Original Article

Innovative Health Education Strategies: Training Professionals in Hypertension and Diabetes Care in Primary Health Care

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Abstract

Background: Cardiovascular diseases (CVD) are the leading cause of death worldwide, and behavioral changes are a cornerstone of their prevention and treatment. However, implementing such changes can be challenging, and the use of validated protocols may support this process.

Objectives: To develop, implement, and evaluate a continuing education protocol for primary care professionals focused on creating and monitoring action plans for the care of patients with arterial hypertension (AH) and diabetes mellitus (DM).

Methods: The strategy involved 20 hours of in-person workshops and 15 hours of online training, based on Ministry of Health guidelines and covering topics such as physical activity, nutrition, and lifestyle. Evaluation was conducted through the development of team-based action plans and the administration of a satisfaction questionnaire.

Results: The model was implemented in five municipalities, with 166 healthcare professionals participating in the in-person workshops. All teams developed action plans to implement the covered topics within their local contexts. The workshops on physical activity, nutrition, and lifestyle change were mostly rated as "good," "very good," or "excellent." The most frequently mentioned terms in the qualitative assessments were "content," "knowledge," and "practices." The strategy proved feasible, and partnerships with local public institutions enabled the active involvement of health professionals in proposing solutions to identified issues (Central Illustration).

Conclusion: The action plans were tailored to local realities and reflected a high level of satisfaction with both the content and the hands-on approach of the sessions.

Keywords: Hypertension; Diabetes Mellitus; Primary Health Care; Health Education.

Introduction

Cardiovascular diseases (CVD) account for approximately 32% of deaths worldwide, with nearly three-quarters occurring in low- and middle-income countries.[1] The World Health Organization (WHO) estimates that about 18% of the population in the Americas is diagnosed with arterial hypertension (AH), and the number of individuals with diabetes mellitus (DM) continues to rise.[2,3] Both conditions are major risk factors for the development of CVD.[4] A recent study by the Global Cardiovascular Risk Consortium found that five modifiable risk factors — namely, smoking, body mass index, systolic blood pressure, non-HDL cholesterol, and DM — accounted for 57.2% of the 10-year population-attributable fraction for incident CVD in women and 52.6% in men, as well as an increased risk of all-cause mortalityy.[5,6] Among these, elevated systolic blood pressure was the largest contributor to incident CVD events across all regions.[5] Effective management of these five risk factors has the potential to significantly improve CVD outcomes, with risk reductions of up to 80% for CVD and over 90% for DM.[7,8]

In this context, lifestyle modifications play a critical role. Systematic reviews have evaluated the effects of aerobic, resistance, and combined physical exercise on health outcomes. Evidence shows that moderate- to high-intensity aerobic activity can significantly reduce both blood pressure and glycated hemoglobin levels.[9-11]

A horizontal and dynamic approach to health education — one that is grounded in patients' daily experiences — can foster empowerment and promote autonomy in self-care.[12,13] However, health professionals often rely on educational strategies that are

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Central Illustration: Innovative Health Education Strategies: Training Professionals in Hypertension and Diabetes Care in Primary Health Care

