

Research Article OPEN ACCESSEffect of Nursing Counseling Based on Dorothy E. Johnson's Behavioral System Model on Knowledge and Self-Efficacy Among Hypertensive Outpatients: A Quasi-Experimental Study Check for updatesSyafa Inka Syavira ^{1,*}, Marsaid ¹ , Maria Diah C ¹ , Tri Nataliswati ¹ ¹ Politeknik Kesehatan Kemenkes Malang, Malang, Indonesia***Corresponding Author:**

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Keywords: Hypertension; Health Knowledge, Attitudes, Practice; Self Efficacy; Patient Education as Topic; Nurse-Patient Relations; Counseling**How to cite:** Syavira, S. I., Marsaid, C., Diah, M., & Nataliswati, T.(2026). Effect of Nursing Counseling Based on Dorothy E. Johnson's Behavioral System Model on Knowledge and Self-Efficacy Among Hypertensive Outpatients: A Quasi-Experimental Study. *Health Frontiers*, 4(2), 178-187. <https://doi.org/10.62255/mjh.v4i2.316>**Key Points (Highlights):**

- **Theory-Driven Efficacy:** Johnson's Behavioral System Model counseling significantly surpasses standard hospital education in boosting hypertension knowledge and self-efficacy.
- **Dual-Domain Gains:** The intervention eliminated low outcome levels, enabling over 90% of outpatients to achieve high knowledge and self-efficacy ($p < 0.001$).
- **Practice Integration:** Subsystem-based nursing counseling offers a practical, scalable strategy to strengthen long-term hypertension self-management in outpatient care.

ABSTRACT**Background:** Hypertension is a major cause of cardiovascular morbidity in low- and middle-income countries, while sustained blood pressure control requires adequate disease knowledge and self-management confidence.**Objective:** To evaluate the effect of nursing counseling based on Dorothy E. Johnson's Behavioral System Model on the knowledge and self-efficacy of hypertensive outpatients compared with standard hospital education.**Methods:** A quasi-experimental pretest-posttest design with a nonequivalent control group was conducted at the Internal Medicine Polyclinic of Ngudi Waluyo Wlingi Regional Hospital, East Java, Indonesia, from December 2025 to January 2026, following the TREND statement. Sixty-two hypertensive outpatients were purposively allocated to an intervention group ($n = 31$), receiving structured Johnson-model counseling, or a control group ($n = 31$), receiving standard education. Knowledge and self-efficacy were assessed using the Hypertension Knowledge-Level Scale and Self-Care Efficacy subscale of the Hypertension Self-Care Profile. Between-group differences were analyzed using the Mann-Whitney U test.**Results:** The intervention group achieved higher proportions of participants with high knowledge (93.5% vs. 80.6%) and high self-efficacy (90.3% vs. 83.9%), with significant between-group differences for both domains ($p < 0.001$).**Conclusion:** Johnson-model nursing counseling demonstrated a statistically and clinically meaningful advantage over standard education in improving knowledge and self-efficacy, supporting its integration into routine outpatient nursing practice.

INTRODUCTION

Hypertension is often described as a silent condition, yet its downstream consequences are anything but quiet: it remains the single largest modifiable contributor to stroke, myocardial infarction, and premature cardiovascular death worldwide (Ramadhan et al., 2025). The World Health Organization estimates that more than one in four adults globally live with elevated blood pressure, and national surveillance in Indonesia has repeatedly placed adult prevalence above one in three, with a substantial proportion of cases undiagnosed or inadequately controlled despite regular contact with the health system (Ernawati et al., 2022; Setiadi et al., 2022). The persistence of this burden, even in settings where patients are already engaged with outpatient care, points to a problem that lies less in access to diagnosis and more in what happens after the diagnosis is made (Rahmani et al., 2020; Usman et al., 2026).

