

The Relationship Between Demographic Characteristics and Knowledge with Preventive Behaviors of Hypertension Complications Among the Community in the Jatiranggon Community Health Center

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Abstract

Introduction: Hypertension is defined as a persistent increase in blood pressure which, if not controlled, can lead to complications such as stroke, heart attack, heart failure, kidney damage, retinopathy, and even death. **Objectives:** This study aimed to examine the relationship between demographic characteristics and knowledge with hypertension complication prevention behaviors in the Jatiranggon Community Health Center service area. **Methods:** This quantitative correlational study with a cross-sectional design involved 105 respondents aged 18–59 years, selected using purposive sampling based on predetermined inclusion criteria. Data were collected using structured questionnaires and analyzed with Chi-square, Kendall's tau-c, and Kendall's tau-b tests. **Results:** Most respondents were aged 56–65 years (42.9%), female (53.3%), had secondary education (60.0%), had Stage 1 hypertension (53.3%), and demonstrated good knowledge (90.5%). However, 68.6% exhibited only fair preventive behaviors. Bivariate analysis showed a significant association between gender and preventive behaviors ($p < 0.05$), with females more likely to engage in such behaviors. No significant associations were found for age, educational level, blood pressure status, or knowledge. **Conclusion:** Gender demonstrated a significant association with hypertension complication prevention behaviors, while age, education, blood pressure, and knowledge did not show significant relationships.

Keywords:

Blood Pressure, Hypertension, Knowledge, Preventive Behavior



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INTRODUCTION

Hypertension is recognized as the leading cause of premature death worldwide. It is defined as persistently elevated blood pressure that increases the risk of target organ damage in various vascular systems, including the retina, brain, heart, kidneys, and arteries (Sadhu et al., 2023). Clinically, hypertension is diagnosed when systolic blood pressure is greater than or equal to 140 mmHg and/or diastolic blood pressure is greater than or equal to 90 mmHg (Lewis et al., 2017). According to the World Health Organization (2019), an estimated 1.28 billion adults aged 30–79 years worldwide are living with hypertension, with the majority residing in low- and middle-income countries. Alarming, about 46% of individuals with hypertension are unaware of their condition, while only 42% have been diagnosed and are receiving treatment. One of the global targets for non-communicable diseases set for the period 2010–2030 is to reduce the prevalence of hypertension by 33%.

The Basic Health Research Survey (Riskesdas, 2018) reported that the prevalence of hypertension in Indonesia was 34.1%, an increase from 25.8% in the 2013 survey. Among adults aged ≥18 years, South Kalimantan had the highest prevalence at 44.13%, followed by West Java (39.60%) and East Kalimantan (39.30%) (Riskesdas, 2018). According to the Dinas Kesehatan Kota Bekasi (Bekasi City Health Office) (2019), the number of hypertension cases in Bekasi City has continued to rise each year. Over a three-year period, cases increased from 19,507 in 2016 to 28,407 in 2017, surged to 87,371 in 2018, and further rose to 115,089 in 2019. A similar trend was observed at the Jatiranggon Health Center, where the number of hypertensive patients increased from 1,762 in 2022 to 1,874 in 2023. Despite this upward trend, most patients have not received routine treatment, largely due to limited awareness of the importance of regular health screening and appropriate management.

Complications of hypertension such as stroke, heart attack, kidney failure, and death may arise from patients' non-compliance with medication and the adoption of unhealthy lifestyles (A'la, 2021; Ridwan, 2017a). In 2023, the Jatiranggon Community Health Center recorded approximately 1,146 patients at risk of developing hypertension-related complications, of whom 138 had already experienced such complications. Although preventive efforts have been carried out through the Prolanis program, home visits, and health education, these strategies have not yet achieved optimal effectiveness. Several factors that influence the prevention of complications include age, education, knowledge, employment, economic status, and family support (Suharmanto, 2021; Windarsih et al., 2017). Greater knowledge of hypertension has also been shown to be closely linked to the adoption of better preventive behaviors (Anjayati et al., 2023;

Harjo et al., 2019). In addition, family support significantly affects patients' adherence to a hypertension diet (Amelia & Kurniawati, 2020). According to Innab and Kerari (2022) highlighted that behavioral interventions, including community-based education and motivational interviewing, can moderately improve patient activation, which is strongly associated with better hypertension self-management outcomes. Their findings emphasize the importance of empowering individuals to actively manage their condition, thereby reducing the risk of complications.

