

RESEARCH ARTICLE (ORIGINAL)

Health Literacy for Hypertension Control Among Riverside Populations: A Qualitative Study

Literacia em Saúde Sobre Hipertensão Arterial na População Ribeirinha: Uma Abordagem Qualitativa

Alfabetización en Salud Sobre La Hipertensión Arterial de los Habitantes Ribereños: Un Enfoque Cualitativo

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Abstract

Background: This study reports the qualitative phase of a sequential explanatory mixed-methods design. **Objective:** To understand the nuances of limited health literacy in the control of hypertension among riverside populations in the Brazilian Amazon.

Methodology: A community consultation was conducted between September and November 2023 through individual meetings with 15 participants living on the islands of Cotijuba and Combu in the state of Pará, in the Brazilian Amazon. The thematic analysis was guided by the following themes: particularities and cognitive abilities related to information about hypertension; application of knowledge; and the limitations and potential of health literacy. Atlas.ti software was used to support data analysis.

Results: Health literacy influenced participants' understanding and knowledge of hypertension, as well as their comprehension, analysis, and use of health information. It also shaped participants' perceptions of access to health information during consultations and of the limitations and potential of health interventions and practices influenced by sociocultural factors.

Conclusion: Lifestyle and health practices and culture, in interaction with other social determinants of health, influence how riverside inhabitants understand and manage hypertension.

Keywords: health literacy; social determinants of health; primary health care; self care; rural population; hypertension

Resumo

Enquadramento: Parte qualitativa de um estudo misto, explanatório e sequencial.

Objetivo: Compreender as nuances das limitações de literacia em saúde no controlo da hipertensão arterial na população ribeirinha amazônica.

Metodologia: Consulta comunitária realizada entre setembro e novembro de 2023, através de reuniões individuais com 15 residentes das ilhas Cotijuba e Combu, na Amazônia paraense. A análise temática, realizada com o auxílio do software Atlas.ti, incidiu sobre o conhecimento da condição clínica, a compreensão e utilização da informação em saúde, bem como as limitações e potencialidades da literacia em saúde.

Resultados: Identificaram-se interferências na literacia em saúde ao nível da compreensão e do conhecimento da condição clínica, da compreensão, análise e utilização da informação em saúde, da percepção do acesso à informação nas consultas e das limitações e potencialidades das ações e práticas de saúde, justificadas socioculturalmente.

Conclusão: O estilo de vida e as práticas e cultura de saúde, ao interagirem com outros determinantes sociais da saúde, influenciam a compreensão e a ação da população ribeirinha na gestão da condição clínica.

Palavras-chave: literacia em saúde; determinantes sociais da saúde; cuidados de saúde primários; autocuidado; população rural; hipertensão

Resumen

Marco contextual: Parte cualitativa de un estudio mixto explicativo secuencial.

Objetivo: Comprender los matices que plantean las condiciones de alfabetización en salud limitadas en el control de la hipertensión arterial sistémica entre la población ribereña.

Metodología: Consulta comunitaria llevada a cabo entre septiembre y noviembre de 2023 mediante reuniones individuales con 15 participantes residentes en las islas de Cotijuba y Combu, en la Amazonía de Pará. El análisis temático se centró en las particularidades y capacidades cognitivas relacionadas con la información sobre el estado clínico; la aplicación de los conocimientos, las limitaciones y las posibilidades en materia de alfabetización en salud, con la ayuda del programa Atlas.ti.

Resultados: Se identificaron interferencias de la alfabetización en salud en la comprensión y el conocimiento de la situación clínica; la comprensión, el análisis y el uso de la información sanitaria; la percepción del acceso a la información en las consultas, y las limitaciones y el potencial de las acciones y prácticas sanitarias justificadas desde un punto de vista sociocultural.

Conclusión: El estilo de vida, los hábitos y la cultura de la salud, en interacción con otros determinantes sociales de la salud, influyen en la comprensión y la actuación de los habitantes ribereños a la hora de gestionar su situación clínica.