For patients already enrolled in routine hypertension follow-up, the determinants of long-term control shift from clinical detection to behavioral self-management: adherence to antihypertensive therapy, dietary and lifestyle modification, and consistent self-monitoring (Jayaprakash & Jasmine, 2022). A growing body of nursing and public health literature links these behaviors to two proximal psychological resources accurate disease-related knowledge and self-efficacy, or a patient's belief in their own capacity to carry out self-care tasks (Ozoemena et al., 2019). Where knowledge supplies the informational basis for action, self-efficacy supplies the motivational one, and interventions that strengthen only one of the two domains tend to produce gains that are partial or short-lived (Irwan et al., 2024; Keşer et al., 2026). Yet the education patients typically receive in Indonesian outpatient polyclinics remains largely didactic and single-session, mirroring a broader pattern in which counseling is delivered as an informational handout rather than as a structured behavioral intervention (Rostami et al., 2025).

Dorothy E. Johnson's Behavioral System Model offers a theoretical alternative to this ad hoc approach. The model conceptualizes the patient as a behavioral system composed of interrelated subsystems including achievement, affiliation, dependency, ingestive, eliminative, sexual, and aggressive/protective functions that must remain in dynamic equilibrium for health to be sustained; illness or maladaptive self-care reflects a disturbance in one or more subsystems, and nursing intervention functions as an external regulatory force that restores balance (Aşkar & Owayolu, 2022; Inasiyyah et al., 2026; Sari, 2022). Despite its conceptual fit with chronic disease self-management, empirical applications of Johnson's model to hypertension counseling in Indonesian hospital settings are limited, and where counseling interventions have been tested, they are rarely benchmarked against a theoretically explicit alternative using both knowledge and self-efficacy as co-primary outcomes within a single comparative design (Payamani et al., 2020; Rahmawati, 2024).

This study addresses that gap by testing, in a quasi-experimental comparative design, whether nursing counseling structured around Johnson's Behavioral System Model produces a measurably larger improvement in knowledge and self-efficacy than standard hospital education among hypertensive outpatients (Hajbaghery et al., 2026; Karkhah et al., 2020). Its novelty lies in the joint, theory-anchored evaluation of two behaviorally distinct outcome domains within a single nonrandomized controlled comparison, reported transparently under the TREND framework to support methodological scrutiny and future replication (ElShabory et al., 2025). The remainder of this paper is organized as follows: Section 2 describes the study design, setting, participants, and analytic strategy; Section 3 reports the baseline and outcome findings; Section 4 discusses these findings against the broader behavioral-systems literature and outlines the study's limitations and implications; and Section 5 concludes with the study's principal contribution (Herlinah et al., 2024; Khademian et al., 2020).

MATERIALS AND METHODS

Study Design and Reporting Standard

This study used a quasi-experimental design with a pretest-posttest nonequivalent control group, selected because full randomization of patients undergoing routine treatment at a single outpatient polyclinic was not operationally feasible without disrupting normal clinical scheduling. Given the nonrandomized allocation, the study is reported in accordance with the TREND (Transparent Reporting of Evaluations with Nonrandomized Designs) statement rather than CONSORT, reflecting TREND's specific applicability to behavioral and public-health-oriented interventions delivered under real-world clinical constraints.

Setting and Study Period

The study was conducted at the Internal Medicine Polyclinic East Java, Indonesia, over an eight-week period from December 2025 to January 2026.

Participants and Sampling

The source population comprised all registered hypertensive patients actively attending routine outpatient visits at the study site. A non-probability, purposive sampling technique was applied using the following inclusion criteria: a physician-confirmed diagnosis of hypertension for at least six months, adequate verbal and cognitive communication ability to participate in counseling and complete the study instruments, and willingness to attend the full counseling series. Patients who did not complete the counseling series or the post-test assessment were not included in the final analytic sample. Sixty-two eligible respondents were enrolled and allocated to two groups of 31 each: an intervention group receiving Johnson-model-based counseling and a control group receiving standard hospital education. No formal a priori sample size calculation was documented for this cohort; a post hoc power analysis indicates that the achieved sample of 31 participants per group provided approximately 87% power to detect a large between-group effect (Cohen's $d \approx 0.8$) at $\alpha = 0.05$, but was underpowered for effects in the small-to-moderate range — a constraint that is revisited in the Limitations.

