

## HEARTS initiative for the prevention and control of high blood pressure in the community of Paján in Ecuador

*Iniciativa HEARTS desde la prevención y control de hipertensión arterial en la comunidad de Paján en Ecuador*

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### ABSTRACT

Cardiovascular diseases are the leading cause of morbidity and mortality worldwide, with high blood pressure (HBP) being its main modifiable risk factor. In response to this problem, the World Health Organization and the Pan American Health Organization developed the HEARTS initiative. This study aimed to analyze the HEARTS initiative in the community of Paján, Ecuador, evaluating its effectiveness in the prevention and control of HBP from a comprehensive approach based on primary care. A descriptive, cross-sectional, and observational methodology was employed, utilizing structured surveys and semi-structured interviews to analyze participants' perceptions regarding access to the program, adherence to treatment, and difficulties in controlling HBP. The results indicate the need to strengthen the dissemination of the program and improve access to medications to ensure its effectiveness in the community.

**Keywords:** hypertension, HEARTS, cardiovascular prevention, treatment adherence.

### RESUMEN

Las enfermedades cardiovasculares son la principal causa de morbilidad y mortalidad a nivel mundial, siendo la hipertensión arterial (HTA) su principal factor de riesgo modificable. En respuesta a esta problemática, la Organización Mundial de la Salud y la Organización Panamericana de la Salud desarrollaron la iniciativa HEARTS. Este estudio tuvo como objetivo analizar la iniciativa HEARTS en la comunidad de Paján, Ecuador, evaluando su efectividad en la prevención y control de la HTA desde un enfoque integral basado en la atención primaria. Se utilizó una metodología descriptiva, transversal y observacional, se aplicaron encuestas estructuradas y entrevistas semiestructuradas, con el propósito de analizar la percepción de los participantes respecto al acceso al programa, su adherencia al tratamiento y las dificultades para controlar la HTA. Los resultados indican la necesidad de fortalecer la difusión del programa y mejorar el acceso a medicamentos para asegurar su efectividad en la comunidad.

**Palabras clave:** hipertensión, HEARTS, prevención cardiovascular, adherencia al tratamiento.

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## INTRODUCTION

Cardiovascular diseases represent the leading cause of morbidity and mortality worldwide, with high blood pressure (HBP) as its main modifiable risk factor (Pérez-Cruz et al., 2024), influenced by poor dietary habits and processed food consumption (Forbes-Hernández et al., 2020; Gallardo & García, 2024; Angulo et al., 2024). Despite advances in its diagnosis and treatment, the lack of a comprehensive approach in primary care has hindered the reduction of its prevalence and effective control (Batista et al., 2024). In response to this problem, the World Health Organization (WHO), in collaboration with the Pan American Health Organization (PAHO) and other institutions, launched the HEARTS initiative, a model based on prevention, access to effective treatments and optimization of the management of hypertension at the first level of care (Ordunez, Campbell, et al., 2023).

In Latin America, the implementation of HEARTS has proven to be an effective strategy for strengthening health systems through standardized protocols, improved access to essential medicines, and the training of healthcare personnel (Rodríguez et al., 2022). In Ecuador, the adoption of this approach has reduced gaps in hypertension control by promoting a preventive and community-based model that prioritizes early care and continuous patient monitoring (Alejo et al., 2024).

Cardiovascular diseases are the leading cause of morbidity and mortality in the Americas, and hypertension is their primary risk factor (Rosende et al., 2023). Despite its effectiveness, the integration of HEARTS in communities faces challenges related to treatment adherence, health education, and the availability of resources (Ordunez, Tajer, et al., 2023). In this context, it is essential to analyze how the implementation of HEARTS in the community is redefining the management of hypertension, identifying the achievements and the pending challenges to guarantee its long-term sustainability (Durán et al., 2024). This study aimed to analyze the implementation of the HEARTS initiative in the community, exploring its effectiveness in preventing and controlling hypertension through a comprehensive primary care approach (Hernández, 2024).

