

CERDIK and PATUH method to control hypertension with the interprofessional education and collaboration approaches

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ABSTRACT

Based on data from the non-communicable disease program at community health centers in 2023, hypertension cases in Pedungan Village, South Denpasar still have the highest number of cases compared to other diseases. Of the existing hypertension cases, only a portion receive health services at the Community Health Center, this is caused by a lack of public knowledge and understanding about controlling hypertension. People with Hypertension must be able to control their blood pressure well to avoid various serious disease complications. To avoid complications that can occur, a person with hypertension needs good knowledge. Knowledge can be increased by providing education. One educational method to increase the knowledge of people with hypertension is the CERDIK and PATUH method. That education method can be provided through collaboration with various parties using the Interprofessional Education (IPE) and Interprofessional Collaboration (IPC) approaches so the education can be provided more comprehensive. The aim to provide CERDIK and PATUH education in efforts to control hypertension using the IPE and IPC approaches. The method use is education through counseling using booklets, audiovisual media, demonstrations, and practice. Based on the pre and post test results, it is stated that providing CERDIK and PATUH education in efforts to control hypertension using the IPE and IPC approaches can increase public knowledge.

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1. INTRODUCTION

Non-Communicable Diseases (NCDs) are one of the major health challenges faced by the Indonesian government. The incidence of NCDs in society continues to increase every year. Based on the 2018 Basic Health Research (Riskesdas), the prevalence of NCDs such as stroke, cancer, diabetes mellitus, chronic kidney disease, and hypertension showed an increase compared to the 2013 Riskesdas results (Irfan et al., 2021).

NCDs are types of diseases that cannot be transmitted between individuals, but their occurrence is often triggered by an unhealthy lifestyle or degenerative factors. Some conditions classified as non-communicable diseases include cardiovascular and vascular diseases such as hypertension, diabetes

mellitus, and cancer, which generally affect adults and older individuals. However, this trend has shifted, as NCDs are now not only found in older adults but are also increasingly observed in teenagers. As a result, the target for NCD screening has expanded from only high-risk adult groups to individuals aged 15 and above. NCDs are non-infectious diseases but are the leading cause of death. Based on the proportion of NCD-related deaths among individuals under 70 years old, cardiovascular disease is the highest cause (39 percent), followed by cancer (27 percent). Meanwhile, chronic respiratory diseases, digestive diseases, and other types of NCDs collectively account for around 30 percent of deaths, with diabetes contributing to 4 percent of deaths ([Purdiyani, 2016](#)). Among the various NCDs found in society, hypertension is one of the most prevalent.

The World Health Organization (WHO) states that the number of hypertension patients will continue to increase in line with the growth of the global population. It is estimated that by 2025, around 29 percent of the world's population will experience hypertension, with the highest percentage of cases currently found in developing countries ([Sari et al., 2022](#)). According to WHO, as cited in [Manoppo et al. \(2018\)](#), this disease is categorized as a "silent disease" because patients often do not realize they have hypertension unless they check their blood pressure. Hypertension is defined as persistent high blood pressure with a systolic pressure of > 140 mmHg and/or a diastolic pressure of > 90 mmHg ([Kusuma et al., 2020](#)). It is a chronic non-communicable disease diagnosed based on high blood pressure measurements reaching approximately 140/90 mmHg or higher ([Israfil et al., 2024](#)). In terms of its causes, 90-95 percent of hypertension cases are due to unknown factors, including lack of physical activity, smoking, alcohol consumption, stress, excessive body weight, and a high-fat diet. Meanwhile, 5-10 percent of hypertension cases are caused by other diseases ([Direktorat P2PTM Ditjen Pencegahan dan Pengendalian Penyakit, 2018](#)).