However, even with adequate knowledge, many individuals fail to consistently engage in effective preventive behaviors. Recent findings by Pahria et al. (2022) showed that knowledge was not significantly associated with self-care behaviors among hypertensive patients with complications, suggesting that knowledge alone may not be sufficient to drive behavioral change. This discrepancy underscores the need to examine additional contributing factors, including individual characteristics and psychosocial influences, in the prevention of hypertension-related complications.

Nevertheless, few studies have investigated the relationship between individual characteristics and knowledge in relation to complication-prevention behaviors, particularly in the context of the Jatiranggon Public Community Center. Therefore, this study aims to examine the associations between selected demographic Characteristics (age, gender, blood pressure, and education) and knowledge with hypertension complication-prevention behaviors among hypertensive patients in the Jatiranggon Community Health Center service area

METHOD

1. Design

This study employed a quantitative correlational design with a cross-sectional approach to examine the relationship between independent variables (demographic characteristics and knowledge) and the dependent variable (preventive behaviors against hypertension complications) at a single point in time. The cross-sectional design was appropriate for identifying associations in community health settings where data were collected only once, particularly when exploring behavioral patterns within a community context. Nevertheless, this design did not permit causal inference or the evaluation of changes over time, which represented its primary limitation.

2. Number of samples and sampling techniques

This study was conducted in the Jatiranggon Community Health Center service area, Bekasi City, West Java, from April to June 2024. Purposive sampling, a non-probability sampling technique, was employed, in which participants were selected based

on specific characteristics relevant to the objectives of the study (Masturoh et al., 2018). The sample size was calculated using the Slovin formula, which was commonly applied when the population size was known and a representative sample was desired within an acceptable margin of error (Sugiyono, 2019). The study population consisted of 1,874 patients with hypertension recorded between January and December 2023.

$$n = \frac{N}{1 + N \cdot (e)^2}$$

$$n = \frac{1.874}{1 + 1.874 \cdot (0,1)^2}$$

$$n = \frac{1.874}{1 + 1.874 \cdot (0,01)}$$

$$n = \frac{1.874}{1 + 18,74}$$

$$n = \frac{1.874}{19,74}$$

$$n = 94,93$$

$$n = 95$$

To minimize potential dropout or non-response bias, the calculated sample size was increased by 10%, resulting in a final total of 105 respondents. The inclusion criteria were as follows: individuals residing in the Jatiranggon Community Health Center service area, diagnosed with hypertension by a physician at the center, aged 18 to 59 years, able to communicate effectively, and willing to participate in the study. Exclusion criteria were individuals who were unable to read or write and those who had already developed hypertension-related complications.

3. Instruments

Data were collected using a structured questionnaire that had undergone validity and reliability testing. Three variables were measured in this study: demographic characteristics, including initials, age, gender, blood pressure, and highest level of education attained. The second instrument was a questionnaire on hypertension, consisting of 19 items that assessed the respondents' understanding of the definition, signs and symptoms, risk factors, potential complications, and preventive measures related to hypertension.

Completion of this questionnaire was based on a Guttman scale consisting of true and false responses. The results of the reliability test stated that the Cronbach alpha value was 0.707, indicating that the knowledge questionnaire was reliable. The third instrument was the hypertension complication prevention behavior questionnaire, which assessed respondents' daily practices to prevent hypertension complications. In this study, the behavior questionnaire consisted of 15 questions with responses based on a Likert scale, namely never, sometimes, often, and always. The reliability test results stated that the Cronbach alpha value was

0.836, indicating that the hypertension complication prevention behavior questionnaire was highly reliable.