## METHODOLOGY

This study employed an observational, descriptive, and cross-sectional design. The study

population consisted of adult patients over 18 years of age diagnosed with hypertension who had received care within the framework of the HEARTS initiative. The sample was selected using non-probability convenience sampling, selecting 20 participants based on their availability and informed consent. Inclusion criteria were established to ensure the relevance of the subjects to the study, including having a medical diagnosis of hypertension, participating in the HEARTS initiative for at least six months, and providing informed consent. Patients with severe comorbidities that could interfere with the assessment, as well as those with cognitive or communication barriers that would make administering the questionnaire difficult, were excluded.

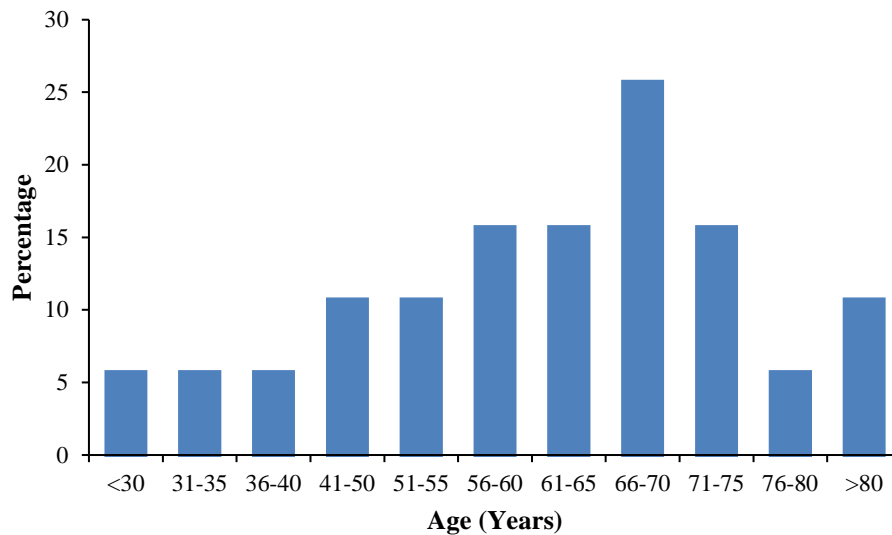
The variables analyzed were classified as independent, dependent, and control variables. The primary independent variable was the respondent's age, as age is a risk factor for hypertension. Dependent variables included knowledge about hypertension and the HEARTS initiative, adherence to pharmacological treatment, and lifestyle changes, including diet, physical activity, and the use of harmful substances such as tobacco and alcohol. Data collection involved the use of previously validated structured questionnaires to assess knowledge about hypertension, therapeutic adherence, and lifestyle changes.

The methodological process included several stages, beginning with data collection through the administration of a questionnaire to each participant. The data were then analyzed using descriptive statistics, which included absolute frequencies and percentages for categorical variables. A questionnaire consisting of 17 questions was designed for the study participants.

The study was conducted by bioethical principles, respecting the guidelines of the Declaration of Helsinki, and was approved by the Ethics Committee of the Paján Health Center. The confidentiality and anonymization of the data obtained were guaranteed, protecting the identity of the participants by assigning codes instead of names. Furthermore, all subjects were informed of the instructions for obtaining their consent, ensuring their voluntary participation. The methodology employed in this research ensured the integrity, reproducibility, and scientific validity of the study, enabling the generation of rigorous evidence on the HEARTS initiative for the prevention and control of hypertension in community settings.

## RESULTS AND DISCUSSION

Figure 1, which shows the age of the population, is a valuable tool for identifying the age groups most vulnerable to hypertension in Paján, especially those over 56 years of age, who have a higher prevalence of cardiovascular disease. This suggests that the HEARTS initiative should prioritize specific interventions for these groups, such as early diagnosis, access to medications, and ongoing follow-up.



