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The Effect of CERDIK Health Education on Knowledge Enhancement among Hypertensive Patients

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ABSTRACT

Introduction: Hypertension is a major global health issue, affecting approximately one-third of adults and contributing significantly to morbidity and mortality. In Indonesia, its prevalence is rising, yet public awareness remains insufficient. The Ministry of Health has promoted the CERDIK framework—encouraging routine checkups, smoking cessation, physical activity, balanced diet, adequate rest, and stress management—as a key preventive measure. However, empirical evidence regarding its impact on patient knowledge in clinical settings remains limited.
Objective: This study aimed to assess the effect of CERDIK-based health education on hypertension knowledge among patients at Sidowaras Primary Care Clinic, North Lampung.
Methods: A quantitative pre-experimental design with a one-group pre-test and post-test approach was utilized. The population comprised 453 hypertensive patients registered between August and October 2024. Using accidental sampling and Slovin's formula, a sample of 27 Prolanis program participants was selected. Data were analyzed using the paired-samples t-test.
Results: The analysis revealed a significant increase in knowledge following the intervention, with a p-value of 0.000 (<0.05).
Conclusion: CERDIK health education effectively improves knowledge among hypertensive patients. Enhancing awareness and understanding of hypertension is crucial to preventing complications from non-communicable diseases. These findings support integrating CERDIK-based education into primary healthcare programs to promote better hypertension management.

Keywords: CERDIK education, hypertension, knowledge

Introduction

Hypertension is defined as a persistent condition characterized by systolic blood pressure exceeding 140 mmHg and diastolic blood pressure above 90 mmHg (Anggie Stiexs et al., 2021). When sustained over time, this condition develops into chronic hypertension, marked by continuously elevated arterial blood pressure, which poses significant health risks (Setiawan et al., 2018). Recognized as a chronic, non-communicable disease with lifelong duration, hypertension is often referred to as a "silent killer," particularly affecting elderly populations (Sri Hidayati & Hidayati, 2023).

Globally, the World Health Organization (2024) reports that the number of adults with hypertension nearly doubled from 650 million in 1990 to 1.3 billion in 2019. This upward trend contributes to approximately 10.8 million preventable deaths annually and results in 235 million years of life lost or lived with disability. Approximately one in three adults worldwide suffer from hypertension, with prevalence increasing to nearly 49% among individuals aged 50 and older, affecting men and women almost equally (WHO, 2024).

In Indonesia, hypertension represents a significant public health challenge. According to the Ministry of Health (Kemenkes RI, 2024), it remains the leading cause of death, with 90–95% of cases attributed to essential hypertension. Data from the 2023 Indonesian Health Survey (SKI) and longitudinal studies on non-communicable diseases (NCDs) identify hypertension as the fourth leading risk factor for mortality, responsible for 10.2% of deaths. Furthermore, acquired disabilities affecting vision, hearing, and mobility are largely attributed to NCDs, with hypertension accounting for 22.2% (Kemenkes RI, cited in Pokhrel, 2024).

Provincial health data from Lampung reveal hypertension as the third most prevalent disease, with cases rising from 190,470 in 2020 to 230,672 in 2022 (Lampung Provincial Health Office, 2022). Among 27 primary health centers surveyed in North Lampung, hypertension exhibited the highest incidence among NCDs (Lampung Provincial Health Office Profile, cited in Oktavia et al., 2023).

Hypertension is influenced by multiple factors, including environmental stress, obesity, smoking, alcohol consumption, and high salt intake, alongside intrinsic factors such as age, sex, and ethnicity. Despite often being asymptomatic, untreated hypertension can lead to severe complications such as stroke (Laili et al., 2023). Knowledge about hypertension is critical for effective disease management, as informed individuals are more likely to attend healthcare services regularly and adhere to treatment plans (Suhanda et al., 2022). Lack of information contributes to poor understanding, while increased education enhances disease comprehension (Primantika & Noorratri, 2023).

