



THE EFFECT OF INFORMATION, MOTIVATION, AND BEHAVIORAL SKILLS MODEL ON TERTIARY PREVENTION BEHAVIOR AMONG HYPERTENSION PATIENTS

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ABSTRACT

Hypertension is a medical condition in which blood pressure increases above 140/80 mmHg. If it is not controlled, it can have negative effects on health and may develop into a chronic disease. Hypertension control depends on tertiary prevention behavior. This study used the Information Motivation Behavioral Skills construct to analyze tertiary prevention behavior among patients with hypertension. This study used a cross-sectional design conducted in Boyolali Regency. The sampling technique used stratified random sampling. Five community health centers were selected, with a total sample of 200 respondents. Data were collected using a questionnaire that had been tested for validity and reliability. Multivariate data analysis was performed using path analysis. The results of the study showed that behavioral skills had a direct association with tertiary prevention behavior among patients with hypertension ($b = 0.40$; 95% CI = 0.28–0.51; $p < 0.001$). Motivation was also directly and significantly associated with tertiary prevention behavior ($b = 0.26$; 95% CI = 0.14–0.38; $p < 0.001$). Information had an indirect association with tertiary prevention behavior through behavioral skills ($b = 0.17$; CI 95% = 0.06–0.28; $p = 0.003$), while motivation also had an indirect association with tertiary prevention behavior through behavioral skills ($b = 0.40$; 95% CI = 0.29–0.51; $p < 0.001$). In addition, information had a direct association with tertiary prevention behavior ($b = 0.17$; 95% CI = 0.06–0.28; $p = 0.006$). The path model demonstrated a good fit to the data (CFI = 1.00; TLI = 1.00; RMSEA = 0.00; SRMR = 0.00). behavioral skills and motivation influence tertiary prevention behavior among patients with hypertension. Information has a direct effect on tertiary prevention behavior, but it has an indirect effect through behavioral skills. Behavioral skills also mediate the effect of motivation on tertiary prevention behavior.

Keywords: behavioral skills; hypertension; IMB model; motivation; tertiary prevention

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INTRODUCTION

Hypertension remains a major global public health challenge because it contributes significantly to cardiovascular diseases, disability, reduced quality of life, and premature mortality. As one of the leading modifiable risk factors for cardiovascular morbidity and mortality, uncontrolled hypertension may result in severe complications, including stroke, coronary heart disease, heart failure, kidney failure, and other forms of target organ damage. Therefore, improving hypertension control, particularly through tertiary preventive behaviour, has become an important strategy in reducing the burden of non-communicable diseases (NCDs). This strategy is in line with the third goal of the Sustainable Development Goals (SDGs), namely Good Health and Well-Being, which aims to ensure healthy lives and promote well-being for all ages. One of the specific targets of SDG

Goal 3 is to reduce premature mortality caused by NCDs, including hypertension-related cardiovascular diseases, by one-third by 2030 (Bappenas, 2020).

In Indonesia, hypertension control has been strengthened through the Regulation of the Minister of Health of the Republic of Indonesia Number 4 of 2019 concerning Minimum Service Standards in the Health Sector. This regulation requires every individual diagnosed with hypertension to receive standardised healthcare services to prevent disease progression and further complications (Ministry of Health of the Republic of Indonesia, 2019). However, successful hypertension management does not solely depend on the availability of healthcare services but also requires active patient involvement in adopting and maintaining healthy behaviours. Healthy behaviour plays an important role in reducing disease risk, improving life expectancy, enhancing quality of life, and supporting healthy ageing (Fernandez et al., 2022). Nevertheless, rapid globalisation and lifestyle transitions have contributed to the increasing adoption of unhealthy behaviours, including unhealthy dietary patterns, physical inactivity, smoking, and poor stress management, which further increase the burden of both communicable and non-communicable diseases (Manderson & Jewett, 2023).