**Figure 1.** Age distribution of the Paján community.

Furthermore, although younger age groups are at a lower risk, implementing primary prevention strategies, such as health education and promoting healthy habits, is crucial for reducing future cases of hypertension (Casales-Hernández et al., 2023). This demonstrates the need to adapt interventions to the age structure of the community, complementing these data with additional epidemiological information to maximize program implementation in reducing the cardiovascular burden in Paján.

The lack of clear information on how to manage hypertension, reported by 60% of participants, indicates a gap in the health education provided by the program, as demonstrated in Table 1. Patient education is a fundamental pillar in the management of hypertension, as it directly influences treatment adherence and the adoption of healthy lifestyles. According to a study by

Jafar et al. (2018), effective health education can significantly improve pressure control in patients with hypertension, especially in low-resource settings. Accessible and understandable educational materials, along with periodic training sessions for patients, are essential to empower them in managing their condition.

**Table 1.** Knowledge of the Paján community about HEARTS

Indicator	Absolute frequency	Percentage
Existence of the HEARTS initiative at the health center	7	35
Knowledge about hypertension control through the HEARTS initiative	8	40
Since participating in the program, have you noticed improvements in your blood pressure?	6	30
Do you think the cost of medications affects your ability to adhere to treatment consistently?	15	75
Do you receive support or subsidies to access essential medicines?	5	25

Only 30% of participants reported improvements in their blood pressure since starting the program. This result, shown in Table 2, suggests that current HEARTS strategies are not fully effective for most patients. This lack of improvement may be related to insufficient treatment adherence, irregular medical follow-up, or the persistence of uncontrolled risk factors, such as an inadequate diet or lack of physical activity (López-Jaramillo et al., 2013). According to a study by Beaney et al. (2018), adherence to antihypertensive treatment is a crucial factor in achieving adequate blood pressure control. Interventions that combine pharmacological treatment with lifestyle changes are the most effective, especially when they consider local cultural patterns and food practices (Alvarado & Zambrano, 2023). It is essential to reinforce continuous medical follow-up and promote comprehensive interventions that address not only pharmacological treatment but also lifestyle factors that contribute to the development of hypertension (Valdés et al., 2023).

**Table 2.** Perception of changes in the health of the Paján community

Indicator	Absolute frequency	Percentage
Perception of improvements in pressure	6	30
Capturing improvement in the HEARTS initiative	12	40
HEARTS Initiative Recommendation Decision	15	75

Another critical aspect is the perception that medication costs affect treatment adherence, mentioned by 75% of respondents. This finding highlighted a significant economic barrier that limits access to essential treatments and compromises the program's effectiveness (Table 3), particularly in structurally poor communities like those documented in Manabí (Macías et al., 2025).

**Table 3.** Sociocultural and economic factors identified in the Paján community

Indicator	Absolute frequency	Percentage
Limited financial resources to access healthy foods	11	55
Socioeconomic support for the HEARTS initiative	10	50
Complications in purchasing medicines	10	50
Financial independence from medications	8	40
Socioeconomic relationship with medications	15	75
Exchanging medications for essential expenses	14	70
Presence of subsidies for medicines	5	25
Diet modification due to economic restrictions	10	50

Although 25% of participants receive some form of subsidy or financial support, coverage is insufficient to ensure that all patients can consistently adhere to their treatment. This problem is not unique to Paján, and has also been observed in communities like Quebrada La Paja, where financial constraints limit access to healthy foods and proper disease control (Astudillo et al., 2025). Studies such as that of Mills et al. (2020) have shown that the high cost of antihypertensive medications is a common barrier in low- and middle-income countries, negatively affecting

treatment adherence and hypertension control. It is urgent to implement broader financial assistance policies, such as government subsidies or access programs to low-cost medications, to reduce this barrier and improve treatment adherence.

The SWOT analysis of the HEARTS initiative in Paján highlights progress and challenges in its implementation, as reflected in Table 4. Among the strengths, the Health Center's recognition as a leader in program implementation, early identification of hypertension, and a high percentage of the population with healthy habits stand out.