In response, the Indonesian Ministry of Health introduced the CERDIK program, which promotes six healthy behaviors: regular health check-ups, avoidance of cigarette smoke, routine physical activity, balanced diet, adequate rest, and stress management. This behavior-based strategy aims to reduce mortality, encourage healthier lifestyles, improve health outcomes, and enable early detection of NCD risk factors (Hakim & Sari, 2023). Healthcare providers, particularly nurses, play a vital role in delivering CERDIK-based education, empowering patients to adopt and maintain these healthy behaviors. The CERDIK acronym facilitates effective communication of public health messages (Laili et al., 2023).

A study by Razi et al. (2024) demonstrated significant improvement in hypertension knowledge following structured CERDIK education, with mean scores increasing from 61.92

pre-intervention to 87.46 post-intervention (p = 0.001), confirming the program's efficacy in primary healthcare settings. Preliminary data from Sidowaras Primary Care Inpatient Clinic in North Lampung recorded 453 hypertension cases from August to October 2024. Interviews with 10 Prolanis program participants revealed limited understanding of hypertension and its management, with most respondents scoring below 56% on CERDIK knowledge assessments. The majority were housewives aged 50–60 years, unfamiliar with the CERDIK program, underscoring a gap in patient education.

Given the increasing burden of hypertension and its complications, this study seeks to evaluate the effect of CERDIK health education on improving knowledge among hypertensive patients at Sidowaras Primary Care Inpatient Clinic, North Lampung. Enhancing patient awareness is essential to optimize disease management and reduce adverse health outcomes.

Objective

This study aimed to assess the effect of CERDIK-based health education on hypertension knowledge among patients at Sidowaras Primary Care Clinic, North Lampung.

Method

This study employed a quantitative research design, which is a systematic and scientific approach aimed at generating knowledge based on reliable and measurable data. Data collection was conducted using multiple methods, including structured questionnaires, knowledge tests, and in-depth interviews. The questionnaires were validated to ensure reliability and suitability for analysis. Additionally, testing instruments were either validated by experts or through established statistical validation methods. Interviews provided supplementary qualitative insights.

The research design was a pre-experimental, One Group Pre-test and Post-test model, considered a less rigorous experimental approach due to the absence of a control group. This design involved measuring participants' knowledge before and after the educational intervention to assess its effectiveness.

The study was conducted on January 16, 2025, at the Sidowaras Primary Care Inpatient Clinic in North Lampung. The population comprised all hypertensive patients registered at the clinic, totaling 453 individuals based on case reports from August to October 2024 (122 in August, 181 in September, and 150 in October).

The sample was drawn from this population using accidental sampling, a non-probability technique whereby participants are selected based on availability and willingness to participate. The sample size was determined using Slovin's formula (Sugiyono, cited in Shell, 2020), resulting in 27 hypertensive patients who were active participants in the Prolanis program—a chronic disease management initiative conducted weekly at the clinic.

The Slovin formula applied was:

$$n = \frac{N}{1+N(e)^2} = \frac{453}{1+453(0{,}01)^2} = \frac{453}{1+4{,}53} = \frac{453}{5{,}53} = 81.91 : 3 \text{ months} = 27 \text{ samples}$$

where n is the sample size, N is the population size, and e is the margin of error set at 1%.

The research instrument consisted of two components: (1) demographic data including name, age, gender, education level, and occupation; and (2) a structured knowledge questionnaire related to the "CERDIK" behavioral program. The questionnaire included 16 validated items covering six behavioral indicators, scored dichotomously (1 for correct, 0 for incorrect). Knowledge levels were categorized as good (76–100%), moderate (56–75%), and poor (<55%) according to Sudarta's criteria (2022).

Primary data were obtained via direct interviews and questionnaire administration among hypertensive patients, capturing demographic and knowledge variables. Secondary data collection included direct observations to assess baseline knowledge of CERDIK behaviors. Educational delivery utilized Structured Academic Presentation (SAP) supported by visual aids such as PowerPoint slides projected via LCD.

Data collection proceeded as follows: the researcher first secured ethical approval and research permits from the Faculty of Health Sciences at Universitas Mitra Indonesia and the clinic's head. Respondents received detailed information regarding the study's purpose, benefits, and confidentiality protocols, with informed consent obtained prior to participation.

The study comprised three phases: (1) pre-test, measuring baseline knowledge; (2) intervention, delivering CERDIK-based health education; and (3) post-test, evaluating knowledge changes using the same questionnaire.