The global prevalence of hypertension remains substantially high. Approximately 1.28 billion adults aged 30–79 years are living with hypertension, indicating that one in three adults worldwide is affected by this condition. The number of adults with hypertension increased from approximately 650 million in 1990 to 1.40 billion in 2024 (WHO, 2023). China has the highest number of individuals living with hypertension, with approximately 226 million cases among adults aged 30–79 years, and this number is expected to increase due to population ageing. Indonesia ranks among countries with a high burden of hypertension, with approximately 63.31 million cases among a population of 179.72 million, resulting in a prevalence of 35.20% (Ministry of Health of the Republic of Indonesia, 2018).

At the regional level, hypertension remains the most prevalent non-communicable disease in Central Java Province, followed by diabetes mellitus and obesity. A total of 7.99 million hypertension cases have been reported based on physician diagnosis and blood pressure measurement among individuals aged 15 years and above (Central Java Provincial Health Office, 2024). A similar increasing trend has also been observed in Boyolali Regency during the last five years. In 2025, the number of hypertension cases reached 338.06 reported cases, with the highest proportion recorded at Ngemplak Primary Healthcare Centre, followed by Cepogo and Mojosongo Primary Healthcare Centres (Boyolali District Health Office, 2025). In addition, the prevalence of hypertension increases with age. Older adults have nearly twice the risk of developing hypertension compared with younger individuals. The prevalence of physician-diagnosed hypertension among individuals aged ≥ 15 years reached 18.70% in those aged 55–64 years, 23.80% in those aged 65–74 years, and 26.10% among those aged 75 years and above (SKI, 2023).

Hypertension is a multifactorial disease influenced by both non-modifiable and modifiable factors. Non-modifiable factors include increasing age and genetic predisposition, while modifiable factors involve unhealthy lifestyles, such as excessive sodium and saturated fat intake, inadequate physical activity, smoking, alcohol consumption, obesity, and unmanaged stress. Environmental conditions, including exposure to air pollution, limited access to green spaces, and high occupational demands, may further increase the risk of hypertension (Hu & Yang, 2023). The increasing prevalence of hypertension not only affects individual health but also creates a substantial economic burden on countries. The World Economic Forum estimated that the economic burden of NCDs between 2012 and 2030 would reach US\$4.40 trillion, including costs associated with healthcare and treatment (Balgis et al., 2022).

Disease prevention strategies consist of primordial, primary, secondary, and tertiary prevention. Primordial prevention focuses on preventing social, economic, environmental, and behavioural

determinants from developing into disease risk factors. Primary prevention aims to prevent the occurrence of new cases by reducing exposure to risk factors, while secondary prevention emphasises early detection and timely management before clinical manifestations occur. Tertiary prevention is directed toward individuals who have already been diagnosed with a disease and aims to prevent complications, disability, recurrence, and premature mortality (Pakpahan et al., 2021).

In patients with hypertension, tertiary preventive behaviour includes adherence to antihypertensive medication, maintaining a balanced diet, reducing sodium intake, engaging in regular physical activity, managing stress, avoiding smoking and alcohol consumption, routinely monitoring blood pressure, and attending regular follow-up visits at healthcare facilities (Davodi et al., 2023). However, previous studies have demonstrated that the implementation of tertiary preventive behaviour among patients with hypertension remains inadequate (Nakwafila et al., 2022). Many patients have poor adherence to medication, continue unhealthy dietary habits, have insufficient physical activity, and fail to perform regular blood pressure monitoring. Consequently, inadequate tertiary preventive behaviour may increase the risk of serious complications, including stroke, myocardial infarction, coronary heart disease, heart failure, kidney failure, hypertensive retinopathy, dementia, sexual dysfunction, and death (Gianevar & Puspita, 2024).