4. Data Collection Process

The data collection process in this study was carried out after obtaining approval from the educational institution and permission from the research location, namely Jatiranggon Community Health Center. Data were collected during the Posbindu (Integrated Coaching Post for Non-Communicable Diseases) activities held on a rotational basis in the Jatiranggon Health Center service area during April - June 2024. Data collection was conducted directly by the authors without the help of an assistant, to ensure consistency in the process of providing information and instructions for filling out the questionnaire.

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5. Data Analysis

Data analysis in this study involved both univariate and bivariate techniques. Univariate analysis was conducted using descriptive statistics to summarize demographics (age, gender, education, blood pressure), levels of knowledge, and hypertension complication prevention behaviors among the hypertensive community within the Jatiranggon Community Health Center service area. Descriptive results were presented in tables and frequency distributions for both independent and dependent variables. Bivariate analysis was performed to examine the relationships between demographic characteristics (age, gender, education) and prevention behaviors, as well as between knowledge and prevention behaviors. The statistical tests employed included Chi-square, Kendall's tau-c, and Kendall's tau-b. All statistical analyses were performed using SPSS version 25.

6. Research Ethics

This study received ethics approval from the Ethics Commission for Health Research and Development of STIK Sint Carolus, with approval letter number 043/KEPPKSTIKSC/V/2024. Before data collection was carried out, all respondents were given a research information sheet containing the purpose of the study, procedures, benefits, potential risks, and participant rights. After receiving this explanation, respondents who were willing to participate were asked to sign an informed consent

sheet in writing as a form of voluntary participation without coercion from any party. The authors guaranteed the confidentiality of the identity and personal data of each respondent by not including names or information that could identify participants in the research report.

RESULT

1. Univariate Analysis

The distribution of respondent characteristics

(n = 105) is presented in Table 1. The univariate analysis showed that most respondents were between 46–55 years old (41.9%) and 56–65 years old (42.9%). A majority were female (53.3%) and had attained secondary education (60.0%). More than half of the respondents had Stage 1 Hypertension (53.3%). In terms of knowledge, most respondents demonstrated good knowledge (90.5%). Regarding hypertension complication prevention behaviors, the majority were categorized as fair (68.6%).

Table 1. Frequency distribution of community characteristics in the Jatiranggon Community Health Center (n = 105)

Respondent Characteristics	Frequency	(%)	
Age	17 - 25 years	1	1
	26 - 35 years	0	0
	36 - 45 years	15	14.3
	46 - 55 years	44	41.9
	56 - 65 years	45	42.9
Gender	Male	49	46.7
	Female	56	53.3
Education	Basic Education	18	17.1
	Secondary Education	63	60
	Higher Education	24	22.9
Blood Pressure	Normal	2	1.9
	Prehypertension	29	27.6
	Stage 1 Hypertension	56	53.3
	Stage 2 Hypertension	18	17.1
Knowledge	Less	0	0
	Simply	10	9.5
	Good	95	90.5
Hypertension complication prevention behavior	Poor	25	23.8
	Fair	72	68.6
	Good	8	7.6

Source: Primary data, 2024

2. Bivariate Analysis

Based on Table 2, bivariate analysis was conducted to assess the relationship between respondent characteristics and hypertension complication prevention behavior. The analysis revealed a statistically significant association between gender and prevention behavior ($p < 0.05$). Female respondents were 7.03 times more likely to engage in preventive behaviors compared to male respondents (OR = 7.03; 95% CI: 2.39–20.73). This suggests that gender is an important factor influencing preventive actions, with women more inclined to adopt behaviors that reduce the risk of hypertension complications.

In contrast, no significant association was observed between educational level and prevention behavior ($p = 0.159$). Although most respondents had completed secondary education (60.0%), preventive behaviors were also reported among those with both lower and higher educational backgrounds. This implies that educational attainment alone may not

have served as a decisive factor in shaping preventive health behaviors.

