

Analysis of HBM Components with Early Detection Behavior of Hypertension at Primary Care Integration (ILP) In 2026

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ABSTRACT

Non-communicable diseases (NCDs), particularly hypertension, remain a major global and national health problem due to their high prevalence and asymptomatic nature in early stages. Hypertension is closely associated with modifiable lifestyle factors, including high salt intake, unhealthy dietary patterns, and low consumption of fruits and vegetables. Early detection through the Integrated Development Post for NCDs (Posbindu PTM) is an important strategy to prevent complications and improve community health outcomes. This study aimed to examine the relationship between Health Belief Model (HBM) components and early hypertension detection behavior among community members in Pesawaran Regency in 2026. A quantitative cross-sectional design was applied involving 395 respondents selected through cluster sampling. Data were collected using a validated HBM-based questionnaire and analyzed using univariate, chi-square, and logistic regression tests. The results showed that 57.2% of respondents had good early detection behavior. All HBM components were significantly associated with early detection behavior ($p < 0.05$). Multivariate analysis revealed that cues to action was the most dominant factor ($OR = 3.175$), indicating that respondents with strong cues to action were more than three times likely to perform early hypertension detection. In conclusion, all HBM components influence early hypertension detection behavior, with cues to action as the strongest predictor. Strengthening health promotion, including nutrition education such as reducing salt intake and improving dietary patterns, along with enhancing the role of health cadres and reminder systems, is essential to increase community participation in routine hypertension screening.

INTRODUCTION

Demographic transitions have shifted the global disease burden toward non-communicable diseases (NCDs), with hypertension contributing to approximately 7.5 million deaths annually and 57 million disability-adjusted life years (DALYs) ¹. Its global prevalence is projected to reach 29.2% by 2025 ². In Indonesia, prevalence rose from 25.8% to 30.8% ³, with Lampung Province at 31.4% and Pesawaran District at 29.8% ⁴. Hypertension is strongly linked to modifiable dietary factors notably high sodium intake, low fruit and vegetable consumption, and excessive processed food intake underscoring the critical role of nutrition in prevention and control ⁵.

Community-based screening through Pos Pembinaan Terpadu Penyakit Tidak Menular (Posbindu PTM) is a key national strategy employing cadres for blood pressure, blood glucose, and behavioral risk factor screening ⁶. However, despite 89 active units in Pesawaran District, attendance

reaches only 37.5% of target populations. A preliminary survey of 25 respondents found merely 32% performed routine examinations, while 68% rarely or never attended, predominantly due to low risk perception and the asymptomatic nature of the disease⁷.

The Health Belief Model (HBM) posits that health behavior is determined by perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy⁸. While structural factors affecting Posbindu effectiveness are documented, individual perception factors particularly regarding nutrition-related risk awareness remain inadequately understood in this setting. This study examines HBM determinants of early hypertension detection behavior among Posbindu PTM participants in Pesawaran District, integrating dietary risk factor assessment to inform context-specific, nutrition-sensitive interventions.

MATERIALS AND METHODS

This quantitative cross-sectional study examined determinants of early hypertension detection behavior among Posbindu PTM participants in Pesawaran District, Lampung Province, Indonesia. Data were collected at a single point from December 2025 to February 2026.

The study population comprised 30,388 registered hypertension cases across four public health centers (Puskesmas). Using Slovin's formula with a 5% margin of error, 395 respondents were recruited through cluster sampling with proportional allocation: Gedong Tataan (n=167), Bernung (n=142), Maja (n=42), and Kota Jawa (n=44). Inclusion criteria were: aged ≥ 15 years; residing in the Puskesmas working area; registered or having attended Posbindu PTM; history of hypertension or risk factors per Posbindu/Puskesmas records; willing to provide informed consent; and capable of reading the questionnaire. Exclusion criteria were: severe illness during data collection; cognitive or communication impairments; incomplete responses; or unavailability despite follow-up^{9,10}.