Understanding the determinants of tertiary preventive behaviour is essential to develop effective interventions for hypertension management. One theoretical framework that can explain the adoption of health behaviour is the Information Motivation Behavioural Skills Model (IMB). The IMB model, developed by Fisher, proposes that health behaviour is influenced by three main components: adequate information, personal and social motivation, and behavioural skills. Patients who possess sufficient knowledge regarding hypertension management, strong motivation to maintain their health, and appropriate behavioural skills are more likely to adopt and maintain healthy behaviours (Sá et al., 2019). Although the IMB model has been widely applied to explain health behaviour changes in chronic disease management, evidence regarding its application in explaining tertiary preventive behaviour among patients with hypertension remains limited, particularly in Indonesian primary healthcare settings. Therefore, this study aims to analyse the determinants of tertiary preventive behaviour among patients with hypertension using the Information Motivation Behavioural Skills Model (IMB).

METHOD

The study population consisted of patients with hypertension registered in the working areas of community health centers in Boyolali Regency. The sample included 200 respondents selected using stratified random sampling. The strata in this study were community health centers. The five community health centers used as research sites were Boyolali 1 Community Health Center, Cepogo Community Health Center, Mojosongo Community Health Center, Nogosari Community Health Center, and Teras Community Health Center. Each community health center contributed 40 respondents. The inclusion criteria included patients aged over 18 years, diagnosed with hypertension, undergoing examination and routine treatment, able to communicate clearly, having no mental disorders, and willing to become respondents. The exclusion criteria included patients who could not be met during data collection, had sensory impairment, or had severe comorbid disease. This study was a quantitative study using an analytical observational approach with a cross-sectional design. The study was conducted in Boyolali Regency from April to May 2026. This design was used to analyze information, motivation, and behavioral skills toward tertiary prevention behavior among patients with hypertension.

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Cepogo Community Health Center, Mojosongo Community Health Center, Nogosari Community Health Center, and Teras Community Health Center. Each community health center contributed 40 respondents. The inclusion criteria included patients aged over 18 years, diagnosed with hypertension, undergoing examination. The dependent variable in this study was tertiary prevention behavior, while the independent variables were information, motivation, and behavioral skills.

The independent variables were based on the Information–Motivation–Behavioral Skills (IMB) model, which included: Information: Information refers to the level of knowledge and understanding of patients with hypertension regarding the definition, risk factors, signs and symptoms, prevention, control, and complications if uncontrolled. This information can be obtained from health workers to support hypertension tertiary prevention behavior. Motivation: All forms of encouragement are divided into internal factors, including awareness that grows within the individual without external pressure. External factors are factors from outside the patient, including family support and the social environment, to perform hypertension tertiary prevention behavior. Behavioral skills: The ability of patients to translate the information and motivation they have into actions to achieve a goal and overcome barriers in performing hypertension tertiary prevention behavior.

Demographic variables such as maternal age, education level, occupation, and gender. Data were collected using a structured questionnaire developed based on the IMB theoretical framework. The questionnaire consisted of several items measuring each construct using a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Each construct included both positive and negative statements to reduce response bias. Prior to the main data collection, the instrument underwent validity and reliability testing through a pilot study involving 50 respondents with characteristics similar to those of the target population. Construct validity was assessed using Pearson item-total correlation analysis, while reliability was evaluated using Cronbach's alpha coefficient to determine the internal consistency of each construct. The results indicated that all questionnaire items met the validity criteria, with item-total correlation coefficients ranging from 0.43 to 0.83. Furthermore, all constructs demonstrated acceptable reliability, with Cronbach's alpha values of 0.78 for the information construct, 0.89 for motivation, 0.78 for behavioral skills, and 0.79 for tertiary prevention behavior.