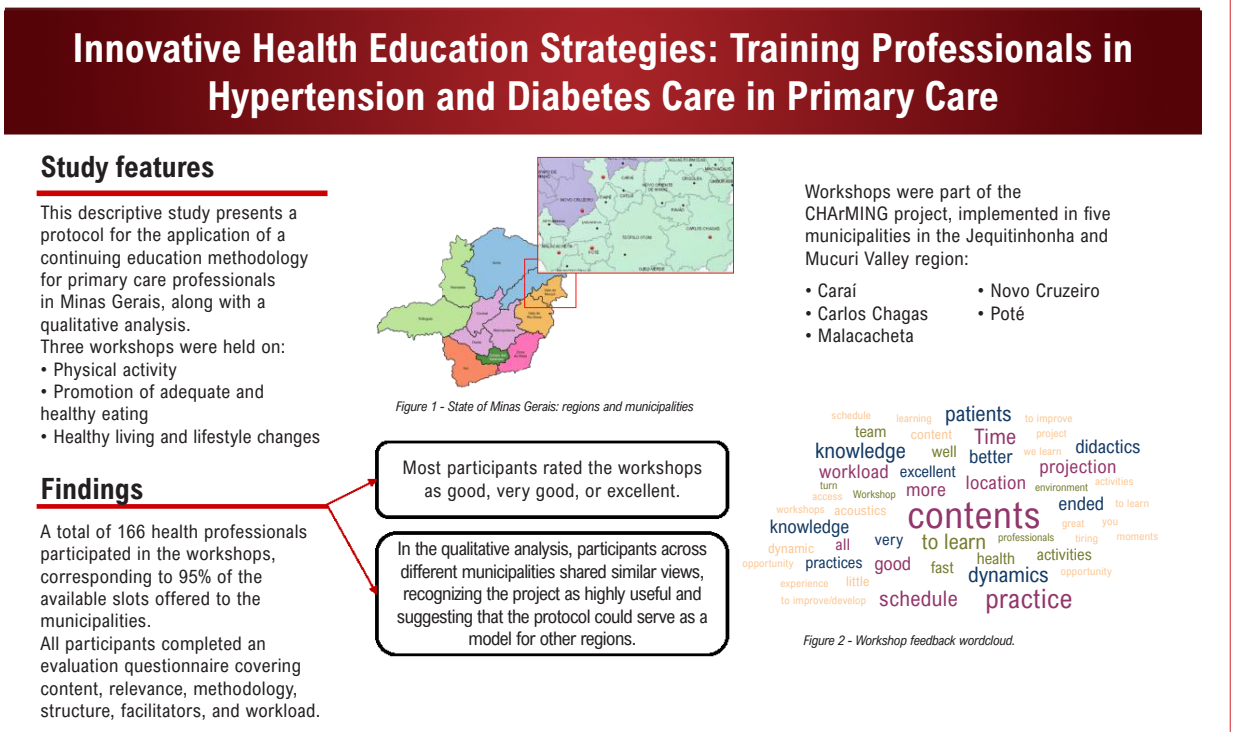

Figura refeita, verificar.

primarily informative, top-down, and prescriptive. This approach has been associated with low adherence to non-pharmacological treatments for AH and DM.[14,15]

Primary health care (PHC) teams face multiple challenges in managing patients with AH and DM. These include the presence of comorbidities, poor treatment adherence, limited social support, insufficient multidisciplinary collaboration, and a lack of training and educational resources.[16,17] Therefore, this study aims to develop, implement, and evaluate a permanent health education (PHE) protocol for PHC professionals to support the creation and adoption of action plans that promote physical activity, healthy eating, and behavioral change among patients.

Methods

Study design

This is a descriptive, mixed-methods study and part of the broader project Control of Hypertension and Diabetes in Minas Gerais (CHArMING), which aims to improve the management of patients with AH and DM through the implementation of a multidimensional strategy in PHC across five cities in Vales do Mucuri e Jequitinhonha, in the state of Minas Gerais, Brazil.[18] This study represents one of the components of the CHArMING project's multifaceted intervention.

Participants and data collection

A total of 35 basic health units (BHUs) from the cities of Caraí, Carlos Chagas, Malacacheta, Novo Cruzeiro and Poté were randomized into two groups: 18 BHUs were assigned to the intervention group and 17 to the control group. For this sub-study, only health professionals from the intervention group were invited to participate.

PHE

The PHE activities were based on Ministry of Health guidelines[17,19-27] and were organized into three thematic modules: (1) promotion of adequate and healthy nutrition; (2) physical activity; and (3) healthy lifestyle and behavior change. These modules included both in-person and online sessions designed to connect real-world challenges — such as the control of AH and DM — with locally developed solutions aligned with scientific evidence.[28]

Face-to-face activities

Health professionals specializing in physical activity, nutrition, and psychology—affiliated with the Telehealth Center of the University Hospital of Minas Gerais —conducted three workshops in each participating municipality. The model had been previously tested[16] with different audiences and was

refined in terms of language and relevance to the PHC context.

The total workload was 20 hours, distributed as follows: (i) physical activity — 8 hours; (ii) adequate and healthy nutrition — 8 hours; and (iii) healthy lifestyle and behavior change — 4 hours (Chart 1; Supplement 1).

Each city offered 35 spots for health professionals from various professional categories, including physicians, nurses, nursing technicians and assistants, community health workers, and members of multidisciplinary teams. The workshops combined theoretical and practical components, aiming to support the collective development of action plans for individual and group activities related to AH and DM care in PHC. The final outcome of each workshop was an action plan developed within each BHU, focusing on physical activity goals and strategies to promote adequate and healthy nutrition.