**Table 4.** SWOT analysis of the HEARTS Initiative in Paján

Strengths	Opportunities
<ul style="list-style-type: none"> <li>• The Paján Health Center is considered the third best district to implement the HEARTS initiative, demonstrating commitment and leadership in cardiovascular prevention.</li> <li>• People are recruited at the stage of hypertension, which allows for intervention before they develop established hypertension.</li> <li>• 80% of respondents engage in regular physical activity and 60% follow a healthy diet.</li> </ul>	<ul style="list-style-type: none"> <li>• Raise awareness and expand coverage to more segments of the population at risk of cardiovascular disease, strengthening prevention.</li> <li>• HEARTS can be complemented with nutrition, physical activity, and metabolic control strategies.</li> <li>• Strategies can be implemented to ensure a consistent supply of antihypertensives and reduce treatment non-adherence.</li> </ul>
Weaknesses	Threats
<ul style="list-style-type: none"> <li>• Sixty-five percent of respondents are unaware of the HEARTS initiative, limiting its implementation in the community.</li> <li>• Only 30% of participants noticed improvements in their blood pressure, which could discourage adherence.</li> <li>• 50% of respondents believe that their blood pressure monitoring by healthcare personnel is inadequate.</li> </ul>	<ul style="list-style-type: none"> <li>• 50% of patients have had trouble purchasing essential medications, and 70% have prioritized other expenses over their treatment.</li> <li>• 55% of patients cannot always find their medications at the health center, which puts the continuity of treatment at risk.</li> <li>• The strategy of recruiting only pre-hypertensive patients excludes people with long-standing hypertension who could benefit from the program. This could bias the evaluation of program implementation.</li> </ul>

However, there are significant weaknesses, such as a lack of awareness of the initiative among 65% of respondents, a low improvement in blood pressure among 30%, and a negative

perception of medical care among 50%, which limit the program's implementation. Opportunities for improvement were identified, including expanding coverage to at-risk populations and integrating the program with nutrition and physical activity strategies. Furthermore, maintaining a consistent supply of antihypertensives could improve disease control. However, threats exist, such as barriers to accessing medications and the exclusion of people with advanced hypertension, which compromise the program's effectiveness.

## CONCLUSIONS

The implementation of the HEARTS initiative at the Paján Health Center has proven to be an effective strategy for controlling hypertension, reflected in improved therapeutic adherence, increased health education, and a significant reduction in patients' blood pressure levels. The results show an improvement in the frequency of medical follow-up and in participants' perceptions of quality of life, consolidating HEARTS as a comprehensive model for the prevention and management of cardiovascular disease in primary care. However, challenges persist in the program's sustainability and lifestyle modification, highlighting the need for complementary strategies to optimize its long-term implementation.

## CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

## AUTHOR CONTRIBUTIONS

**Conceptualization:** Sofía D. Véliz and Melanie D. Toro. **Data curation:** Sofía D. Véliz and Melanie D. Toro. **Formal analysis:** Sofía D. Véliz, Melanie D. Toro, Mario A. Revilla, Diana J. Asanza, and Jordan J. Demera. **Investigation:** Sofía D. Véliz, Melanie D. Toro, Mario A. Revilla, Diana J. Asanza, and Jordan J. Demera. **Methodology:** Freddy B. Saldarriaga and Patricia P. Pinargote. **Software:** Sofía D. Véliz and Diana J. Asanza. **Supervision:** Freddy B. Saldarriaga and Patricia P. Pinargote. **Validation:** Freddy B. Saldarriaga and Patricia P. Pinargote. **Visualization:** Mario A. Revilla, Diana J. Asanza, and Jordan J. Demera. **Original draft writing:** Sofía D. Véliz, Melanie D. Toro, Mario A. Revilla, Diana J. Asanza, Jordan J. Demera. **Writing, review and editing:** Sofía D. Véliz, Melanie D. Toro, Mario A. Revilla, Diana J. Asanza, Jordan J. Demera, Freddy B. Saldarriaga, Patricia P. Pinargote.



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