The analysis was conducted in three stages: Univariate analysis was used to describe the characteristics of respondents and study variables using frequency distribution, mean, standard deviation, minimum, and maximum values. Bivariate analysis Bivariate analysis was performed to determine the association between the independent variables and the dependent variable and to evaluate the strength of the relationships. Since the data were continuous and measured on a ratio scale but did not meet the assumption of normality based on the Kolmogorov–Smirnov test, Spearman's rank correlation, a non-parametric statistical test, was employed. A p-value of < 0.05 was considered statistically significant, indicating rejection of the null hypothesis (H_0) and the presence of a significant association between the variables. Multivariate analysis was conducted using path analysis to estimate the direct and indirect effects of exogenous variables on endogenous variables. Path coefficients are standardized and unit-free estimates, where larger absolute coefficient values indicate stronger associations between variables. Path analysis assumes linear and recursive relationships among variables, in which the causal direction flows from exogenous variables to endogenous variables. The analytical procedures were performed according to the path analysis.

RESULT

In this study, the sample characteristics and research variables in the form of continuous data are described in the following table.

Table 1.
Result of Univariate Analysis

Characteristics	Category	f	%
Gender	Female	133	66,5
	Male	67	33,5
Age	Late Adolescence (16-19 years)	0	0
	Young Adulthood (20–29 years)	2	1
	Adulthood (30–39 years)	1	0,5
	Middle Adulthood (40–49 years)	23	11,5
	Older Adults (≥50 years)	0	0
Education	Elementary School	71	35,5
	Junior High School	43	21,5
	Senior High School	54	27
	Bachelor Degree	32	16
Income	Low	67	33,5
	High	133	66,5
Occupation	Housewife	78	39
	Private Employee	55	27,5
	Farmer	28	14
	Civil Servant	3	1,5
	Other's Occupation	36	18

Based on the data presented in table 1, for the gender variable, out of 200 research respondents, 133 respondents (66.5%) were female and 67 respondents (33.5%) were male. The age variable showed that young adults (20–29 years) accounted for 2 participants (1%), adults (30–39 years) accounted for 1 participant (0.5%), middle-aged adults (40–49 years) accounted for 23 participants (11.5%), and older adults/elderly (≥50 years) accounted for 174 participants (87%). The education level variable showed that the highest proportion was at the elementary school level, with 71 respondents (35.5%), followed by junior high school with 43 respondents (21.5%), senior high school with 54 respondents (27%), and higher education with 32 respondents (16%). The income variable showed that 133 respondents (66.5%) had high income, while 67 respondents (33.5%) had low income. The occupation variable showed that most respondents were housewives, with 78 respondents (39%), followed by private employees with 55 respondents (27.5%), farmers with 28 respondents (14%), civil servants/state-owned enterprise employees with 3 respondents (1.5%), and others with 38 respondents (18%). The characteristics of the study sample and research variables in continuous form are presented in the following table.

Table 2.
Descriptive Statistics of Continuous Variables

Variable	Mean	Standard Deviation	Minimum	Maximum
Information	23.43	2.78	13	30
Motivation	29.57	3.30	21	35
Behavioral Skills	23.93	3.67	12	30
Tertiary Prevention Behavior	24.54	3.94	14	30

Based on table 2, shows that the information variable measurement had a mean of 23.43 and a standard deviation of 2.78, with the lowest information score of 13 and the highest score of 30. The motivation variable had a mean of 29.57 and a standard deviation of 3.30, with the lowest motivation score of 21 and the highest score of 35. The behavioral skills variable had a mean of 23.93 and a standard deviation of 3.67, with behavioral skills score ranging from 12 to 30. The tertiary prevention behavior variable had a mean of 24.54 and a standard deviation of 3.94, with tertiary prevention behavior scores ranging from 14 to 30.