Similarly, blood pressure classification showed no statistically significant relationship with prevention behavior ($p = 0.958$). Preventive behaviors appeared relatively consistent across respondents with normal blood pressure, prehypertension, stage 1 hypertension, and stage 2 hypertension. This indicated that blood pressure severity did not necessarily determine the likelihood of adopting preventive measures.

Furthermore, although the majority of respondents (90.5%) demonstrated good knowledge about hypertension, no statistically significant relationship was found between knowledge level and preventive behaviors ($p = 0.383$). This finding suggests a potential gap between knowledge and practice, indicating that knowledge alone may not be sufficient to drive effective preventive behavior.

Table 2. Relationship between respondent characteristics and hypertension complication prevention behavior

Variables	Hypertension Complication Prevention Behavior						Total		P-Value	OR	Confidence Interval (95%)
	Good		Fair		Poor		n	%			
	n	%	n	%	n	%					
Age											
17 - 25 years	0	0	0	0	1	1.0	1	10	0.385	-	-
26 - 35 years	0	0	0	0	0	0	0				
36 - 45 years	1	1.0	12	11.4	2	1.9	15	14.3			
46 - 55 years	5	4.8	29	27.6	10	9.5	44	41.9			
56 - 65 years	2	1.9	31	29.5	12	11.4	45	42.9			
Gender											
Male	4	3.8	25	23.8	20	19.0	49	46.7	0.000*	7.03*	2.39 - 20.73
Female	4	3.8	47	44.8	5	4.8	56	53.4			
Education											
Basic Education	1	1.0	11	10.5	6	5.7	18	17.1	0.159	-	-
Secondary Education	4	3.8	44	41.9	15	14.3	63	60.0			
Higher Education	3	2.9	17	16.2	4	3.8	24	22.9			
Blood Pressure											
Normal	0	0	2	1.9	0	0	2	1.9	0,958	-	-
Prehypertension	3	2.9	19	18.1	7	6.7	29	27.6			
Stage 1 Hypertension	4	3.8	37	35.2	15	14.3	56	53.3			
Stage 2 Hypertension	1	1.0	14	13.3	3	2.9	18	17.1			
Knowledge											
Lack of Knowledge	0	0	0	0	0	0	0	0	0.383	-	-
Sufficient Knowledge	0	0	7	6.7	3	2.9	10	9.5			
Good Knowledge	8	7.6	65	61.9	22	21.0	95	90.5			

Source: Primary data, 2024

Notes: OR = Odds Ratio; *p < 0.05 (significant)

DISCUSSION

1. Univariate Analysis

1.1. Age

Most respondents were aged 46–55 years (41.9%) or 56–65 years (42.9%). This pattern is consistent with age-related pathophysiology, as advancing age is associated with arterial stiffness and impaired hemodynamic regulation, which can elevate blood pressure and increase the risk of hypertension (Astuti et al., 2021). Similar age distributions were reported by Hakim and Sari (2023), who found that 45.3% of 128 participants were 56–65 years old.

Interestingly, one respondent (1.0%) in the 17–25 age group had hypertension. This case may reflect family-level lifestyle patterns such as frequent consumption of salty foods and fast food modeled by hypertensive parents. Given the very small number in this age group, this observation should be interpreted with caution.

1.2. Gender

Females comprised 56 respondents (53.3%), suggesting a higher burden of hypertension among women in the Jatiranggon Community Health Center service area. This aligns with Oktavia et al. (2023), who reported that most respondents were female (65.8%). The pattern may be related to the age structure of the sample, as many women were in the

late-middle to older-adult range, when post-menopausal declines in estrogen are associated with higher blood pressure (Ridwan, 2017).

1.3. Education

The majority had secondary education (n = 63, 60.0%). Education can shape health literacy and decision-making, thereby influencing lifestyle and disease management. Our distribution mirrors Rozi et al. (2021), who found that 45% had completed secondary education. Interviews suggested that economic constraints limited opportunities for higher education after senior high or vocational school.