Palabras clave: alfabetización en salud; determinantes sociales de la salud; atención primaria de salud; autocuidado; población rural; hipertensión



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Introduction

The ability to critically use information is one of the main pillars of health literacy (HL), as it determines informed decision-making and the formulation of judgments within healthcare (Zanchetta & Moraes, 2023). The development of HL potential is fostered through individual or collective interventions (Zanchetta et al., 2020). In the context of Amazonian healthcare, addressing HL in hypertension refers to a public health problem of epidemiological relevance in Brazil (Migowski & Costa, 2024). Among the riverside population of the Brazilian Amazon in Pará, HL has repercussions for the quality of life of this vulnerable population due to the social determinants of health (SDOH) that influence their health-disease process (Pinheiro et al., 2025), owing to socio-environmental and educational inconsistencies. Considering the specific characteristics of riverside inhabitants, HL is an important SDOH for ensuring healthcare, since groups with particular cultural characteristics require healthcare professionals to have specific knowledge to guide interventions that take such singularities and individualities into account. Thus, SDOH influence the standard of living and are related to people's worldview, determining collective and individual behaviors (Pinheiro et al., 2025).

The results presented herein constitute the qualitative phase of a sequential explanatory mixed-methods study (QUAN → quali; Creswell & Creswell, 2022), conducted exclusively with riverside inhabitants who obtained lower mean scores, that is, revealed limited HL, in the assessment conducted by Santos (2024b), using the *Health Literacy Questionnaire* – Brazilian version (HLQ-Br; Moraes et al., 2021), on five of its nine scales. Thus, the objective of the present study was to understand the nuances of limited HL conditions in the control of hypertension among riverside populations in the Brazilian Amazon in Pará.

Background

This study is based on the deductive epistemological paradigm (*top-down*) proposed by Sandelowski (2000), which is appropriate for the phenomenon under study through a subjective and contextualized understanding based on human experiences. Knowledge is considered to emerge through human interactions with the social context, with no single reality existing, but rather co-constructed realities within specific contexts. This approach

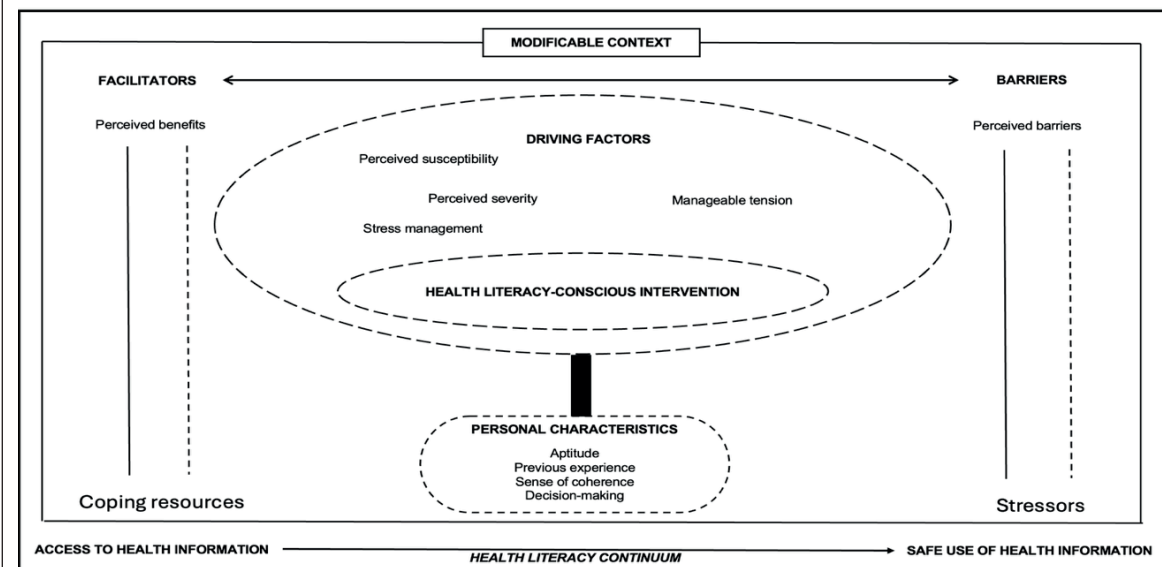
is applicable to the present study, which considers HL a complex phenomenon due to its multidimensionality and the relationship it establishes among individuals, healthcare professionals, and health services (Zanchetta & Moraes, 2023).