Bivariate Analysis

Table 3.
Results of Bivariate Analysis *Spearman's Rank*

Variables	<i>P</i>	Information	Motivation	Behavior Skills	Tertiary Prevention Behavior
Motivation	Correlation Coefficient (r_s)	0,22			
	<i>P value</i> (2-tailed)	0,002			
Behavior Skills	Correlation Coefficient (r_s)	0,27	0,50		
	<i>P value</i> (2-tailed)	<0,001	<0,001		
Tertiary Prevention Behavior	Correlation Coefficient (r_s)	0,36	0,48	0,58	
	<i>P value</i> (2-tailed)	<0,001	<0,001	<0,001	

Table 3 shows the results of the Spearman's rank correlation test on the relationship between information, motivation, behavioral skills, and tertiary prevention behavior among patients with hypertension, as follows:

Relationship between information and tertiary prevention behavior among patients with hypertension

The analysis showed a correlation coefficient of 0.36 with a p-value of < 0.001 . Since the p-value was < 0.05 , there was a significant positive relationship between the level of information and tertiary prevention behavior among patients with hypertension. The positive direction of the relationship indicates that the better the information received by patients, the higher their tendency to perform tertiary prevention behavior.

Relationship between motivation and tertiary prevention behavior among patients with hypertension

The analysis showed a correlation coefficient of 0.48 with a p-value of < 0.001 . Since the p-value was < 0.05 , it can be concluded that there was a significant positive relationship with a moderate correlation strength between motivation and tertiary prevention behavior among patients.

Relationship between behavioral skills and tertiary prevention behavior among patients with hypertension

The analysis showed a correlation coefficient of 0.58 with a p-value of < 0.001 . This indicates that behavioral skills had a significant positive relationship and the strongest direct relationship with tertiary prevention behavior among patients compared with the other variables.

Relationship between information and motivation

The analysis showed a correlation coefficient of 0.22 with a p-value of 0.002. Since the p-value was < 0.05 , there was a significant positive relationship between the level of information and motivation among patients with hypertension.

Relationship between information and behavioral skills

The analysis showed a correlation coefficient of 0.27 with a p-value of < 0.001 . This indicates that the level of information possessed by patients had a significant positive relationship with their practical skills in managing hypertension.

Relationship between motivation and behavioral skills

The analysis showed a correlation coefficient of 0.50 with a p-value of < 0.001 . This value indicates a significant positive relationship with a fairly strong correlation between patients' motivation and their behavioral skills.

Path Analysis

The results of data processing using path analysis with STATA 13 were obtained as follows:

1. Model Specification

The model specification explains the effects between the variables studied. This study had measured variables, namely information, motivation, behavioral skills, and tertiary preventive behavior. Based on the explanation in Figure 1, the values of the effects between variables were obtained, namely the endogenous variables behavioral skills and tertiary preventive behavior, and the exogenous variables information and motivation.

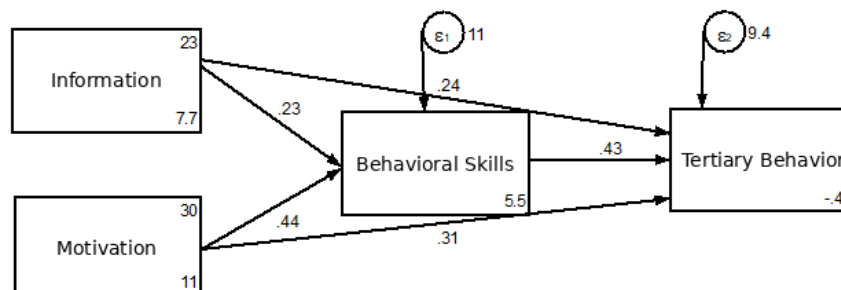


Figure 1. Structural Model of Path Analysis

2. Model Identification

Table 4. Model Identification of Path Analysis

Model Identification	N
Measured variables	4
Endogenous variables	2
Exogenous variables	2
Unmeasured variables	2
Path	3

$df = (\text{number of measured variables} \times (\text{number of measured variables} + 1) / 2 - (\text{paths} + \text{number of unmeasured variables} + \text{covariance between exogenous variables}))$

$$= (4 \times (4 + 1) / 2 - (5 + 2 + 1))$$

$$= 10 - 8$$

$$= 2$$

The df value = 2, so the path analysis model was over identified. Therefore, path analysis could be used.