Instruments were self-administered questionnaires measuring HBM constructs (15 items per construct, 4-point Likert scale), early detection behavior, and dietary habits (salt intake, fruit/vegetable consumption, and processed food intake). Validity and reliability testing among 30 respondents with similar characteristics in Lampung Selatan District (February 12–15, 2026) yielded validity coefficients of 0.370–0.985 and Cronbach's alpha values of 0.903–0.978. Data were edited, coded, entered, and cleaned before analysis. Univariate analysis described variable distributions. Bivariate associations were tested using Chi-square. Multivariate analysis employed binary logistic regression with backward elimination to determine simultaneous effects, identify the dominant determinant, and estimate adjusted odds ratios. Candidate variables entered at $p < 0.25$ in simple logistic regression; non-significant variables ($p > 0.05$) were sequentially removed. The variable with the highest significant odds ratio was identified as the dominant predictor. All analyses used SPSS at $\alpha = 0.05$ (95% confidence interval).

RESULTS

Univariate Analysis

The distribution of Health Belief Model (HBM) constructs and early detection behavior among 395 respondents. The majority demonstrated favorable perceptions across most constructs: cues to action (59.5%, $n=235$), self-efficacy (55.9%, $n=221$), perceived benefits (54.9%, $n=217$), and perceived severity (54.7%, $n=216$). Perceived susceptibility and absence of perceived barriers were nearly balanced (51.4% and 50.1%, respectively), indicating that while health education by Posbindu cadres has partially shaped community awareness, risk perception and access barriers remain unevenly addressed. Early detection behavior was favorable in 57.2% ($n=226$) of respondents, yet the substantial proportion with less favorable behavior (42.8%, $n=169$) signals a persistent participation gap requiring targeted intervention.

Bivariate Analysis

Table 2. The Relationship Between Vulnerability Perception and Early Detection Behavior of Non-Communicable Diseases

Perception of Vulnerability	Early Detection Behavior of Non-Communicable Diseases (NCDs) of Hypertension				Quantity	%	p-value	OR 95% CI
	Good		Not Good					
	n	%	n	%				
Ya	137	67,5	66	32,5	203	100,0	0.000	2,402
No	89	46,4	103	53,6	192	100,0		(1,597-
Total	226	57,2	169	42,8	395	100,0		3,614)

The analysis showed a significant association between perceived susceptibility and early detection behavior ($p < 0.001$). Respondents with perceived susceptibility were more likely to demonstrate good early detection behavior (67.5%) compared to those without (46.4%). The odds ratio ($OR = 2.402$; 95% CI: 1.597–3.614) indicates that individuals who perceived themselves at risk were approximately 2.4 times more likely to engage in early detection. This finding highlights the importance of risk perception in shaping preventive health behavior. Individuals who recognize their vulnerability to hypertension are more motivated to undergo regular screening, which is consistent with the theoretical framework of the Health Belief Model.

Table 3. The Relationship Between Perception of Severity and Early Detection Behavior of Non-Communicable Diseases of Hypertension

Perception of Severity	Early Detection Behavior of Non-Communicable Diseases (NCDs) of Hypertension				Quantity	%	p-value	OR 95% CI

	Good		Not Good					
	n	%	n	%				
Yes	142	65,7	74	34,3	216	100,0		2.170
No	84	46,9	95	53,1	179	100,0	0.000	(1.446-
Total	226	57,2	169	42,8	395	100,0		3.258)

A significant relationship was also found between perceived severity and early detection behavior ($p < 0.001$). Respondents who perceived hypertension as a serious condition were more likely to perform early detection (65.7%) compared to those who did not (46.9%). The OR value of 2.170 (95% CI: 1.446–3.258) suggests that higher perceived severity increases the likelihood of preventive behavior by more than two times. This indicates that understanding the potential complications of hypertension, such as cardiovascular disease, may encourage individuals to seek early screening.

Table 4. The Relationship Between Benefit Perception and Early Detection Behavior of Non-Communicable Diseases of Hypertension

Perception of Benefits	Early Detection Behavior of Non-Communicable Diseases (NCDs) of Hypertension				Quantity	%	p-value	OR 95% CI
	Good		Not Good					
	n	%	n	%				
Ada	145	66,8	72	33,2	217	100,0	0.000	2.412 (1.603-3.629)
No	81	45,5	97	54,5	178	100,0		
Total	226	57,2	169	42,8	395	100,0		

Perceived benefits were significantly associated with early detection behavior ($p < 0.001$), with respondents recognizing benefits more likely to engage in screening (66.8%) than those who did not (45.5%). The OR of 2.412 (95% CI: 1.603–3.629) indicates a strong positive influence. This suggests that individuals are more likely to adopt preventive behaviors when they believe that early detection can effectively reduce health risks and improve outcomes.