1.4. Blood pressure

More than half of respondents met criteria for Stage 1 hypertension (n = 56, 53.3%). On-site measurements indicated systolic 140–159 mmHg and/or diastolic 90–99 mmHg (Rejo & Nurhayati, 2020). Some respondents with normal or prehypertension reported taking antihypertensive medication before measurement, which may explain their lower readings. Because measurements were cross-sectional, these values represent a single time point and may not reflect usual control.

1.5. Knowledge

Most respondents demonstrated good knowledge regarding hypertension (n = 95, 90.5%),

likely supported by regular participation in Posbindu (integrated health post) activities and broader access to health information via social media. Nevertheless, several misconceptions persisted: 23 respondents (21.9%) believed high-fat foods lower blood pressure, 11 (10.5%) thought physical activity does not reduce hypertension risk, 14 (13.4%) believed regular exercise eliminates the need for treatment, 37 (35.2%) assumed hypertensive patients are always symptomatic, and 22 (21.0%) did not believe daily coffee intake can contribute to hypertension. These gaps suggest the need for targeted education that addresses and corrects such myths.

1.6. Hypertension complication prevention behavior

Most respondents exhibited adequate hypertension complication prevention behaviors ($n = 72$, 68.6%), which may be supported by their generally good knowledge base (Rozi et al., 2021). However, certain behaviors remained suboptimal: 50 respondents (47.6%) still consumed salty foods more than once per day, none (0.0%) reported daily fruit intake, 39 (37.1%) never exercised three to five times per week, 11 (10.5%) did not take medication regularly, and 46 (43.8%) continued to consume fast food. These findings indicate that behavioral counseling should prioritize dietary sodium reduction, routine physical activity, and medication adherence in order to translate knowledge into consistent practice.

2. Bivariate Analysis

2.1. Relationship between age and behavior in preventing hypertension complications

In this study, respondents aged 56–65 years demonstrated adequate preventive behaviors against hypertension complications, accounting for 29.5%. The Kendall's tau-c correlation test yielded a p-value of 0.385 (> 0.05), indicating no statistically significant relationship between age and preventive behavior.

These findings are consistent with Hakim and Sari (2023), who also reported no significant association between age and hypertension management ($p = 0.891$). Although age is recognized as a major determinant in the development of hypertension, the present study suggests that age alone does not necessarily influence preventive behavior. This is in line with Indriawati and Syaifudin (2020), who found no significant relationship between age and preventive practices ($p = 0.220$).

The aging process is a natural biological phenomenon. As individuals age, structural changes in blood vessels such as reduced elasticity and increased vascular stiffness contribute to elevated blood pressure (Adam, 2019). However, these physiological changes may not directly affect preventive behavior, which can be shaped by compensatory factors including adequate knowledge, strong personal motivation, and regular access to healthcare services.

2.2. Relationship between gender and behavior in

preventing hypertension complications

Female respondents accounted for 44.8% of those who demonstrated adequate preventive behavior. The Chi-Square test yielded a p-value of 0.000 (< 0.05), indicating a significant relationship between gender and preventive behavior. This finding is consistent with Suharmanto (2021) and with Indriawati and Syaifudin (2020), both of whom reported a significant association between gender and hypertension prevention behavior.

Adequate preventive behavior was more prevalent among women compared to men, with only 25 male respondents (23.8%) demonstrating such behavior. One explanation is that many female respondents, particularly housewives, regularly sought services at the Jatiranggon Community Health Center where they received education and routine monitoring. By contrast, male respondents may have been more prone to risk behaviors such as smoking, alcohol use, excessive caffeine intake, and inadequate sleep.

2.3. Relationship between education and behavior in preventing hypertension complications

Respondents with secondary education represented the largest group demonstrating moderate preventive behavior (41.9%). Kendall's tau-b correlation test yielded a p-value of 0.159, indicating no statistically significant relationship between educational level and preventive behavior. These findings are consistent with Ramadani et al. (2024), who also reported no significant association between education and hypertension control ($p = 0.50$).