Online activities

Online activities served as a complement to the face-to-face training or as an alternative for health professionals who were interested in the training but could not secure a spot in the in-person sessions. Educational materials included short videos and supplementary reading content, with a total estimated workload of 15 hours (Chart 2). All health professionals working in PHC in the participating municipalities were granted access to the course through Moodle, an online platform managed by the Telehealth Center, University Hospital, Universidade Federal de Minas Gerais.[29]

Evaluation of face-to-face activities

To assess the participants' profile, a questionnaire was administered to collect sociodemographic data, including age, gender, and professional category. Adherence to the face-to-face activities was measured using attendance lists, and the relative frequency of participation was calculated by municipality and by workshop.

Chart 1 – Description of the face-to-face workshops developed for the continuing education of CHArMING project health professionals

Workshop	Objective	Topics/Themes	Educational strategies
Healthy Lifestyle and Behavior Change	To raise awareness among health professionals about the importance of emotional health in managing chronic conditions, engage teams in patient care for AH and DM, and discuss challenges and strategies for promoting behavior change.	1) Group setting 2) Emotional health of health professionals and the importance of self-care 3) Mental, physical, and emotional health (including anxiety, depression, and substance abuse) 4) Theoretical foundations of group work 5) Elaboration of an action plan: planning for the implementation of collective activities for lifestyle changes	- Name story: participants share the origin of their names - Interactive presentation - Group project: small-group planning and presentation to the full team
PAHN	To train health professionals to conduct collective PAHN activities for individuals with AH and DM.	1) Group setting 2) Brazilian Food Guide: NOVA classification and appreciation of regional foods 3) PAHN: support materials for collective activities 4) Group experience sharing: obstacles and facilitators 5) Group evaluation: strengths and limitations 6) Action plan development: planning collective PAHN activities based on the PDSA cycle	- Cohabitation agreement - Videos - Cooking workshop - Exploration and discussion of reference books - Balancing choices: barriers and facilitators - Group dialogue - Interactive presentation
Physical activities	To present key concepts and discuss proposals for implementing a physical activity intervention plan for individuals with AH and DM.	1) Group setting 2) Context: reflections on physical activity practices for chronic cardiovascular conditions in public health 3) Evidence on the impact of physical activity on public health, with a focus on AH and DM 4) Participants' relationship with physical activity: reflections 5) Presentation of intervention proposals, including a brief overview 6) Action plan development with each BHU	- Group contract - Interactive presentation - Completion of the Well-being Pentacle - Collaborative development of the municipality's Physical Activity Itinerary - Simulated implementation of physical activity group proposals

AH: arterial hypertension; BHU: basic health unit; DM: diabetes mellitus; PDSA: Plan, Do, Study, Act; PAHN: Promotion of Adequate and Healthy Nutrition.

Chart 2 – Modules and themes of the online course "Healthy Living with Hypertension and Diabetes: Strategies for Physical Activity, Diet, and Well-being"

Module and characteristics	Themes	Supplementary reading material
Physical activity 12 short videos and supplementary reading materials	Concepts of physical activity. Pre-participation medical assessment for individuals with DM and AH. Principles of physical training. Prescription and monitoring of physical training. Subjective perception of exertion: Borg Scale. Handgrip strength test. Group exercises. Barriers to physical activity. Muscle strength training. Upper limb exercises. Lower limb exercises. Abdominal/core exercises.	Protocol for Intervention in Physical Activity and Promotion of Healthy Eating – CHArMING Project
Promotion of adequate and healthy nutrition 4 short videos and supplementary reading materials	The Food Guide as a strategy for addressing the Brazilian context. What is adequate and healthy food? Collective approach: planning and conducting group sessions. Evaluation of group-based activities.	Na Cozinha com as Frutas, Legumes e Verduras (p. 48) Instrutivo: Metodologia de Trabalho em Grupos para Ações de Alimentação e Nutrição na Atenção Básica (pp. 72-75 and Chapter 5) Instrutivo de Abordagem Coletiva para Manejo da Obesidade no SUS (Chapters 3, 5, 7, and 8) Instrutivo de Abordagem Coletiva para Manejo da Obesidade no SUS – Caderno de Atividades Educativas (pp. 51-54)
Healthy lifestyle and changes in lifestyle 2 short videos and supplementary reading materials	Mental health care. Behavior change.	HEARTS: Package of Technical Measures for the Management of Cardiovascular Disease in Primary Health Care – Counseling patients on healthy habits (pp. 8 and 11-23). Instrutivo de Abordagem Coletiva para Manejo da Obesidade no SUS (Chapter 4).