In Indonesia, the prevalence of hypertension has reached significant levels. According to the 2018 Basic Health Research (Riskesmas), the prevalence of hypertension among individuals aged 18 and above is 34.1 percent. This means that approximately 1 in 3 adults in Indonesia suffers from hypertension. This data indicates a significant increase from the 2013 Riskesdas, which recorded a prevalence rate of 25.8 percent. The risk factors contributing to this high prevalence include unhealthy lifestyles such as alcohol consumption, smoking, lack of physical activity, and a high-salt diet. In Bali, particularly in the working area of Puskesmas Denpasar Selatan IV in Pedungan village, the prevalence of hypertension remains significant. Based on data from the 2023 NCD Program Profile at the Puskesmas, the number of hypertension patients reached 7,762 out of a total population of 29,102. This means that 26.7 percent of the population suffers from hypertension.

Among the many individuals diagnosed with hypertension, only around 1,454 people received healthcare services at the Puskesmas. This is due to a lack of social awareness regarding the importance of follow-up visits or regular check-ups at healthcare facilities. Additionally, data shows that the number of hypertension patient visits for check-ups fluctuates each month, with the lowest rate recorded in September, when only 12 percent of registered hypertension patients sought medical consultation. This indicates that public awareness regarding hypertension control remains very low.

According to reports from the NCD program holders, hypertension cases continue to increase over time, although the numbers fluctuate. Due to the silent nature of this disease, which often does not cause noticeable symptoms unless blood pressure is checked, it is frequently referred to as a "silent killer." Hypertension patients often do not realize they have the condition because there are no apparent symptoms. Many of them doubt the diagnosis given by doctors and do not follow the recommended therapy from healthcare professionals ([Making et al., 2021](#)).

The results of interviews with Puskesmas staff show that hypertension-related issues include: (1) Detection of hypertension cases is only limited to visits within the healthcare facility, while many residents do not undergo regular blood pressure checks, leading to undiagnosed hypertension; (2) Limited understanding of the available information regarding the importance of hypertension prevention and management, resulting in infrequent routine check-ups at the Puskesmas; (3) Limited knowledge and skills in properly managing hypertension cases; (4) Limited public awareness of the dangers and complications that may arise if hypertension is not routinely monitored and controlled.

The Puskesmas has implemented several solutions to address hypertension cases in the community. These include updating data on hypertension patients in each banjar to facilitate collaboration with the community health team (perkesmas) in raising awareness about monthly routine check-ups, coordinating and communicating with the village administration (Kelurahan) and community leaders (Kepala Lingkungan) to encourage residents, especially hypertension patients, to visit the Puskesmas, and conducting direct communication (darbin) with community health cadres to ensure that hypertension patients undergo routine check-ups either at the Puskesmas or during Posbindu sessions. Additionally, efforts include providing education and motivation to Prolanis participants to ensure they regularly visit the Puskesmas for check-ups and communicating with healthcare network facilities to collect data on hypertension patients.

However, the implementation of these measures has not been optimal. Health promotion efforts have primarily followed a top-down approach, and there has been a lack of active bottom-up participation from the community. This is evident from the data, which shows that the number of patients attending regular check-ups at the Puskesmas remains low. Blood pressure control is key to preventing more severe complications for hypertension patients (Sunarti & Patimah, 2019). Promotional efforts aim to enhance public awareness and knowledge, motivating individuals to prevent the disease (Sultan et al., 2021). Hypertension management is more effective when supported by health promotion initiatives because the disease can actually be prevented and controlled (Fauzi et al., 2020).

Health promotion can be carried out through various means, one of which is education or health literacy programs. Education is an essential effort in preventing and managing hypertension. Research has found that education positively impacts knowledge, skills, attitudes, and even reduces blood pressure (Adiatman & Nursasi, 2020). Similarly, other studies have concluded that educational interventions improve participants' knowledge and skills (Agustini et al., 2020).