3. Model Fit and Parameter Estimation

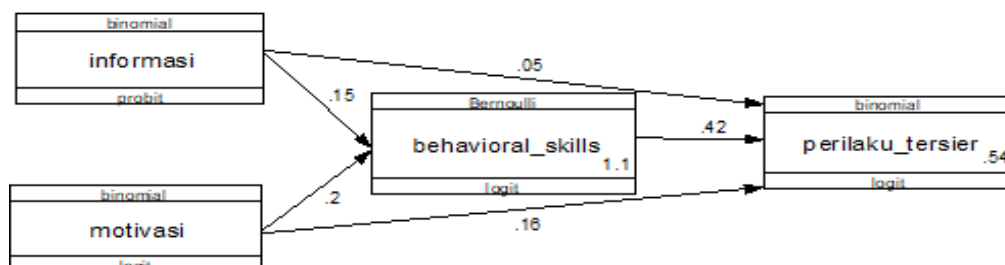


Figure 2. Path analysis of the relationship between information and motivation with behavioral skills and tertiary preventive behavior.

Table 5.
Results of path analysis

Results of path analysis						
Dependent Variables		Independent Variables	b	CI 95%		p
				Lower Limit	Upper Limit	
Direct Effect						
Tertiary	←	Information	0,17	0,06	0,28	0,003
prevention	←	Motivation	0,26	0,14	0,38	<0,001
Behavior	←	Behavioral skills	0,40	0,28	0,51	<0,001
Indirect Effect						
Behavioral	←	Information	0,17	0,05	0,30	0,006
Skills	←	Motivation	0,40	0,29	0,51	<0,001
N observation= 200						
Log likelihood= -2032,83						
RSMEA = 0,00 (<0.08)						
CFI = 1,00 (>0.90)						
TLI = 1,00 (>0.90)						
SRMR = 0,00(<0.05)						
CD = 0.32						

The relationship between behavioral skills and tertiary prevention behavior

Table 5 shows that there is a direct positive relationship between behavioral skills and tertiary prevention behavior, and the relationship is statistically significant. Each 1-score increase in behavioral skills is followed by an increase in tertiary prevention behavior of 0.40 ($b = 0.40$; 95% CI = 0.28 to 0.51 $p < 0,001$).

The relationship between motivation and tertiary prevention behavior

Table 5 shows that there is a direct positive relationship between motivation and tertiary prevention behavior, and the relationship is statistically significant. Each 1-score increase in motivation is followed by an increase in tertiary prevention behavior of 0.26 ($b = 0.26$; 95% CI = 0.14 to 0.38; $p < 0,001$).

The relationship between information and tertiary prevention behavior

Table 5 shows that there is a significant direct relationship between information and tertiary prevention behavior. Each 1-score increase in information is followed by an increase in tertiary prevention behavior of 0.17 ($b = 0.17$; 95% CI = 0.06 to 0.28; $p = 0,003$).

The relationship between information and tertiary prevention behavior through behavioral skills

Table 5 shows that there is a positive indirect relationship between information and tertiary prevention behavior through behavioral skills, and the relationship is statistically significant. Each 1-score increase in information increases tertiary prevention behavior through behavioral skills by 0.17 ($b = 0.17$; 95% CI = 0.05 to 0.30; $p = 0,006$).

The relationship between motivation and tertiary prevention behavior through behavioral skills

Table 5 shows that there is a positive indirect relationship between motivation and tertiary prevention behavior through behavioral skills, and the relationship is statistically significant. Each 1-score increase in motivation increases tertiary prevention behavior through behavioral skills by 0.40 ($b = 0.40$; 95% CI = 0.29 to 0.51; $p < 0,001$).