AH: arterial hypertension; DM: diabetes mellitus; PHC: primary health care; SUS: Sistema Único de Saúde.

Following each workshop, participants were invited to complete an evaluation questionnaire covering both qualitative and quantitative aspects. This included questions about the content provided, its relevance to professional practice, teaching methods, facilitators, duration, and the location, structure, and organization of the sessions. Responses were rated on a Likert scale with the following options: "poor," "fair," "good," "very good," and "excellent."

Additionally, the satisfaction questionnaire included open-ended items to capture participant impressions, with specific fields for positive aspects ("What's good"), negative aspects ("What's disappointing"), and suggestions for improvement ("I suggest").

Data analysis

Quantitative data were analyzed descriptively, with results expressed as absolute and relative frequencies using Microsoft Excel 2010. Workshop evaluations were analyzed by module. Qualitative data were examined using Bardin's content analysis methodology, which involved interpreting the responses in the context of each workshop.[30] A word cloud was generated using Mentimeter® in order to enhance data visualization.

Ethics

This study was approved by the National Research Committee in Ethics (*Comissão Nacional de Ética em Pesquisa*, CONEP) under protocol number CAAE 55598822.0.0000.514. All participants provided informed consent.

Results

A total of 166 health professionals participated in the workshops, accounting for 95.0% of the available slots. Most participants (57.0%) attended all three workshops, 31.0% attended two, and 11.0% attended only one. Among those who attended at least one workshop, 3.0% were physicians, 13.2% nurses, 7.8% nursing technicians, 15.0% were members of the multi-professional team, and 61.0% were community health workers.

The action plans developed during the sessions included proposals to implement healthy eating practices and strategies to encourage the population to engage in at least 150 minutes of moderate physical activity per week. Figure S1 presents one of the action plans created by a family health team.

Regarding workshop evaluations, most aspects were rated as "good," "very good," or "excellent." The highest frequency of "poor" and "fair" responses referred mainly to the workload (n = 34; 8.1%) and the location, structure, and organization (n = 27; 6.4%) (Table S1).

Qualitative analysis revealed a predominance of positive feedback on the in-person sessions, with high satisfaction concerning the quality of the workshops — particularly their relevance to professional practice and the competence of the facilitators. The only negative aspects reported were poorly ventilated rooms and lighting issues, which hindered the visibility of projected materials. The word cloud summarizing participant feedback is shown in Figure S2.

Even among BHUs with very different characteristics, participants' impressions were largely consistent. Positive feedback on the workshops was prevalent, as reflected in statements such as "I thought the course was very good" and "I loved everything, excellent." Participants frequently emphasized the relevance of the workshops to their daily practice in PHC, particularly in improving their ability to counsel and guide patients.

The facilitators' teaching approach received numerous positive remarks, with participants describing the content delivery as excellent. The quality of the material was also praised, being described as "well prepared," with specific appreciation for the inclusion of mental health topics. Learning was regarded as meaningful, with several participants commenting on the acquisition of new knowledge. Overall, responses highlighted the workshops' importance to routine professional practice, the high quality of both instruction and content, and general satisfaction with the experience.

In the section for negative feedback ("What a shame"), participants expressed concerns about applying the content in daily practice. One of the most frequently cited issues was the course's workload — some found it exhausting, while others felt it was too brief. Additional challenges included limited resources, such as malfunctioning projectors and inadequate projection surfaces, as well as discomfort related to the physical environment, particularly excessive heat and brightness at some venues.

Out of 239 health professionals enrolled in the online course, 48 (20%) completed it within 8 months.

Discussion

PHE[30,31] is a cornerstone of training in the health sector, encompassing the "production and systematization of knowledge related to training and development for health work." This policy encourages collaboration between the health system and educational institutions in a way that respects users and values health professionals,[31] enabling the development of health planning that aligns with local needs.

PHC plays a key role as a privileged setting for fostering a dialogical approach to continuing education. Grounded in the Family Health Strategy and supported by multi-professional teams, PHC offers a comprehensive range of services — from health promotion and disease prevention to the treatment and rehabilitation of various conditions, including CVD, AH, and DM.[1,31]

Combining educational strategies to promote healthy lifestyles with the needs of both health professionals and the population remains a significant challenge, especially given the low adherence to healthy habits among the Brazilian population.[31] The approach proposed in this study was guided using active learning methodologies, emphasizing the value of local knowledge and the collective development of action plans. By framing continuing education as a formative process that encourages reflection on professional practice and workplace learning — with a focus on collaboration, shared knowledge, and social participation — active methodologies serve as a strategic means to integrate diverse knowledge within teams. This integration supports the creation of innovative, context-specific solutions to real-world challenges encountered in the work environment.