Education can be enhanced through collaboration with multiple stakeholders using Interprofessional Education (IPE) and Interprofessional Collaboration (IPC) approaches, making the process more comprehensive and well-directed. IPE and IPC involve cooperation between multiple healthcare professionals to deliver more holistic education. A literature study analyzing 13 related journals found that IPE and IPC can empower communities (Wibawa et al., 2021). Thus, applying IPE and IPC approaches can provide significant benefits to society. Education using IPE and IPC approaches is combined with the CERDIK and PATUH educational methods for hypertension management. CERDIK and PATUH are part of the GERMAS (Healthy Living Community Movement) program initiated by the government. CERDIK is an acronym for preventive measures, which include (C) checking health regularly, (E) eliminating cigarette smoke, (R) engaging in regular exercise, (D) maintaining a balanced diet, (I) getting enough rest, and (K) managing stress. It is considered an effective strategy for preventing non-communicable diseases (NCDs). PATUH outlines recommended actions for hypertension patients, including (P) performing routine health check-ups as advised by doctors, (A) adhering to appropriate and consistent treatment, (T) maintaining a balanced diet, (U) undertaking safe and regular physical activity, and (H) avoiding alcohol, cigarette smoke, and carcinogenic substances (Dewi et al., 2022).

Table 1. Stages of implementation of activities with the POAC method

Activity plan	Activity Stages
Planning	<ul style="list-style-type: none"> • Conducting observations to partners regarding community service activities until reaching an agreement on the activities carried out. • Handling community service permits • Coordinating with all study programs involved in PKM. • Preparing educational materials with other study programs involved in the program <p>CERDIK</p> <ul style="list-style-type: none"> - <i>Cek Kesehatan secara berkala</i> (Regular Health Checks) - <i>Enyahkan asap rokok</i> (Eliminate cigarette smoke) - <i>Rajin olahraga</i> (Exercise regularly) - <i>Diet seimbang</i> (Balanced diet) - <i>Istirahat cukup</i> (Get enough rest) - <i>Kelola stress</i> (Manage stress) <p>PATUH</p> <ul style="list-style-type: none"> - <i>Periksa Kesehatan secara rutin berdasarkan anjuran dokter</i> (Check health regularly based on doctor's advice) - <i>Atasi Penyakit dengan pengobatan yang tepat</i> (Overcome diseases with proper treatment) - <i>Tetap diet berdasarkan gizi seimbang</i> (Maintain a diet based on balanced nutrition) - <i>Upayakan aktivitas fisik secara rutin dan aman</i> (Try to do physical activity regularly and safely) - <i>Hindari asap rokok, alkohol beserta zat karsinogenik</i> (Avoid cigarette smoke, alcohol and carcinogenic substances) <p>The materials were structured according to the relevant fields or study programs.:</p> <ul style="list-style-type: none"> - CERDIK and PATUH from the nursing study program - Food ingredient substitution from food engineering - Making chayote juice for hypertension patients from the pharmacy study program - Acupressure at certain points on the body to lower blood pressure from the acupuncture study program. <ul style="list-style-type: none"> • After the extension material is prepared, a booklet will be made.
Organizing	<ul style="list-style-type: none"> • Technical meeting • Checking the completeness of equipment and others until confirmation of targets to be given CERDIK and PATUH education • Evaluation of the implementation
Actuating	<ul style="list-style-type: none"> • Pretest to determine family knowledge about handling and preventing hypertension with the CERDIK and PATUH programs • Counseling on education on handling and preventing hypertension with the CERDIK and PATUH programs from all study programs • Audiovisual presentation of making chayote juice • Acupressure demonstration and practice • Evaluation
Controlling	<ul style="list-style-type: none"> • Post-test of family knowledge about handling and preventing hypertension with CERDIK and PATUH programs • Evaluation of PKM conducted • Closing

Research related to the CERDIK and PATUH educational methods has been extensively conducted, with several studies confirming their effectiveness in delivering health education. A study by [Ekawati et al. \(2021\)](#) found that educating stroke patients using CERDIK and PATUH significantly influenced

their behavior in reducing the risk of recurrent strokes. Another study by [Anita et al. \(2023\)](#) indicated that CERDIK and PATUH education positively impacted individuals' knowledge about controlling and preventing hypertension and stroke. Similarly, research by [Putri et al. \(2023\)](#) demonstrated that this method contributed to an increase in knowledge among respondents, particularly hypertension patients.