Thus, it is assumed that population HL is a determinant of healthcare service use, since inadequate HL is associated with the underuse of preventive methods and a lower level of knowledge about chronic diseases and their unfavorable implications for clinical outcomes due to disease exacerbation, poor adherence to medication regimens and dosages, and increased hospital admissions (Pinheiro et al., 2025).

Because it is complex, multidimensional, intersectoral, and interdisciplinary, the phenomenon of HL is divided into three main dimensions: (i) functional: the ability to read and write; (ii) interactive: the receipt and processing of information; and (iii) critical: the way in which individuals deal with the information provided (Nutbeam, 2000).

The theoretical-conceptual framework is based on the Theory of Salutogenesis, which addresses the origins and sources of health (in contrast to the pathogenic perspective) and enables an understanding of health maintenance even in the presence of stressors and adversity. This theory guides health promotion interventions by seeking to understand how individuals living in similar contexts cope differently with the conditions imposed by life (Antonovsky, 1979). As a conceptual inspiration, Nola Pender's Health Promotion Model was used (Pender et al., 2015), in which perceptions of susceptibility, severity, barriers, and benefits signal individual actions that converge toward the recognition of a health-damaging habit, its conceptualization as a threat, and the consequent abandonment of that habit, thereby influencing self-efficacy. The model guides the understanding and analysis of patterns of health-related behaviors that are influenced by individual or collective beliefs.

The original framework was developed by Santos et al. (2024b) and consists of three axes: (a) HL as a *continuum* of practices; (b) access to sources of information; and (c) the safe use of health information. It is considered that HL-aware interventions constitute a central process in a movement that includes difficulties caused by perceived barriers and stressors, as well as coping resources. These are related to personal characteristics such as aptitude, previous experience, sense of coherence, and decision-making, which sustain the driving factors of perceived susceptibility and severity, stress and tension management, within a modifiable context (Figure 1).

Figure 1*Original theoretical-conceptual framework*

Source: Adapted from Santos, M. Y. (2024b). Health literacy of people with systemic arterial hypertension living in riverine communities in the Pará Amazon, 2024. <https://shre.ink/7FB3>

Research question

What are the nuances of limited HL conditions in the control of hypertension among riverside populations in the Amazon region of Pará?

Methodology

The research project was approved by the Research Ethics Committee (CEP) of the Nursing Program at the Pará State University (UEPA), in accordance with Opinion No. 5,985,623, in 2023. This article presents, following a deductive descriptive approach (Sandelowski, 2000), exclusively the qualitative results of a community consultation, a technique applied by Zanchetta et al. (2020), conducted through individual in-person meetings as a component of a mixed-methods study (Creswell & Creswell, 2022) initiated in March 2023.

The research was conducted on the islands of Cotijuba and Combu, which are part of the insular area of the Brazilian Amazon in Pará, between September and November 2023, totaling 20 hours of fieldwork conducted by the first author, a male nurse specializing in emergency care, with 4 years of experience in urgent and emergency care in riverside communities in the region.

Within the context of the community consultations, the researcher introduced himself as a master's student in nursing, entering the field to collect qualitative data for his research. The researcher explained to the participants that the community consultation aimed to assess the responses obtained during data generation and investigate patients' relationships with Primary Health Care (PHC) services, with the purpose of mitigating feelings of hierarchical

relationships, social desirability, and potential biases at this stage of the research.