Table 5. The Relationship Between Inhibition Perception and Early Detection Behavior of Non-Communicable Diseases of Hypertension

Perception of Barriers	Early Detection Behavior of Non-Communicable Diseases (NCDs) of Hypertension				Quantity	%	p-value	OR 95% CI
	Good		Not Good					
	n	%	n	%				
None	128	64,6	70	35,4	198	100,0	0.003	1.847
Ada	98	49,7	99	50,3	197	100,0		(1.234-

Total	226	57,2	169	42,8	395	100,0	2.766)
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Perceived barriers were also significantly associated with early detection behavior ($p = 0.003$). Respondents without perceived barriers were more likely to engage in early detection (64.6%) compared to those with barriers (49.7%). The OR value (1.847; 95% CI: 1.234–2.766) indicates a moderate effect size. Compared to other HBM components, this variable showed a relatively lower OR, suggesting that although barriers influence behavior, their impact is weaker than motivational factors such as perceived benefits or susceptibility. However, addressing these barriers remains important to improve participation in screening programs.

Table 6. The Relationship Between Cues To Action And Early Detection Behavior Non-Communicable Diseases Hypertension

Cues To Action	Early Detection Behavior of Non-Communicable Diseases (NCDs) of Hypertension				Quantity	%	p-value	OR 95% CI
	Good		Not Good					
	n	%	n	%				
Ada	162	68,9	73	31,1	235	100,0	0.000	3.329
None	64	40,0	96	60,0	160	100,0		(2.187-
Total	226	57,2	169	42,8	395	100,0		5.066)

Cues to action demonstrated the strongest association with early detection behavior ($p < 0.001$). Respondents with cues to action were significantly more likely to perform early detection (68.9%) compared to those without (40.0%). The OR of 3.329 (95% CI: 2.187–5.066) indicates that individuals receiving external or internal triggers were more than three times more likely to engage in screening. This finding suggests that cues to action such as reminders from health workers, family encouragement, or exposure to health information play a dominant role in initiating preventive behavior. Compared to other variables, this factor has the highest influence, highlighting its importance in intervention strategies.

Table 7 Relationship Between Self-Efficacy and Early Detection Behavior of Non-Communicable Diseases Hypertension

Self-Efficacy	Early Detection Behavior of Non-Communicable Diseases (NCDs) of Hypertension				Quantity	%	p-value	OR 95% CI
	Good		Not Good					
	n	%	n	%				

Yakin	146	66,1	75	33,9	221	100,0	2.287
Not Sure	80	46,0	94	54,0	174	100,0	0.000 (1.521-
Total	226	57,2	169	42,8	395	100,0	3.440)

Self-efficacy was significantly associated with early detection behavior ($p < 0.001$). Respondents with high self-efficacy were more likely to engage in early detection (66.1%) compared to those with low self-efficacy (46.0%). The OR of 2.287 (95% CI: 1.521–3.440) indicates that confidence in one's ability to perform health-related actions substantially increases the likelihood of engaging in screening behavior. This result emphasizes that individuals who feel capable of accessing health services and managing their health are more likely to participate in preventive programs.

Multivariate Analysis

Table 8. Multivariate Logistic Regression Analysis of Early Hypertension Detection Behavior

Variables	B	p-value	OR (Exp(B))	95% CI
Perceived Susceptibility	1.059	0.000	2.885	1.658–5.018
Perceived Severity	-0.491	0.252	0.612	0.264–1.417
Perceived Benefits	0.748	0.001	2.112	1.331–3.350
Perceived Barriers	0.590	0.011	1.805	1.145–2.845
Cues to Action	1.155	0.000	3.175	2.022–4.985
Self-Efficacy	0.380	0.342	1.463	0.668–3.205

The multivariate analysis showed that cues to action was the most dominant factor influencing early hypertension detection behavior (OR = 3.175), indicating that respondents with strong cues were more than three times more likely to engage in screening. Perceived susceptibility and perceived benefits also demonstrated significant associations, while perceived severity and self-efficacy were not statistically significant in the final model.