Based on these findings, this community engagement initiative aims to educate individuals suffering from hypertension and at-risk groups on hypertension prevention and management using CERDIK and PATUH, combined with the IPE and IPC approaches. The team collaborates with multiple disciplines across all programs at ITEKES Bali to provide a more comprehensive educational approach, ensuring the achievement of the desired outcomes. The programs involved include nursing, food technology, pharmacy, and acupuncture. This initiative seeks to deliver CERDIK and PATUH education through the IPE and IPC frameworks, enhancing public knowledge and awareness of hypertension management. By improving understanding, the program aims to address and mitigate hypertension-related issues within the community.

2. METHODS

This educational activity was conducted at Puskesmas Denpasar Selatan IV, with a total of 42 participants. The stages of the educational implementation followed the Planning, Organizing, Actuating, and Controlling (POAC) concept ([Agustini et al., 2023](#)), as outlined in Table 1.

This community service activity involved counseling on hypertension prevention and management. Behavioral changes can be achieved through various strategies, starting with increased knowledge and attitudes. One way to enhance knowledge is through health education. This understanding was improved through lectures delivering material on CERDIK and PATUH for hypertension management, as well as demonstrations and hands-on practice of acupressure. Before the counseling session began, the target community was given a pre-test, and after the session, they were given a post-test to assess the effectiveness of the counseling.

3. RESULTS AND DISCUSSION

Results

Planning stage

At the beginning of the activity, the team planned by first coordinating with the PTM program coordinator at Puskesmas Denpasar Selatan IV regarding the CERDIK and PATUH educational initiative for hypertension management using the IPE and IPC approaches. At this stage, the partner agreed on the team's objectives and mutually determined the time and location of the activity. Subsequently, the team began designing the operational implementation of the activity and preparing the necessary facilities and infrastructure, such as educational materials, booklets, audiovisual videos, blood pressure measurement devices (sphygmomanometers), and other essential equipment. At this stage, the team also coordinated with the Denpasar City Health Office regarding permission to conduct activities involving the community, particularly Prolanis members within the working area of Puskesmas Denpasar Selatan IV.

Implementation stage

The community service activity was conducted on Saturday, October 26, 2024, at the meeting room of Puskesmas Denpasar Selatan IV in an offline setting. Overall, the event ran smoothly. A total of

42 elderly participants attended, demonstrating remarkable enthusiasm and eagerness. Table 2 presents an overview of the participants' characteristics based on age and gender.

Table 2. Characteristics of participants based on age and gender

Age	Categories		Total
	Male	Female	
19– 44 years old	0	0	0
45 - 59 years old	7	18	25
>60 years old	6	11	17
Total	13	29	42

This community service activity began with a Prolanis session featuring exercise or yoga. In the implementation phase of the education session, the team started by administering a pre-test to assess participants' initial understanding before receiving educational materials.

The next stage involved delivering educational content from various study programs at ITEKES Bali, including: (1) Education on CERDIK and PATUH for hypertension management from the Nursing undergraduate program; (2) Education on food ingredient substitution to prevent hypertension from the Food Technology program; (3) Education on non-pharmacological treatments (such as using chayote juice to reduce hypertension), accompanied by a video demonstration on preparation methods from the Pharmacy program; (4) Education on acupressure techniques for lowering blood pressure in hypertensive patients, with a demonstration involving participants so they could practice independently, from the Acupuncture program.

All these materials were compiled into an engaging booklet with images and step-by-step guides, which was distributed to all participants. After the educational session, participants had the opportunity to engage in discussions, ask questions, and share their experiences with hypertension. The session concluded with a post-test administered to all participants to evaluate their knowledge, understanding, and skills before and after the education session. Figure 1 provides documentation of the event during the educational activities.



Figure 1. Location and equipments

This community service activity was conducted at Puskesmas Denpasar Selatan IV, targeting 42 participants who are members of the Prolanis program within the puskesmas' service area. Preparations for educational materials and examination tools were made in advance, including booklets as educational media and blood pressure measurement using a sphygmomanometer.

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Figure 2. Implementation of pre-test

The first activity was to provide a pre-test to all participants to determine the level of knowledge and understanding of participants regarding hypertension management. The results of the pre-test can be seen in Table 3.