Data processing involved multiple steps (Notoatmodjo in Oktavianti, 2020): editing to ensure completeness and accuracy, coding of qualitative responses into numerical values for analysis, and data cleaning to remove inconsistencies. Knowledge scores and demographic variables were systematically coded and entered into statistical software.

Univariate analysis described demographic characteristics and knowledge score distributions before and after intervention, presented as frequencies, percentages, and means (Notoatmodjo in Syafriani et al., 2022). Prior to bivariate testing, the Shapiro-Wilk test assessed data normality, with a p-value > 0.05 indicating normal distribution.

Bivariate analysis was conducted using the paired samples t-test at a 95% confidence level ($\alpha = 0.05$) in SPSS. Hypothesis testing followed conventional criteria: a p-value ≤ 0.05 led to rejection of the null hypothesis, confirming that CERDIK education significantly improved knowledge among hypertensive patients. Conversely, p-values > 0.05 indicated no significant effect (Notoatmodjo in Khoirunnisah, 2022).

Result

Table 1. Frequency Distribution of Respondent Characteristics at Sidowaras Primary Inpatient Clinic, North Lampung, in 2025

Variable	Category	Frequency (%)
Age	40 - 50 years	5 (18.5%)
	50 - 60 years	18 (66.7%)
	60 - 70 years	3 (11.1%)
	70 - 80 years	1 (3.7%)
	Total	**27 (100%)**
Gender	Male	0 (0%)
	Female	27 (100%)
	Total	**27 (100%)**

Education	Elementary (SD)	7 (25.9%)
	Junior High (SMP)	6 (22.2%)
	Senior High (SMA)	11 (40.7%)
	Bachelor's (S1)	3 (11.1%)
	Total	**27 (100%)**
Occupation	Farmer	3 (11.1%)
	Entrepreneur	1 (3.7%)
	Civil Servant/Retired	2 (7.4%)
	Housewife	21 (77.8%)

Based on Table 1, the majority of respondents were aged 50–60 years (66.7%), all were female (100%), most had completed senior high school (40.7%), and the predominant occupation was housewife (77.8%).

Table 2. Average Knowledge Level Before and after CERDIK Educational Intervention

Knowledge Level	N	Min. Score	Max. Score	Mean	Standard Deviation
Pre-test	27	31.00	75.00	48.96	10.68
Post-test	27	62.00	100.00	89.22	10.83

The table presents the descriptive statistics of participants' knowledge scores before and after the intervention. A total of 27 respondents were assessed. Prior to the intervention, the knowledge scores ranged from a minimum of 31.00 to a maximum of 75.00, with a mean score of 48.96 and a standard deviation of 10.68. These values indicate a relatively moderate variation in baseline knowledge among participants. Following the intervention, there was a marked improvement in knowledge scores, with the minimum and maximum scores increasing to 62.00 and 100.00, respectively. The mean score rose significantly to 89.22, accompanied by a standard deviation of 10.83. This consistent standard deviation suggests that, while the overall level of knowledge improved, the variability among participants remained comparable. These findings indicate that the intervention was effective in enhancing the participants' knowledge levels substantially.

Table 3. Shapiro-Wilk Normality Test Results

Variable	Statistic	df	Sig. (p-value)
Pre-test	0.954	27	0.267
Post-test	0.875	27	0.004

According to Table 3, the pre-test data showed a p-value of 0.267, which is greater than 0.05, indicating a normal distribution. However, the post-test p-value was 0.004, which is less than 0.05, indicating that the post-intervention data were not normally distributed. Hence, the overall data violated the assumption of normality.

Table 4. Paired Sample t-Test for the Effect of CERDIK Education

Comparison	Mean Difference	Standard Deviation	Standard Error	p-value	N

Pre-test vs Post-test	40.26	14.37	2.77	0.000	27

As shown in Table 4, the average increase in knowledge scores after the CERDIK educational intervention was 40.26, with a standard deviation of 14.37 and a standard error of 2.77. The paired sample t-test revealed a p-value of 0.000 (< 0.05), indicating a statistically significant improvement in knowledge following the intervention.