The following inclusion criteria were applied: living in a riverside region of Pará; being 18 years of age or older; being able to read and write (a mandatory requirement for participating in the first stage of HL level measurement); having no self-reported cognitive limitations; and having been enrolled in the Hypertension and Diabetes Program (HIPERDIA) within PHC services for at least six months. Purposive sampling (Creswell & Creswell, 2022) was used to select participants, focusing on criteria related to compromised HL scores, such as dealing with challenges and experiences of failure in controlling hypertension, as identified in the quantitative results of the study. Fifteen patients were invited to participate in the community consultation; this sample represented 50% of the total subsample of individuals ($n = 30$) who obtained the lowest scores in the previous HL measurement phase. Data were collected by the first author through home visits, accompanied by two Community Health Workers (CHWs), five months after completion of the quantitative stage of the research. This strategy was justified by knowledge of the territory and the location of the participants' residences. All invited individuals accepted the invitation.

Considering the lack of prior contact between the researcher (a native of the region) and the participants, the community consultations, aimed at gaining an in-depth understanding of the subjective dimension of the phenomenon under investigation, took place in private locations (at home or near the riverbanks) during a single in-person meeting. Data generation was based on an original semistructured interview guide, using simple and accessible language, containing eight open-ended

questions about HL: understanding of hypertension; sources of health information; daily consequences of hypertension; care considered necessary for hypertension management; treatment of hypertension; self-perception and self-care in hypertension; and difficulties in accessing, understanding, and using health information. A pilot study was conducted with two participants (subsequently excluded from the data analysis) to identify any terms in the semistructured guide that might cause unfamiliarity or misunderstanding; no adaptation of the guide was necessary following the pilot. Individual interactions were documented in an audio file using a digital recorder, as authorized by the participants. No manual or digital field diary records were made. Empirical saturation was reached at the 15th consultation, when repetition of content in the participants' accounts and recognition of information concerning HL competencies were observed, even when the accounts were brief. The recordings were not returned to the participants to preserve the originality and spontaneity of their accounts and avoid "sterilization" of the data.

Data analysis began with manual transcription of the audio files, followed by extensive reading to identify the empirical content, which was subsequently subjected to thematic analysis (Paillé & Mucchielli, 2016). The process adopted a deductive approach, beginning with the creation of a preliminary list of 41 predetermined codes anchored in the theoretical-conceptual framework of the study. Textual coding was performed with the assistance of Atlas.ti software. To ensure the rigor and validity of qualitative research at this stage (Creswell & Creswell, 2022), analytical validation strategies were implemented through investigator triangulation. This strategy involved consensus meetings and the maintenance of a reflexive journal in which all decisions made between the first two authors during the coding process were documented. As a result of the analysis, the initial theoretical framework was found to be appropriate, as the participants' accounts aligned with the predetermined codes, with no new categories emerging. Based on this alignment, thematic analysis synthesized the pattern of participants' health-related ideas and behaviors into three broad themes: (a) particularities and cognitive abilities related to information about hypertension; (b) application of knowledge in resolving issues related to hypertension; and (c) limitations and potential of HL in hypertension within the context of healthcare for riverside communities.

Finally, although participant validation was not performed, the accuracy of the results was ensured through the triangulation strategy. Thus, the study meets the criteria for methodological rigor and transparently reports the applicable items of the *Consolidated Criteria for Reporting Qualitative Research* (COREQ).

Results

The community consultation respected the local culture in its dialogues and interactions, maintaining an informal character in order to explore the participants'

understandings, practices, and perceptions. The sample included six men and nine women who identified with their biological sex, with a mean age of 52 years and 9 years of schooling; 10 participants identified as mixed race, three as White, and two as Black. The self-reported health profile showed that 67% of the participants were sedentary, 47% consumed alcohol, 33% were smokers, and 53% used medicinal plants to treat hypertension. The duration of the individual meetings ranged from 12 to 27 minutes.

The results concern the interference of HL in the control of hypertension, with a total of 117 pieces of evidence associated with HL and 78 related to the concomitant SDOH. The identification of HL as a SDOH was based on evidence presented according to its frequency in the following areas: (a) understanding of hypertension = 25; (b) personal knowledge about hypertension = 19; (c) understanding of health information = 17; (d) use of health information = 16; (e) perceived access to information during consultations = 13; (f) limitations of interventions inherent to HL = 13; (g) analysis of health information = 12; (h) imprecision of health knowledge = 10; and (i) potential inherent to HL = 5. Other areas of evidence referred to health practices as a SDOH: (a) self-monitoring = 28; (b) self-care practices = 23; (c) use of medicinal plants = 15; and (d) emergency interventions for hypertension control = 12.