Table 3. Results of the pre-test of education participants

Category	Pre-Test			Total
	Good	Fair	Poor	
Knowledge				
Total	33	7	2	42

Based on Table 3, it can be concluded that on average, participants have good knowledge, but there were still 2 participants with insufficient knowledge and 7 participants with sufficient knowledge.



Figure 3. Education from each study program

The next stage of implementation involved providing education from all study programs at ITEKES Bali, under the theme of CERDIK and PATUH initiatives for hypertension management, using

an Interpersonal Education (IPE) and Interpersonal Collaboration (IPC) approach. This method ensured a more comprehensive education, as each topic was directly delivered by experts from the respective study programs.

Participants received education from various programs: (1) Education on CERDIK and PATUH in hypertension management from the Nursing program; (2) Education on food ingredient substitution to prevent hypertension from the Food Technology program; (3) Education on non-pharmacological treatments, including the use of chayote juice to lower blood pressure, with an instructional video from the Pharmacy program; (4) Education on acupressure techniques for hypertension patients to help reduce blood pressure from the Acupuncture program.



Figure 4. Demonstration and practice of acupressure, discussion and health check.

In the next stage, the team demonstrated how to perform acupressure techniques on hypertension patients to help lower blood pressure. Participants then practiced the demonstrated technique together with their peers. They were given the opportunity to discuss and ask questions to the team, showing enthusiasm and eagerness throughout the educational process. Afterward, participants underwent blood pressure checks to monitor their levels.



Figure 5. Implementation of post test

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In the final stage, participants were given a posttest to evaluate the level of knowledge and understanding of the community service participants so that it could be compared before and after the education was given. The results of the comparison of the pre-test and post-test can be seen in Table 4.

Table 4. Results of comparison of pre and post-tests of education participants

Categories	Pre-Test			Total	Posttest			Total
	Good	Fair	Poor		Good	Fair	Poor	
Total	33	7	2	42	39	3	0	42

Based on Table 4, a comparison of participants' knowledge before and after the education session can be observed. Before the session, only 33 participants had good knowledge, which increased to 39 after the education. Participants with moderate knowledge decreased from 7 to 3, while those with poor knowledge, initially 2, were no longer found after the session. These results indicate that the CERDIK and PATUH educational initiative for hypertension control using the IPE and IPC approach effectively enhanced participants' knowledge.

Discussion

Controlling blood pressure is the key to success that must be carried out by all individuals with hypertension to prevent a more serious increase in blood pressure (Sunarti & Patimah, 2019). Promotion is an effort to enhance public awareness and knowledge, thereby increasing motivation and willingness to prevent the disease (Sultan et al., 2021). The management of hypertension is actually more effective when done through health promotion (Fauzi et al., 2020), as this disease can indeed be prevented and controlled.

Health promotion is conducted through various methods, including education or health education. Education is an essential effort in preventing and managing hypertension. Research conducted by Adiatman and Nursasi (2020) shows that education has a positive effect on increasing knowledge, skills, attitudes, and reducing blood pressure. Education can be delivered through collaboration with various parties using the Interprofessional Education (IPE) and Interprofessional Collaboration (IPC) approaches, making it more comprehensive and structured. IPE and IPC are forms of cooperation or collaboration among healthcare professionals to provide education, ensuring a more well-rounded approach. In implementing IPE/IPC, at least two healthcare professions must be involved in learning or working together (Munawaroh et al., 2024). A literature study conducted by Wibawa et al. (2021), analyzing 13 related journals, found that IPE and IPC can enhance community empowerment. Therefore, using the IPE and IPC approaches can positively impact society.