DISCUSSION

This study found that all Health Belief Model (HBM) constructs were significantly associated with early hypertension detection behavior among Posbindu PTM participants in Pesawaran District, with cues to action emerging as the dominant independent predictor (adjusted OR = 3.175) after controlling for other variables. This indicates that while individual risk perception matters, external stimuli are the most critical proximal drivers of screening participation^{11,12}.

The majority of respondents reported favorable perceived susceptibility (51.4%), severity (54.7%), and benefits (54.9%), suggesting that existing health education has partially shaped community awareness. These findings align with Rosenstock's HBM proposition that individuals who feel vulnerable to disease and value preventive action are more motivated to engage in health

behavior¹³. However, the narrow margins between favorable and unfavorable categories indicate that awareness remains uneven and requires intensification. Perceived barriers were evenly distributed (50.1% vs. 49.9%), reflecting persistent structural obstacles such as occupational constraints and limited schedule information that moderately impede participation even when individual perceptions are favorable¹⁴.

Cues to action demonstrated the strongest bivariate association (OR = 3.329) and retained dominance in multivariate analysis. This supports Becker's extension of the HBM, which posits that cognitive readiness alone is insufficient without environmental triggers to mobilize action¹⁵. Self-efficacy, although significant in bivariate analysis (OR = 2.287), lost independent significance in the adjusted model, suggesting that confidence in accessing services may be mediated by external cues; individuals receiving consistent prompting and support are more likely to perceive themselves as capable of sustained screening¹⁶.

Socio-cultural factors further contextualize these findings. In Pesawaran's communal society, health decisions are often collective, shaped by family authority, neighborhood social norms, and traditional health beliefs¹⁷. The high prevalence of cues to action (59.5%) likely reflects strong kinship networks and community-based cadre systems. Conversely, respondents lacking family support or experiencing stigma regarding chronic disease diagnosis may avoid screening despite favorable individual perceptions¹⁸. Future interventions should therefore leverage community leaders and family units as conduits for health messaging rather than targeting individuals in isolation¹⁹.

Several limitations warrant consideration. The cross-sectional design precludes causal inference. Self-reported questionnaires may introduce social desirability bias. Cluster sampling across only four public health centers limits generalizability. The study did not measure objective dietary variables (e.g., sodium intake, dietary patterns) that could strengthen the nutritional context relevant to JoNE's scope. Finally, unmeasured confounders such as health literacy, cadre competence, and facility resource availability may influence the observed associations.

From a policy perspective, these findings support integrating systematic reminder mechanisms into Posbindu PTM operations, including digital reminders (e.g., WhatsApp broadcasts), community announcements, and cadre home-visit invitations¹⁹. Incorporating brief dietary risk assessments and sodium-reduction counseling into Posbindu sessions would align hypertension screening with nutrition-focused prevention²⁰. District health authorities should also consider mobile screening units and after-hours scheduling to reduce structural barriers, alongside social-mobilization campaigns engaging family networks and community leaders. Future research should employ longitudinal designs to establish causality and qualitative inquiry to elucidate socio-cultural mechanisms shaping screening behavior in this setting.

CONCLUSION

This cross-sectional study of 395 Posbindu PTM participants in Pesawaran District found that all Health Belief Model constructs significantly influenced early hypertension detection behavior. The majority reported favorable perceptions: perceived susceptibility (51.4%, n=203), severity (54.7%, n=216), benefits (54.9%, n=217), absence of barriers (50.1%, n=198), cues to action (59.5%, n=235), and self-efficacy (55.9%, n=221), with 57.2% (n=226) demonstrating good early detection behavior. Bivariate analysis confirmed significant associations across all constructs ($p < 0.05$). Multivariate analysis identified cues to action as the dominant predictor (adjusted OR = 3.175, 95% CI: 2.022–4.985, $p < 0.05$), indicating that respondents with favorable external triggers were approximately 3.2 times more likely to engage in screening after controlling for other HBM variables. These findings demonstrate that external stimuli are the most critical determinant of detection behavior, underscoring the need for consistent health promotion, community-based reminder systems, and strengthened cadre engagement to enhance routine blood pressure screening within Posbindu PTM programs.

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