, family history, smoking habits, physical activity, and fruit and vegetable consumption in relation to hypertension incidence.

Methods

Study Design

This study employed a quantitative design with a cross-sectional approach to identify factors associated with the incidence of hypertension among the productive-age population in the working area of Puskesmas Muara Beliti in 2025. This design was chosen because it enables the assessment of relationships between variables at a single point in time. The study was conducted from April 25 to May 16, 2025. This approach allowed simultaneous analysis of hypertension occurrence in relation to individual characteristics such as age, occupation, body weight, family history, smoking habits, physical activity, and fruit and vegetable consumption within the productive-age population.

Sampling

The study population comprised all patients visiting Puskesmas Muara Beliti in 2024, totaling 12,986 individuals. A sample of 93

respondents was selected using purposive sampling, with the sample size determined through Slovin's formula to ensure representativeness. Inclusion criteria were individuals willing to participate, aged 16–64 years, and able to communicate effectively. Exclusion criteria included individuals who were acutely ill at the time of data collection or who declined to participate.

Instruments

Primary data were collected using a structured questionnaire adapted from previous research. The questionnaire assessed independent variables, including age, occupation, body weight, family history of hypertension, smoking habits, physical activity level, and fruit and vegetable consumption. The dependent variable, hypertension incidence, was obtained from secondary data available at Puskesmas Muara Beliti. The instrument was adapted to the local context and presented in language that was easily understood by productive-age respondents.

Data Collection

Data collection was carried out during the study period, from April 25 to May 16, 2025. Respondents who met the inclusion criteria were informed about the study objectives and procedures and were then asked to complete the questionnaire after providing written informed consent. Questionnaires were self-administered, with the researcher available to provide assistance when necessary. Data on hypertension incidence were obtained through a review of medical records at the health center.

Data Analysis

Data processing included editing, coding, and entry. Editing was conducted to ensure completeness and consistency of responses. Each item was then coded numerically to facilitate entry into statistical software. Data were analyzed using SPSS software. Univariate analysis was used to describe the frequency distribution of each variable. Bivariate analysis was performed using the Chi-square test to assess the association between independent and dependent variables, with a significance level set at $p \leq 0.05$. Multivariate analysis using logistic regression was conducted to identify the most dominant factors associated with hypertension incidence.

Ethical Consideration

Ethical principles of responsible research were upheld, including informed consent, confidentiality, and anonymity. Prior to questionnaire completion, respondents were provided with detailed information regarding the study objectives, benefits, and procedures, and were asked to sign an informed consent form to confirm their voluntary participation. To maintain confidentiality, respondent identities were anonymized and replaced with numerical codes. The researcher guaranteed that all personal information would be used solely for analysis and would not be disclosed in any form. The study obtained official approval from relevant authorities prior to implementation.

Results

This section presents the frequency distribution of respondents' characteristics based on the variables examined in relation to the incidence of hypertension among the productive-age population in the working area of Puskesmas Muara Beliti in 2025. Data are presented as both percentages and absolute numbers for each category of variables. This information provides an initial overview of the distribution of hypertension cases and respondent characteristics according to age, occupation, body weight, family history of hypertension, smoking habits, physical activity, and fruit and vegetable consumption. The detailed distribution of these variables is shown in Table 1.

Table 1 shows that the proportion of respondents without hypertension was 32 (34.4%), which was lower than those with hypertension, 61 (65.6%). The proportion of respondents in the late adulthood age group was 47 (50.5%), slightly higher than those in the early adulthood group, 46 (49.5%). For occupational status, respondents who were employed numbered 43 (46.2%), which was lower than those who were unemployed, 50 (53.8%). Respondents with a normal body weight accounted for 36 (38.7%), while those with abnormal body weight comprised 57 (61.3%). Respondents without a family history of hypertension totaled 30 (32.3%), which was lower than those with a positive family history, 63 (67.7%). In terms of smoking habits, non-smokers were 56 (60.2%), which was higher than smokers, 37 (39.8%). Respondents with

good physical activity were 51 (54.8%), slightly higher than those with moderate physical activity, 42 (45.2%). Lastly, respondents with adequate fruit and vegetable consumption totaled 50 (53.8%), which was higher than those with insufficient consumption, 43 (46.2%)