Although education can influence knowledge, it does not always translate into healthy behavior. Respondents with higher education did not necessarily show better preventive practices. The availability of health information through social media and other informal sources allows individuals to acquire knowledge beyond formal education. However, interviews revealed that even with sufficient knowledge, respondents often found it difficult to change entrenched habits or adopt healthier lifestyles.

2.4. Relationship between blood pressure and behavior in preventing hypertension complications

The majority of respondents with stage 1 hypertension demonstrated adequate preventive behavior (35.2%). Across all categories of blood pressure normal, prehypertension, stage 1, and stage 2 adequate preventive behavior was consistently observed. Kendall's tau-c correlation test yielded a p-value of 0.958 (> 0.05), indicating no significant relationship between blood pressure classification and preventive behavior.

This is consistent with Hall et al. (2024), who noted that health behaviors were not consistently associated with blood pressure control. While medication adherence showed a modest association,

other behaviors such as diet and smoking were not predictive of blood pressure outcomes. This suggests that blood pressure is also shaped by pharmacological interventions, comorbidities, and genetic predisposition. As a result, adequate preventive behavior does not always equate to optimal blood pressure control.

2.5. Relationship between knowledge and behavior in preventing hypertension complications

Respondents with good knowledge tended to show adequate preventive behavior. However, Kendall's tau-b test yielded a p-value of 0.383 (> 0.05), indicating no significant relationship between knowledge and behavior. This result is consistent with Zaenurrohmah and Rachmayanti (2017) and Setiarini (2018), both of whom found no significant association between knowledge and hypertension management. Conversely, Wati et al. (2023) reported a significant relationship between knowledge and attitudes toward prevention in a study at the Janti Health Center ($p = 0.01$).

Sari et al. (2025) similarly observed that although most participants had adequate knowledge and demonstrated positive self-care practices, there was no statistically significant association between the two ($p = 0.099$). This suggests that knowledge alone may not be sufficient to influence preventive actions. Supporting evidence from Jariyasakulwong et al. (2025) showed that while most participants had moderate to good knowledge, their self-care practices remained suboptimal. The study concluded that knowledge is not a strong predictor of blood pressure control, and other factors such as motivation, cultural context, economic conditions, and social support play a decisive role.

Although knowledge is commonly believed to shape behavior, as noted by Anjayati et al. (2023), this is not always reflected in practice. Some respondents viewed hypertension as a natural consequence of aging and felt no urgency to change their lifestyle. Others stated that long-standing habits were difficult to alter. Interviews also indicated that time constraints due to work commitments led many to rely on fast food rather than prepare healthier meals.

Study Limitations

This study has several limitations. Initially, the research was planned to be conducted during Post Integrated Development (Pos Pembinaan Terpadu /Posbindu) activities, but no schedule was available at the time of data collection. As a result, researchers adopted a door-to-door approach and also collected data at the health center. In addition, some respondents who were literate were unwilling to complete the questionnaire independently, requiring the authors' assistance in filling it out.

Despite these limitations, this study is expected to provide useful insights for the Jatiranggon Community Health Center in

strengthening its prevention programs. Recommendations include routine educational activities and regular monitoring of community behaviors to reduce hypertension complications. Furthermore, the findings may serve as a reference for future research that includes additional variables not examined in this study.

CONCLUSION

This study examined the relationship between demographic characteristics, knowledge, and preventive behaviors against hypertension complications in the Jatiranggon Community Health Center service area. The results showed a significant association between gender and preventive behavior, while no significant associations were found for age, education, blood pressure, or knowledge. These findings highlight the importance of incorporating gender-sensitive approaches into health education and mentoring programs. Although most respondents demonstrated adequate knowledge, this did not consistently translate into preventive actions, underscoring the need for practical and sustainable strategies within primary healthcare. The study further emphasizes the value of developing intervention programs tailored to community needs at the health center level. Future research should include additional variables and adopt more comprehensive designs to provide deeper insights into the determinants of preventive behavior in hypertension management.

Conflict of Interest

The authors declare that they have no conflict of interest in relation to the conduct, preparation, or publication of this research.

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