DISCUSSION

The results of the study indicate a positive and statistically significant direct relationship between behavioral skills and tertiary preventive behavior among hypertensive patients ($b = 0.40$; 95% CI =

0.28 to 0.51; $p < 0.001$). Descriptively, this finding aligns with field data showing that the majority of respondents (58.5%) had implemented tertiary preventive measures well. Theoretically, optimal behavioral skills play a critical role in strengthening patients' self-efficacy. Respondents who believe in their capabilities tend to be more consistent in executing hypertension self-management, such as adhering to medication, managing diet, monitoring blood pressure, and controlling environmental risk factors. These practical skills bridge the gap between information and motivation, transforming them into sustained actions. This finding is consistent with a quantitative study by Yu et al. (2025) involving 320 elderly hypertensive patients, which found that an information-motivation-behavioral skills model-based dietary pattern significantly improved clinical outcomes through enhanced behavioral skills. Adherence improvement via self-management skills training was also demonstrated by Zhang et al. (2024) among 150 patients with chronic conditions. Furthermore, a path analysis by Li & Wang (2023) involving 250 respondents confirmed that the behavioral component exerts a stronger coefficient of influence ($b = 0.45$; $p < 0.001$) on driving clinical changes compared to the information component alone. Although a mixed-methods approach by Brown et al. (2022) involving 40 patients confirmed the crucial role of these skills, they noted that environmental barriers, such as limited access to healthcare facilities, can still restrict the translation of skills into actual behavior. Conversely, descriptive data reveal that 41.5% of respondents still exhibited poor behavioral skills. This condition resonates with the challenges outlined by Chen & Kim (2021) in their study of 120 multimorbid older adults, where the relationship between behavioral skills and prevention behavior was non-significant ($p > 0.05$) because cognitive and physical declines in their sample required caregiver presence for practical skills to be executed.

Subsequent data analysis demonstrates a positive and significant direct relationship between motivation and tertiary preventive behavior ($b = 0.26$; 95% CI = 0.14 to 0.38; $p < 0.001$). This fact is reinforced by descriptive data showing that 51% of respondents possessed high motivation. Motivation, originating both internally (the desire to maintain quality of life and avoid complications) and externally (support from family and healthcare providers), serves as the driving force behind patient commitment, triggering long-term adherence to sodium restriction and medication regimens. This outcome is supported by Oktavianisya (2025), who found that an IMB model-based hypertension module intervention effectively increased motivation and medication adherence ($p < 0.006$). Similarly, Geleto et al. (2023), in a study of 418 respondents in Ethiopia, identified a lack of motivation as a primary determinant of non-adherence to comprehensive self-care behaviors. Qualitatively, Tan et al. (2021) deepened this perspective by explaining how internal motivational mechanisms overcome personal barriers, while a randomized controlled trial (RCT) by Sankaran et al. (2022) proved that motivational interviewing-based interventions exert a robust direct effect on enhancing self-management. However, this study also notes that 49% of respondents had low motivation. This variation is similar to a cross-sectional correlational study by Al-Nawafleh et al. (2021) involving 221 hypertensive patients in Jordan, which reported that motivation was not a statistically significant predictor ($p > 0.05$) when analyzed concurrently with more dominant factors such as direct knowledge and concrete social support.

In contrast to the previous two variables, the direct relationship between information and tertiary preventive behavior yielded the weakest coefficient of influence, despite remaining statistically significant ($b = 0.17$; 95% CI = 0.06 to 0.28; $p = 0.003$). Descriptively, the majority of respondents (52%) possessed a good level of information. This low coefficient indicates that merely knowing or being exposed to information regarding hypertension risks and treatments is insufficient to trigger complex tertiary preventive behaviors without integration with motivation and practical skills. The weakness of this relationship aligns with prior literature; Ademe et al. (2021) confirmed a significant relationship between knowledge and self-care practices ($p = 0.002$) among 286 patients, but emphasized that information serves only as an initial baseline. Saarti et al. (2022), evaluating 195 respondents, also stated that high knowledge does not guarantee long-term adherence in the

absence of psychosocial support. Qualitatively, Fletcher et al. (2023) clarified that the primary barrier for patients today is no longer access to information, but rather how that health literacy is processed and integrated into daily routines. Furthermore, Kim & Oh (2021), in their study of 145 community-dwelling older adults, found a contrasting, non-significant relationship ($p > 0.05$) due to severe cognitive and functional limitations in their sample, which prevented health information from being applied independently without full caregiver assistance. Our field data, indicating that 48% of respondents still had poor information, underscores the critical need for more applicable educational strategies.