Table 1. Frequency Distribution Based on Respondent Characteristics

Variables	Frequency (n)	Percentage (%)
Hypertension status		
Non-hypertensive	32	34,4
Hypertensive	61	65,6
Age		
Late adulthood	47	50,5
Early adulthood	46	49,5
Occupation		
Employed	43	46,2
Unemployed	50	53,8
Body weight		
Normal	36	38,7
Abnormal	57	61,3
Family history		
None	30	32,3
Present	63	67,7
Smoking habits		
Non-smoker	56	60,2
Smoker	37	39,8
Physical activity		
Good	51	54,8
Moderate	42	45,2
Fruit and vegetable consumption		
Adequate	50	53,8
Inadequate	43	46,2
Total	**93**	**100**

Subsequently, bivariate analysis was conducted to examine the association between each independent variable and the incidence of hypertension among respondents in the productive-age group. This analysis aimed to identify factors that demonstrated a statistically significant relationship with hypertension. The results are presented in Table 2, which displays the proportion of hypertension cases according to the categories of each variable.

Table 2 shows that there were associations between age, body weight, smoking habits, physical activity, and fruit and vegetable consumption with the incidence of hypertension. The majority of early adulthood respondents had hypertension (39.1%), respondents with abnormal body weight experienced hypertension in 75.4% of cases, smokers accounted for 37.8% of hypertension cases, those with moderate physical activity had hypertension in 83.3% of cases, and respondents with inadequate fruit and vegetable consumption experienced hypertension in 86.0% of cases.

Following bivariate analysis using the Chi-square test, the study aimed to determine the relationships between various risk factors and the incidence of hypertension among the productive-age population in the working area of Puskesmas Muara Beliti. This analysis was performed to evaluate whether there were statistically significant associations between independent variables—such as age, occupation, body weight, family history, smoking habits, physical activity, and fruit and vegetable consumption—and the dependent variable, hypertension incidence. The results of this analysis are presented in Table 3.

Table 2. Analysis of the association between age, occupation, body weight, family history, smoking habits, physical activity, and fruit and vegetable consumption

Variables	Hypertension status				Total	Pvalue
	Non-hypertensive		Hypertensive			
	n	%	n	%	n	
Age						
Late adulthood	4	8,5	43	91,5	47	0,00
Early adulthood	28	60,9	18	39,1	46	
Occupation						
Employed	17	39,5	26	60,5	43	0,45
Unemployed	15	30,0	35	70,0	50	
Body weight						
Normal	18	50,0	18	50,0	36	0,02
Abnormal	14	24,6	43	75,4	57	
Family history						
None	8	26,7	22	73,3	30	0,39
Present	24	38,1	36	61,9	63	
Smoking habits						
Non-smoker	9	16,1	47	83,9	56	0,00
Smoker	23	62,2	14	37,8	37	
Physical activity						
Good	25	49,0	26	51,0	51	0,00
Moderate	7	16,7	35	83,3	42	
Fruit and vegetable consumption						
Adequate	26	52,0	24	48,0	50	0,00
Inadequate	6	14,0	37	86,0	43	

Table 3. Final Multiple Logistic Regression Model of Independent Variables Associated with Hypertension Incidence

Variable	*pValue*	*OR*	95,0% *C.I.for EXP*(B)	
			Lower	*Upper*
Physical activity	0,002	4,80	1,80	12,80

The results of the multivariate logistic regression analysis indicated that physical activity was the only variable significantly associated with hypertension incidence (p = 0.002, < 0.05). The odds ratio (OR) of 4.80 suggests that respondents with low or insufficient physical activity had a 4.8-fold higher likelihood of developing hypertension compared to those with adequate or good physical activity. The 95% confidence interval (CI) for the OR ranged from 1.80 to 12.80, indicating statistical precision and significance, as the interval did not include 1. These findings confirm that low physical activity is an important predictor of hypertension in the final model. Therefore, physical activity emerged as the dominant factor influencing hypertension among the productive-age population in the working area of Puskesmas Muara Beliti. This underscores the importance of promoting active lifestyles as a key strategy for hypertension prevention in this demographic group.

Discussion

The present study found a significant association between age and the incidence of hypertension among the productive-age population at Puskesmas Muara Beliti. Although the productive-age range is generally defined as 18–64 years, the risk of hypertension increases with advancing age, ultimately affecting quality of life and productivity (Asikin et al., 2021). Physiological changes in the cardiovascular system—such as arterial stiffening and reduced vascular elasticity—help explain why individuals in the late adulthood segment of the productive-age group are at greater risk compared to those in early adulthood (Prasasti, 2022). Age, therefore, functions not only as a biological determinant but also as a proxy for

accumulated lifestyle and stress exposures that contribute to elevated blood pressure (Sidabutar et al., 2022; Toar & Sumendap, 2023).