Discussion

This study investigated the effect of a health education intervention based on the CERDIK approach on improving hypertension-related knowledge among patients at the Sidowaras Primary Inpatient Clinic, North Lampung. The findings revealed a statistically significant improvement in knowledge following the intervention, as demonstrated by the paired t-test results, which showed a mean difference of 40.26 with a p-value of < 0.001. These results affirm the effectiveness of the CERDIK education model in enhancing patient knowledge about hypertension prevention.

Demographic analysis showed that the majority of respondents were female (100%), within the 50–60 age group (66.7%), had attained senior high school education (40.7%), and were predominantly housewives (77.8%). Prior to the intervention, most respondents exhibited low levels of knowledge—particularly older individuals aged 60–70 years with only elementary-level education. Following the intervention, the majority of participants moved into the "good knowledge" category, highlighting the positive impact of the CERDIK educational approach.

Several sociodemographic factors were observed to influence knowledge levels. Age-related physiological and cognitive changes may affect the ability to retain and process health information. According to Pujiningsih et al. (2024), aging impairs the body's regulatory mechanisms, including blood pressure control and cognitive capacity. Older adults often experience a decline in memory and learning, which may hinder their ability to fully benefit from educational interventions.

Although this study only involved female participants, gender differences in health information-seeking behavior are widely documented. Women are generally more proactive in accessing and utilizing health information, especially related to family and chronic disease management. Despite men often having broader access to social networks, Pujiningsih et al. (2024) and Putra et al. (2025) noted that women tend to show higher motivation to learn about health-related topics, which may positively influence knowledge acquisition.

A clear association was observed between educational attainment and knowledge improvement. Participants with higher education levels exhibited better baseline understanding and greater gains post-intervention. This finding is consistent with Putra et al. (2025), who emphasized that higher education facilitates access to credible information sources and enhances the ability to comprehend and apply health-related knowledge.

Most respondents were housewives, which may limit their exposure to health information. Individuals employed in more socially interactive environments are more likely to encounter health education through their networks. The relatively isolated routine of housewives could contribute to the initially low knowledge scores observed in this group.

Before the intervention, the mean knowledge score was 48.96, and after receiving CERDIK-based education, it increased to 89.22. This substantial improvement underscores the

efficacy of structured health education in enhancing understanding of hypertension management and prevention. These findings align with those of Razi et al. (2024), who also reported significant improvements in hypertension-related knowledge following CERDIK-based health promotion.

The CERDIK health education framework—comprising Periodic Health Checks (Cek kesehatan secara berkala), Eliminate Smoking (Enyahkan asap rokok), Regular Physical Activity (Rajin olahraga), Balanced Nutrition (Diet seimbang), Adequate Rest (Istirahat cukup), and Stress Management (Kelola stres)—is an initiative by the Indonesian Ministry of Health aimed at reducing the prevalence of non-communicable diseases through behavioral change and increased awareness. Nurses and health workers play a pivotal role in delivering this education and empowering patients to adopt preventive behaviors.

However, several limitations must be acknowledged. The study was conducted during concurrent provincial health screenings, which created environmental noise and disrupted participants' focus. Additionally, some respondents may not have fully understood the questionnaire items, leading to responses that may not accurately reflect their actual knowledge or beliefs. Time constraints also limited follow-up assessments, which could have provided deeper insights into knowledge retention.

Conclusion

The study concluded that most respondents were women aged 50–60, with high school education and working as housewives. Their average knowledge score before CERDIK education was 48.96, increasing significantly to 89.22 after the intervention. The paired samples t-test confirmed this improvement was statistically significant ($p < 0.001$), indicating the effectiveness of CERDIK education.

It is recommended that respondents adopt CERDIK practices—regular check-ups, avoiding smoke, physical activity, a balanced diet, rest, and stress management—as part of their daily routine. The clinic can use these findings to inform health programs and policies. Future researchers may use this study as a reference, and Universitas Mitra Indonesia can use it to support students in conducting and reporting research more effectively.

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Authors' contribution

Each author contributed equally in all the parts of the research. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

Conflict of interest

This research has no conflict of interest from planning, data collection, analysis, to publication. Respondents in this study were kept confidential and obtained consent by signing an informed consent sheet.

Ethical consideration

Not applicable.

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