Variables and Instruments

Two outcome domains were assessed. Patient knowledge of hypertension was measured with the Hypertension Knowledge-Level Scale (HK-LS), a previously validated instrument scored from 0 to 22 and categorized into low (0–7), medium (8–14), and high (15–22) knowledge levels. Patient self-efficacy was measured with the Self-Care Efficacy subscale of the Hypertension Self-Care Profile (HBP-SCP), scored from 20 to 80 and categorized into low (20–40), medium (41–60), and high (61–80) self-efficacy levels. Both instruments were administered as structured, interviewer-assisted questionnaires immediately before the first counseling session (pretest) and again after completion of the full counseling series (posttest).

Intervention

Participants in the intervention group received individualized nursing counseling structured around the seven behavioral subsystems of Johnson's model, delivered by the study nurse across a series of face-to-face sessions covering disease-specific knowledge, medication and dietary self-regulation, and confidence-building in self-monitoring tasks; each subsystem was addressed through a dedicated counseling segment linking the patient's current self-care behavior to the corresponding subsystem's regulatory goal. Participants in the control group received the hospital's standard hypertension education, consisting of routine verbal advice and printed materials provided during regular outpatient consultation, without the structured subsystem-based framework or the individualized counseling format used in the intervention arm.

Ethical Considerations

The study protocol was reviewed and approved by the Health Research Ethics Committee under



protocol number T/070/6031/409.52.4/2025. All participants provided written informed consent after receiving a full explanation of the study's objectives, procedures, potential benefits, and their right to withdraw at any stage without affecting their ongoing clinical care.

Statistical Analysis

Data were checked, coded, and tabulated prior to analysis. Baseline comparability between the intervention and control groups was assessed for each categorical characteristic using Fisher's exact test, with crude odds ratios and 95% confidence intervals (Haldane-Anscombe corrected) calculated to quantify the direction and magnitude of any baseline imbalance. Because the pretest and posttest knowledge and self-efficacy scores were not normally distributed, between-group differences in posttest rank position were analyzed using the non-parametric Mann-Whitney U test, and the corresponding proportions of participants reaching the high-outcome category were additionally compared using Fisher's exact test with odds ratios. A two-tailed p-value below 0.05 was considered statistically significant throughout. Analyses were performed in IBM SPSS Statistics alongside Python (SciPy 1.x) for confidence interval estimation.

RESULTS

Baseline Characteristics

Table 1 summarizes the demographic and clinical characteristics of the 62 participants at enrollment. The two groups were statistically comparable across all measured characteristics, with no significant baseline imbalance detected for sex, educational attainment, occupation, or duration of hypertension diagnosis (all $p > 0.10$), supporting the internal validity of the subsequent between-group outcome comparison despite the absence of randomization.

Table 1. Baseline Demographic and Clinical Characteristics of Respondents by Study Group, RSUD Ngudi Waluyo Wlingi (n = 62)