The following sections present a description of the results, together with illustrative narratives of the participants' experiences, identified by participant number and corresponding coding: adult (A), older adult (I), young adult (J), woman (M), and man (H).

Information about hypertension: Sources, acquisition, understanding, and use

Regarding the understanding of hypertension, participants predominantly understood hypertension as a chronic disease that could cause cardiac changes, including the possible occurrence of acute myocardial infarction and other diseases and systemic changes triggered by a lack of hypertension control. Adequate knowledge extended to the need to control hypertension through self-assessment and the correct and continuous use of medication. However, participants attributed the onset of hypertension to the natural aging process: "Now it appeared [hypertension] because of age, the blood pressure appeared, but it is already under control." (Participant 2, AJH#2). Understanding hypertension proved to be an essential condition in its relationship with other comorbidities, and access to information occurred through informal conversations in public places with other island residents or through interactions with healthcare professionals. Despite the presence of some communication barriers, participants reported that they were able to understand the written information on medical prescriptions: "the doctors talk about things there and sometimes I don't understand... when I need to, I talk to the [Community Health Worker] about high blood pressure, about its care, and the nurse also talks here at the health post" (Participant 1, AJH#1).

The use of information was evidenced by awareness of lifestyle habits that are detrimental to hypertension control, the need to adapt daily activities and eating habits to prevent hypertension, understanding of the correct use of medication and hypertension symptoms, and the ability to perform self-assessment. Conversely, the impact of a lack of information was reflected in the lack of awareness of hypertension as a chronic disease and the lack of motivation for self-care and self-management of hypertension: “But this other disease [hypertension] is common and then it goes away.” (Participant 7, IH#3). Regarding access to information, self-motivation was reported through seeking information in the media (such as radio and television) and awareness of obtaining the information necessary for self-care during consultations with the healthcare team: “That [hypertension], I saw them talking about it on TV once.” (Participant 13, IM#3). Information provided by healthcare professionals guided the incorporation of medication use to control hypertension into daily care. Changes in eating habits, due to recognition of the harm caused by excessive salt use, were associated with awareness of the high risks involved. The perception of individual empowerment for self-care (physical exercise, emotional control, and diet) was permeated by recognition that hypertension interferes with household activities and emotional control, as demonstrated by self-assessment and identification of blood pressure values within the safety range for hypertension control, as narrated: “. . . I usually preserve my fish in salt. . . even when I buy salted *pirarucu*. . . but then I can’t eat it. I try to remove the salt, wash it well, boil it, and I believe that if I don’t eat salt, everything is fine.” (Participant 5, IM#5).

Self-perception and self-care in hypertension

Lack of hypertension control due to cultural dietary practices involving the preservation and storage of meat in brine, combined with a diet rich in cassava flour and carbohydrates (rice), was illustrated as follows: “I know I have to make my little chart, measure my blood pressure every day, take my medication, and remove from my diet whatever was harmful” (Participant 4, AJM#2). Other participants described the intake of salty and fatty foods as contributing to “harm” (sic) to health. Additionally, participants reported being able to recognize the manifestation of hypertension symptoms: “My blood pressure is high when everything rises up to my head, the discomfort starts there, I feel my head getting heavy. . . it starts here at the back. . . and spreads. . .” (Participant 11, IM#1). On the other hand, there were reports of asymptomatic hypertension in its idiopathic form; however, most participants recognized the importance of daily blood pressure self-monitoring as a control strategy.

The narratives showed that, due to the distance, the use of urgent and emergency care services is low; however, riverside inhabitants seek PHC units when they experience symptoms because of their greater proximity to the islands. Transportation is usually provided by *rabetas* (a type of small boat made from tree bark): “One time I felt sick . . . they had to take me to the hospital, but they had to wait

for the boat to come and take me. We don’t always have gasoline to put in the *rabeta* . . .” (Participant 15, IM#5).