Education using the IPE and IPC approaches is combined with the CERDIK and PATUH educational methods in hypertension management. CERDIK and PATUH are part of the GERMAS program launched by the government. CERDIK is an acronym that includes preventive measures, namely: (1) C: *Cek Kesehatan secara berkala* (Regular health checks); (2) E: *Enyahkan asap rokok* (Eliminate cigarette smoke); (3) R: *Rajin olahraga* (Exercise regularly); (4) D: *Diet seimbang* (Balanced diet); (5) I: *Istirahat cukup* (Get enough rest); (6) K: *Kelola stress* (Manage stress)

CERDIK is considered a preventive effort to avoid non-communicable diseases (NCDs). Meanwhile, PATUH is an acronym for: (1) P: *Periksa Kesehatan secara rutin berdasarkan anjuran dokter* (Check health regularly based on doctor's advice); (2) A: *Atasi Penyakit dengan pengobatan yang tepat* (Overcome diseases with proper treatment); (3) T: *Tetap diet berdasarkan gizi seimbang* (Maintain a diet based on

balanced nutrition); (4) U: *Upayakan aktivitas fisik secara rutin dan aman* (Try to do physical activity regularly and safely); (5) H: *Hindari asap rokok, alkohol beserta zat karsinogenik* (Avoid cigarette smoke, alcohol and carcinogenic substances) (Dewi et al., 2022).

Several studies have extensively examined the effectiveness of the CERDIK and PATUH educational methods, showing their efficacy in health education. Research by Ekawati et al. (2021) states that education promoting healthy behaviors through CERDIK and PATUH significantly influences stroke patients' behaviors in reducing the risk of recurrent strokes. Another study by Anita et al. (2023) confirms that CERDIK and PATUH education affects knowledge regarding hypertension prevention and management. Research by Putri et al. (2023) and Nuraeni et al. (2024) also supports that providing education through CERDIK and PATUH improves respondents' or hypertension patients' knowledge. Based on the results of the study above, the CERDIK and PATUH education subjects in handling hypertension are very important to carry out because they have been proven to increase public knowledge. In addition, the provision of CERDIK and PATUH education can also be combined with the IPE and IPC approaches, according to the results of a literature study conducted by Wibawa et al. (2021), by analyzing 13 related journals, it was stated that IPE and IPC can increase community empowerment. Forms of empowerment according to community needs. Therefore, the combination of these two things is something that can be a renewal in the field of education that can have a positive effect on the community and the health team.

Based on the community service activities that have been carried out, there has been an increase in public knowledge regarding the prevention and management of hypertension. Therefore, it is essential to conduct similar activities continuously, and the local health center (puskesmas) is expected to consistently assist participants, particularly those in the Prolanis program. This support will help maintain and even enhance the participants' acquired knowledge. Overall, the implementation of the CERDIK and PATUH Educational Initiative for Hypertension Control using the IPE and IPC Approaches has been successful. Participants showed great enthusiasm in attending the program and suggested that similar activities should be conducted again with more intensive guidance, allowing for further improvement in their knowledge.

4. CONCLUSION AND RECOMMENDATIONS

The objective of this community service program is to provide new knowledge to hypertension patients in Pedungan Village through a multidisciplinary approach. The program consists of two phases: (1) Implementation Phase – Educational sessions were conducted using booklets, audiovisual media (video screenings), and demonstrations on acupuncture techniques that can be practiced independently at home to lower blood pressure; (2) Evaluation Phase – Results showed a 10.6 percent increase in participants' knowledge after the educational sessions (average pre-test score: 85, post-test score: 94), with no participants categorized as having poor knowledge. This initiative aims to help patients better understand hypertension management, including recognizing relapse symptoms, controlling blood pressure using CERDIK and PATUH, and applying non-pharmacological hypertension control methods such as chayote juice substitution, acupuncture massage techniques, and relaxation exercises.

The Prolanis program at the Puskesmas has been running well, but several aspects need further improvement, including the need for comprehensive hypertension management by addressing both physical and mental health aspects, as hypertension requires long-term treatment that can lead to stress, anxiety, and depression. Additionally, integrating non-pharmacological interventions such as acupuncture, acupressure, and traditional medicine into existing services can provide a more holistic approach. Lastly, developing community-based interventions like peer support groups can help enhance self-efficacy among hypertension patients, empowering them to manage their health more effectively through shared experiences and mutual encouragement.

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