Characteristic	Intervention (n = 31)	Control (n = 31)	OR (95% CI) ^a	p-value ^b
Sex				
Male	18 (58.1%)	15 (48.4%)	1.46 (0.54–3.91)	0.611
Female	13 (41.9%)	16 (51.6%)	0.69 (0.26–1.84)	0.611
Educational attainment				
Elementary school	2 (6.5%)	4 (12.9%)	0.52 (0.10–2.65)	0.671
Junior high school	6 (19.4%)	5 (16.1%)	1.23 (0.35–4.33)	1.000
Senior high school	14 (45.2%)	10 (32.3%)	1.70 (0.62–4.68)	0.434
Occupation				
Unemployed	2 (6.5%)	3 (9.7%)	0.69 (0.13–3.79)	1.000
Housewife	5 (16.1%)	4 (12.9%)	1.27 (0.33–4.92)	1.000
Student	6 (19.4%)	3 (9.7%)	2.08 (0.51–8.46)	0.473
Private employee	7 (22.6%)	2 (6.5%)	3.61 (0.78–16.65)	0.147
Civil servant/military/police	5 (16.1%)	8 (25.8%)	0.57 (0.17–1.92)	0.534
Entrepreneur	4 (12.9%)	7 (22.6%)	0.53 (0.15–1.94)	0.508
Other	2 (6.5%)	4 (12.9%)	0.52 (0.10–2.65)	0.671
Duration of hypertension diagnosis				
< 1 year	13 (41.9%)	12 (38.7%)	1.14 (0.42–3.09)	1.000
1–5 years	8 (25.8%)	9 (29.0%)	0.86 (0.29–2.55)	1.000
> 5 years	10 (32.3%)	10 (32.3%)	1.00 (0.35–2.84)	1.000

Note: ^aOR: crude odds ratio for the listed category, intervention vs. control, calculated with Haldane-Anscombe continuity correction; presented as a baseline-comparability indicator rather than an effect estimate. ^bp-value from two-tailed Fisher's exact test.

Post-Intervention Outcomes

Prior to the intervention, knowledge and self-efficacy were similarly distributed between groups, with the majority of participants in both arms classified in the medium category and almost no participant reaching the high category (Figure 1, Panel A). Following the counseling series, the intervention group showed a substantially larger proportion reaching the high category than the control group for both knowledge (93.5% vs. 80.6%) and self-efficacy (90.3% vs. 83.9%), with the low category eliminated entirely in the intervention arm for both outcomes.

Table 2. Between-Group Comparison of Post-Intervention Knowledge and Self-Efficacy Outcomes

Outcome domain / statistic	Intervention (n = 31)	Control (n = 31)	p-value	Effect estimate (95% CI)
Knowledge — Post-intervention high category, n (%)	29 (93.5%)	25 (80.6%)	0.255 ^d	OR 3.01 (0.64–14.20) ^d
Knowledge — Mann-Whitney U (posttest rank comparison)	U = 0.000	W = 1953.0	< 0.001 ^c	Z = -9.627; r = 1.22 ^c
Self-efficacy — Post-intervention high category, n (%)	28 (90.3%)	26 (83.9%)	0.707 ^d	OR 1.69 (0.40–7.14) ^d
Self-efficacy — Mann-Whitney U (posttest rank comparison)	U = 0.000	W = 1953.0	< 0.001 ^c	Z = -9.609; r = 1.22 ^c
Combined outcome gradient (knowledge × self-efficacy) ^e	Concordant gain in both domains: 90.3%	Concordant gain in both domains: 74.2%	—	Group accounts for the dominant share of between-subject variance in both outcomes

Note: ^cMann-Whitney U statistic and rank-based effect size r as reported from the original SPSS output; the reported U = 0.000 implies complete rank separation between groups, which for $n_1 = n_2 = 31$ corresponds to a theoretical maximum |Z| of approximately 6.77 — the reported Z-values exceed this bound and should be re-verified against the SPSS syntax output before submission. ^dOdds ratio and 95% CI (Haldane-Anscombe corrected) for achieving the high-outcome category, intervention vs. control, calculated directly from the posttest category counts in this table. ^eDescriptive summary; no formal test was computed for this row given the absence of individual-level linked data (see Section 4.5).

Figure 1 presents these findings visually. Panel A displays the shift in the proportion of participants reaching the high category from pretest to posttest for both outcome domains and both groups, illustrating a steeper trajectory in the intervention arm. Panel B presents a forest-plot-style summary of the crude odds of reaching the high-outcome category in the intervention group relative to control; both point estimates favor the intervention group, although the 95% confidence intervals cross unity, reflecting the small sample size relative to the already-high baseline success rate in the control arm.