Health literacy in hypertension in the riverside context

Limited HL is reflected in imprecise knowledge, as stated by one participant: “I don’t think food affects blood pressure, actually, I don’t even know how to answer you” (Participant 10, IH#1). This imprecision is also represented by the provision of health information containing too many technical terms and by the lack of access to information about the possible causes of hypertension development: “Several times they gave me the prescription for the medication, and several times I don’t understand how much medication they prescribe for me or why” (Participant 14, IM#4). Limited understanding of hypertension was expressed by Participant 12 (IM#2): “One doctor says one thing, another doctor says something else, right? And when I have doubts, I don’t do anything, I just go on with my life and take my medications.” Another aspect identified was the failure to recognize the benefits to one’s own body of using nonpharmacological measures for control and of playing an active role in the health-disease process: “I didn’t understand what the doctors were saying, they just prescribed the medication and never told me what I had” (Participant 03, AJM#1). CHWs represent an external resource for the development and strengthening of HL competencies. According to the participants, CHWs provide information about hypertension and encourage self-care, self-monitoring, and medication use: “. . . she herself gives me guidance, if it’s high, they already come to my ear. Why is your blood pressure high? Have you taken today’s medication?” (Participant 11, IM#1).

The reported evidence allows an understanding of the synergy between the various levels of SDOH and the HL of riverside inhabitants in the domain of self-perception and self-care. This analysis extends to an understanding of the specific characteristics of the way of life of riverside inhabitants and their repercussions for HL-oriented practices. The thematic analysis used themes from the theoretical-conceptual framework, focusing on access to and difficulties in the safe use of information, aptitude, previous experience, sense of coherence, and decision-making, thereby expanding the understanding of the cognitive dimension, the application of knowledge, and the limitations and potential of HL in hypertension within the riverside context.

Discussion

Information about hypertension: Particularities and cognitive abilities

Knowledge of hypertension entails being attentive to daily habits that do not stabilize blood pressure and recognizing the need to seek medical care, according to the geographic characteristics of locally accessible health services. Knowledge about hypertension represents a cognitive dimension of HL (Min et al., 2022) resulting from the critical analysis of the partiality and quality of

the information obtained, access to information, and communication with healthcare professionals. All these variables are influenced by individual motivation and engagement (Mutlu et al., 2025), which may support overcoming barriers to understanding information caused by the use of technical language and the lack of clarification about hypertension.

Application of knowledge in resolving hypertension-related issues

The evidence indicates that access to credible sources is an intrinsic factor in the use of this critical competency (Pinheiro et al., 2025). Therefore, within the scope of HL, the absence of information for its conscious and safe use represents a relevant challenge. The operationalization of effective interventions also involves mobilizing popular knowledge, particularly the use of medicinal plants as a cultural practice intrinsic to the management of various diseases. Health practices for self-care related to hypertension self-monitoring proved to be an act of attention to symptoms of elevated blood pressure (Santos, 2024a). In this context, delays in accessing the necessary care may lead to other diseases (Santos, 2024a). The participants' narratives revealed awareness of the worsening of the hypertension condition due to delays in seeking professional care.

Limitations and potential of health literacy in hypertension in the riverside context

The potential of HL enabled a better understanding, interpretation, analysis, and application of health information in the daily lives of riverside inhabitants. The use of technical language in outpatient consultations makes the relational bond for clarifying doubts more difficult, which explains patients' passivity in the face of their inability to understand this language, which is considered difficult (Mutlu et al., 2025). This cognitive difficulty extends to their own health status and to the partial and incorrect use of therapeutic measures, which are exacerbated by the inability to read (Silva et al., 2023).

Additionally, the family experiences of the riverside population with hypertension involving other family members with chronic diseases allow them to identify risk factors for hypertension control and raise awareness of the risk to life if the disease is not adequately controlled.