This study successfully demonstrates a significant mediating effect of behavioral skills on the relationship between information and tertiary preventive behavior ($b = 0.17$; 95% CI = 0.05–0.30; $p = 0.006$). Descriptive data support this mechanism: among the 52% of respondents with good information, 58.5% possessed optimal behavioral skills, which ultimately guided 52.5% of the total respondents into the good tertiary preventive behavior category. This pathway reinforces that information about hypertension management must first be transformed into psychomotor skills to manifest as permanent behavior. This mediating effect is fully supported by a quantitative study by Tsamlag et al. (2020) involving 382 chronic disease patients, which showed that information significantly influences skills, and skills directly determine patient behavior. Structural equation modeling (SEM) analysis by Yang et al. (2022) involving 245 respondents also found that the direct effect of information tends to weaken or become non-significant independently, but becomes highly significant when mediated by behavioral skills ($p = 0.004$). Qualitatively, Horvat et al. (2023) provided a rational explanation, stating that highly literate patients frequently fail to maintain adherence if they are not specifically trained in practical problem-solving skills to overcome daily barriers. Nevertheless, a longitudinal study by Santos & Perez (2021) involving 110 patients offered a distinct perspective, showing that during the initial phase (the first 3 months), information has a strong direct relationship with behavior without the mediation of skills ($p < 0.05$) due to a psychological shock effect from acute complication risks. However, over the long term, this direct effect diminishes, and the mediation model through behavioral skills remains the most stable pathway.

Finally, behavioral skills were empirically proven to act as a significant mediating variable between motivation and tertiary preventive behavior ($b = 0.40$; 95% CI = 0.29 to 0.51; $p < 0.001$). Evidence of this mediation is reinforced by the synchronization of descriptive data across the 200 respondents: of the 51% with high motivation, the majority (58.5%) exhibited good behavioral skills, which served as the primary driver for 52.5% of respondents to achieve optimal tertiary preventive behaviors. This signifies that strong intentions and commitment (motivation) require technical capacity building so that they do not remain mere expectations, but instead transform into tangible health management actions. This mediation model is consistent with pioneering findings by Osborn & Egede (2020) within the IMB framework, where motivation is strongly related to skills, and skills strongly predict behavior. Similarly, an SEM analysis by Fisher et al. (2022) involving 290 chronic cardiovascular care patients reported that the largest portion of the total effect of motivation on behavior operates indirectly through the strengthening of practical capabilities ($p < 0.001$). A qualitative exploration by Hamilton et al. (2023) involving 30 participants further elucidated that even highly motivated patients are vulnerable to treatment burnout if they are not equipped with specific skills to manage therapeutic side effects. However, an anomaly was found in a study by Park & Cho (2021) regarding SEM modeling among 165 low-income patients with chronic hypertension, which reported that the behavioral skills mediation pathway was non-significant ($p > 0.05$). This discrepancy occurred because, in low-income populations, structural barriers such as financial constraints and limited healthcare access are far more dominant. Therefore, the effectiveness of behavioral skills as a mediator in this study still depends heavily on the stability of the patients' socioeconomic environment.

CONCLUSION

This study concluded that information, motivation, and behavioral skills were significantly associated with tertiary prevention behavior. Behavioral skills had an important role in strengthening the relationship between information, motivation, and tertiary prevention behavior

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