In contrast, no significant association was found between occupational status and hypertension (Arum, 2019). This suggests that whether an individual is employed or unemployed does not directly determine their blood pressure status. However, occupation may exert indirect influence through work-related stress, opportunities for physical activity, and dietary patterns (Iskandar et al., 2023). For example, unemployed individuals in this study may still experience hypertension due to low physical activity or unhealthy lifestyle behaviors (Jehani et al., 2022). Thus, in the productive-age population, lifestyle-related factors may play a more prominent role than occupational status alone.

Body weight showed a significant association with hypertension, consistent with previous findings that overweight and obesity markedly increase blood pressure (Mawanti, 2020; Avogo, 2023). Visceral fat accumulation may impair endothelial function and elevate peripheral vascular resistance, contributing to hypertension (Kifle et al., 2022). Consequently, weight management should be prioritized as a key preventive measure, particularly among the productive-age population (Tolonen et al., 2022).

Contrary to common assumptions, family history was not significantly associated with hypertension in this study. This indicates that genetic predisposition may not be the predominant determinant of hypertension in this age group (Alisha et al., 2023). Instead, modifiable behaviors such as low physical activity, smoking, and high-sodium diets likely play a greater role (Bhattacharya et al., 2022). Preventive strategies, therefore, should emphasize lifestyle modification rather than focusing solely on hereditary risk (Delobelle et al., 2022).

Smoking habits were significantly associated with hypertension. Nicotine and other active compounds in cigarettes can cause vasoconstriction and increase heart rate, leading to elevated blood pressure (Rajkumar & Romate, 2020). Active smokers also face heightened risks of endothelial damage and atherosclerotic plaque formation (Boateng & Ampofo, 2023). This finding reinforces the importance of smoking cessation programs and public education on the cardiovascular risks of tobacco use (Filippou et al., 2022).

Physical activity was another variable significantly associated with hypertension. Regular physical activity helps maintain vascular elasticity, control body weight, and reduce stress and blood pressure. Even moderate activities, such as brisk walking for 20 minutes daily, can significantly lower hypertension risk (Adamu et al., 2022). However, many in the productive-age group have limited time for exercise due to work commitments (Jose et al., 2022). This underscores the importance of promoting accessible and sustainable physical activity interventions, even in simple forms such as walking or cycling (Rajkumar & Romate, 2020).

Dietary habits, particularly fruit and vegetable consumption, were also significantly associated with hypertension. Adequate intake provides fiber, potassium, and antioxidants that contribute to vascular health and blood pressure control (Filippou et al., 2022; Sari et al., 2024). Nonetheless, dietary neglect remains common among productive-age adults due to busy lifestyles and reliance on convenience foods. Therefore, community-based programs should prioritize nutrition education and access to fresh produce (Tolonen et al., 2022; Williams et al., 2022).

Multivariate analysis revealed that physical activity was the most dominant factor influencing hypertension incidence. When all variables were analyzed simultaneously, low physical activity emerged as the strongest predictor of elevated blood pressure (Jose et al., 2022). This aligns with prior evidence that physical activity has a profound impact on cardiovascular function (Marleni, 2020). Consequently, primary healthcare facilities, including Puskesmas, should integrate physical activity promotion and facilitation into hypertension prevention strategies. Such

interventions may include structured exercise programs, walking groups, and workplace wellness initiatives (Nurhaida & Refialdinata, 2021)..

Conclusion and Recommendation

This study demonstrated a significant association between several risk factors and the incidence of hypertension among the productive-age population at Puskesmas Muara Beliti. Factors significantly associated with hypertension included age, body weight, smoking habits, physical activity, and fruit and vegetable consumption. In contrast, occupational status and family history showed no statistically significant relationship with hypertension. Multivariate analysis identified physical activity as the most dominant factor contributing to hypertension in this population. These findings underscore the substantial impact of lifestyle modification—particularly increasing physical activity—on the prevention and control of hypertension.

Based on these findings, it is recommended that Puskesmas and relevant health authorities strengthen health promotion and prevention strategies targeting hypertension, particularly within the productive-age group. Consistent health education should be implemented to emphasize the importance of maintaining an ideal body weight, quitting smoking, engaging in regular physical activity, and adopting adequate fruit and vegetable consumption. These efforts may be delivered through community outreach, social media campaigns, and structured health education sessions. Furthermore, routine blood pressure screening should be conducted to enable early detection and timely intervention. For individuals in the productive-age group, increased awareness and commitment to healthy lifestyle practices are essential to reduce hypertension risk and maintain long-term quality of life

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Declaration on the Use of AI
No AI tools were used in the preparation of this manuscript.

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