The action plans developed reflected participants' understanding of the topics covered as well as the contextualized solutions derived from the realities of their territories and local teams. The implementation of these products — particularly the proposals related to regular physical activity and adequate, healthy nutrition[31] — should be rigorously monitored and systematically evaluated to ensure that the agreed-upon actions are effectively incorporated and to assess their potential for future replication.

A high adherence rate (95%) to the workshops was observed, with most professionals attending all sessions. Workshops were predominantly rated positively, with the few negative evaluations mainly related to workload, venue, and physical structure. The qualitative analysis reinforced these findings, highlighting overall satisfaction with the content and occasional concerns regarding infrastructure (Central Illustration). Professionals' perceptions were consistent with the workshop feedback, with most participants emphasizing the relevance of the content, while also noting challenges related to accessibility and workload. These positive perceptions may contribute to better knowledge retention and improved clinical management. Critically analyzing work processes allows for the adoption of new approaches to enhance user care, reinforcing previous findings on the value of PHE for PHC professionals.[32,33] Importantly, the low Human Development Index (HDI) of the participating cities did not pose a barrier to implementing the methodology, suggesting its feasibility and potential applicability in diverse settings.

A previous study examining health professionals' perceptions of PHE found that, although its importance is widely acknowledged, several obstacles continue to hinder its effectiveness — particularly lack of managerial and coordinator support, limited interest, work overload, and insufficient time.[34] To help overcome these barriers and enhance the effectiveness of the current program, the project team implemented a tele-tutoring initiative. This strategy focused on monitoring the action plans developed during the workshops and addressing questions raised by professionals during the implementation phase.

Suggestions for improvement included comments on the workload and the quality of the resources used. Participants also expressed the importance of continuing the workshops, indicating

strong interest and commitment. While some professionals suggested reducing the duration of each session to avoid fatigue, others felt that the time allocated was insufficient. There were also suggestions to schedule sessions in a way that would allow full participation by entire family health teams, including more inclusive dates and times. These suggestions and feedback provide valuable insights for refining the methodology, including potential adjustments to workload, activity format, accessibility, and available resources, all aimed at improving the experience for both teams and participants.

Conclusion

The educational strategy proved to be feasible and well accepted. Collaboration with local public entities enabled the participation of health professionals motivated to acquire new knowledge and to propose solutions to identified challenges. The locally adapted action plans were positively received, and participants expressed satisfaction with both the workshop content and the practical activities.

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Author Contributions

Conception and design of the research: Soares TBC, Santos PLC, Moura RMF, Motta-Santos D, Gonçalves R, Pereira PD, Lopes ACS, Marcolino MS; acquisition of data: Soares TBC, Santos PLC, Moura RMF, Motta-Santos D, Gonçalves R, Pereira PD, Marcolino MS; analysis and interpretation of the data: Soares TBC, Santos PLC, Moura RMF, Motta-Santos D, Pereira DN, Rezende LC, Lopes ACS, Marcolino MS; statistical analysis: Soares TBC, Pereira DN, Rezende LC, Lopes ACS, Marcolino MS; obtaining financing: Marcolino MS; writing of the manuscript: Soares TBC, Moura RMF, Motta-Santos D, Gonçalves R, Marcolino MS; critical revision of the manuscript for intellectual content: Soares TBC, Santos PLC, Moura RMF, Motta-Santos D, Gonçalves R, Pereira PD, Pereira DN, Rezende LC, Lopes ACS, Marcolino MS, Oliveira CRA.

Potential Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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Study Association

This study is not associated with any thesis or dissertation work.

Ethics Approval and Consent to Participate

This study was approved by the Ethics Committee of the CONEP under the protocol number 55598822.0.0000.5149. All the procedures in this study were in accordance with the 1975 Helsinki Declaration, updated in 2013. Informed consent was obtained from all participants included in the study.

Use of Artificial Intelligence

The authors did not use any artificial intelligence tools in the development of this work.

Availability of Research Data

The underlying content of the research text is contained within the manuscript.

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***Supplemental Materials**

For additional information, please click here.