The evidence confirms the results documented by Horde et al. (2023) in a systematic literature review, demonstrating how the application of health knowledge reflects the influence of HL on the understanding of risk situations. Hypertension is understood as a disease that, when uncontrolled, can cause death, exposure to potentially life-threatening situations, and the need for urgent care. Like people living with hypertension in another state in the Northeast region of Brazil (Ribeiro et al., 2022), riverside inhabitants recognize the risks and symptoms of uncontrolled hypertension, thus corroborating personal knowledge based on the HL of this socially vulnerable population.

The evidence also allows a deeper understanding of the interaction between limited levels of HL in hypertension

and other SDOH, manifested mainly by (a) perception of one's own potential to manage and resolve health problems; (b) ability to critically analyze health information; and (c) fluctuations in motivation to learn about personal health conditions.

Additionally, health practices, combined with positive attitudes toward hypertension control, provide an understanding of patterns of healthcare influenced by beliefs (Siqueira et al., 2023). The sense of coherence proposed in the Theory of Salutogenesis (Antonovsky, 1979) became evident in the narratives concerning the uniqueness of living conditions and perceived severity, thus enabling an understanding of the historical and cultural context of life and the rationales underlying hypertension control and the origins of self-care. Individual and collective empowerment promotes autonomy in health management due to the perception of vulnerabilities and health benefits and risks (Pender et al., 2015).

Despite advances in studies on HL in the context of noncommunicable chronic diseases, its approach among riverside communities remains poorly explored or is almost nonexistent in literature. This scenario characterizes the present research as a pioneering study in exploring the subjectivities, meanings, and nuances of HL in this population, contributing to addressing an empirical gap in Amazonian contexts and providing a basis for planning health practices and interventions that are more closely aligned with the reality of this community.

The limitations of this study should be acknowledged. There is a possibility of social desirability bias, since, as the interviewer was a healthcare professional, participants may have emphasized positive and successful aspects of hypertension control. The exclusion of individuals who were unable to read or write may have masked even deeper barriers related to HL in the territory. As a deductive qualitative study, it is recognized that the results are mediated by the researchers' perspectives, experiences, and theoretical references. Finally, the study design, focused on a sample and context with significant uniqueness, restricts the direct transferability of the results to other sociocultural realities without the necessary cultural adaptations, in addition to the absence of participant validation of the accounts. Nevertheless, these limitations do not invalidate the rigor adopted, and the research presents solid and relevant contributions to the field of study and to society.

Implications for nursing practice

Nurses should recognize the limited levels of HL among riverside populations who use PHC services, employing clear and effective communication combined with an understanding of the SDOH that influence successful or less satisfactory outcomes for their patients. Nurses play a fundamental role in promoting and fostering HL based on the particularities of the health-disease process among riverside inhabitants of the Brazilian Amazon in Pará. This is accompanied by the achievement of better outcomes in health promotion, autonomy, and well-being among service users (Zanchetta & Moraes, 2020).

Conclusion

SDOH, particularly lifestyle, health practices, and culture, influence the understanding of information about hypertension control. Expanding this understanding by considering the promotion of HL in hypertension translates into improved self-care management and informed and safe decision-making by the riverside population. Consequently, the practice of effective, culturally sensitive, and acceptable self-care is strengthened. If HL in hypertension is understood in this way, equitable opportunities for changes in the health outcomes of riverside communities may become evident.

To achieve better outcomes in health promotion interventions, the practical implications for nursing require adapting the care plan and educational technologies to the riverside context. In practice, nurses should map and use community spaces to conduct educational interventions focused on hypertension. Additionally, CHWs are a key component and promoters of self-care; therefore, nurses are responsible for continuously training these professionals and providing them with tools to act as facilitators of HL at the interface between the community and the health service.

As concrete recommendations for future research, intervention studies and participatory methodological research (such as *co-design*) are suggested, with the aim of co-creating educational materials and health communication strategies developed directly with riverside populations, ensuring cultural appropriateness. Observational studies are also recommended to assess how joint training of nurses and CHWs in HL strategies affects informed decision-making, treatment adherence, and hypertension management in these communities.

Author contributions

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