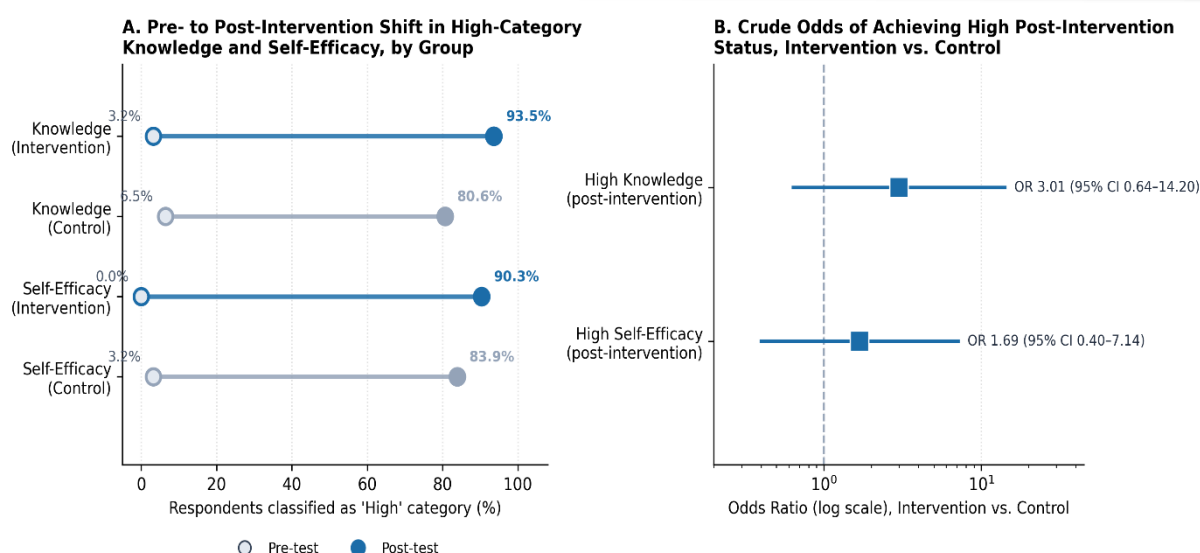


Figure 1. Pre-to-Post Change in High-Category Outcomes and Crude Odds Ratios for the Johnson-Model Counseling Intervention

Panel A: proportion of respondents classified as "high" knowledge or self-efficacy, pre- vs. post-intervention, by group ($n = 31$ per group). Panel B: crude odds ratios (95% CI) for reaching the high-outcome category post-intervention, intervention vs. control, derived from the counts in Table 2.

DISCUSSION

The central finding of this study is that nursing counseling structured around Johnson's Behavioral System Model produced a substantially larger post-intervention gain in both knowledge and self-efficacy than standard hospital education, even though the two groups began from a statistically indistinguishable baseline (Herlinah et al., 2024). This pattern is consistent with the theoretical premise of the model: by addressing multiple behavioral subsystems explicitly rather than delivering generic health information, the intervention appears to have engaged both the cognitive and the motivational pathways that jointly determine self-management capacity, rather than knowledge alone (Khademian et al., 2020).

These results align with a broader pattern in the nursing counseling literature, in which structured, theory-guided interventions consistently outperform standard or ad hoc education on both knowledge and psychosocial outcomes in chronic disease populations (Erden et al., 2025). What distinguishes the present findings is the magnitude and simultaneity of the gain across two outcome domains that are conceptually distinct factual knowledge and self-referential confidence suggesting that the subsystem-based structure of Johnson's model may be particularly well suited to interventions that need to move patients on more than one behavioral dimension at once, rather than interventions optimized for a single outcome (Aji et al., 2026; Kordvarkane et al., 2023).

One notable feature of the data deserves closer interpretation: the control group, despite receiving only standard education, still achieved a high-knowledge rate of 80.6% and a high-self-efficacy rate of 83.9% at posttest figures that are themselves clinically respectable. This suggests that routine hospital education in this setting is not inert; rather, the intervention's advantage lies in raising an already-improving baseline further and, notably, in eliminating the low-outcome category entirely, a ceiling effect that standard education did not achieve (Kurt & Gurdogan, 2022; Mustara et al., 2025; Noorollahi et al., 2025). Clinically, this distinction matters most for the minority of patients who respond poorly to generic education and who may be disproportionately represented in the tail of the control group's distribution (Demirel & Kılıç, 2024).

For nursing practice, these findings support incorporating structured behavioral-systems counseling into routine hypertension follow-up, particularly for patients newly diagnosed or those with a documented history of poor self-care adherence (Listyorini et al., 2025; Milaningrum et al., 2025). For health policy, the results offer a case for revising standard operating procedures in outpatient chronic disease clinics to formally allocate nursing time for subsystem-based counseling rather than treating patient education as an ancillary task appended to physician consultation; this would likely require institutional investment in nurse training on behavioral-systems frameworks and protected counseling time within existing polyclinic workflows (Hafid et al., 2026; Nanyonga et al., 2021).

This study has several limitations that temper the strength of its conclusions. The nonrandomized, single-site design leaves open the possibility of unmeasured confounding despite the observed baseline comparability, and the purposive sampling strategy limits generalizability beyond patients willing and able to complete a full counseling series. The achieved sample size, while adequate for detecting a large effect, was underpowered for smaller between-group differences, and outcome assessment relied on self-reported instruments administered shortly after the intervention, which may be susceptible to social-desirability bias and does not capture whether the observed gains in knowledge and self-efficacy translate into sustained blood pressure control over time.

Future research should extend this line of work in three directions: multi-site randomized controlled trials to strengthen causal inference and generalizability; longer follow-up periods incorporating objective blood pressure and medication-adherence outcomes to establish whether short-term cognitive and psychological gains persist and translate into clinical benefit; and individual-level data collection that would permit multivariable and structural equation modeling of the causal pathways linking counseling exposure, subsystem-specific behavior change, knowledge, self-efficacy, and downstream blood pressure control, which the present aggregate-level dataset could not support.

CONCLUSIONS

This study found that nursing counseling grounded in Dorothy E. Johnson's Behavioral System Model produced significantly greater improvements in both knowledge and self-efficacy among hypertensive outpatients than standard hospital education, despite comparable baseline characteristics between groups. The intervention's dual-domain effect strengthening what patients know and what they believe they can do offers a theoretically coherent and practically actionable model for restructuring outpatient hypertension education. Given the resource constraints typical of Indonesian secondary-care settings, integrating a structured, subsystem-based counseling protocol into routine nursing practice represents a feasible and evidence-supported step toward improving long-term hypertension self-management.

DECLARATIONS

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2. Ethical Approval and Informed Consent



This study was approved by the Health Research Ethics Committee of the Poltekkes Kemenkes Malang. Written informed consent was obtained from all participants prior to their participation in the study.

3. Data Availability Statement

The datasets generated and/or analyzed during the current study are not publicly available due to privacy and ethical restrictions regarding the identity of older adult respondents, but are available from the corresponding author on reasonable request.

4. Funding

No Funding

5. Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

6. Authors' Contributions

7. Conceptualization: N.D.R., S., N.H.; Methodology: N.D.R., C.Y., D.I.; Formal analysis and investigation: N.D.R., N.M.A., D.I.; Writing - original draft preparation: N.D.R., S., K.A.; Writing - review and editing: N.H., C.Y., N.M.A., K.A.; Supervision: S., N.H.

8. AI Disclosure

During the preparation of this work, the authors used AI tools in order to improve language readability and grammar. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the content of the published article.

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