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Research paper

# Primary healthcare professionals' views on cardiovascular rehabilitation and disease management

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ABSTRACT

*Background:* Despite its benefits, cardiovascular rehabilitation (CR) is underutilised and not widely accessible globally, including in Brazil, where public CR programs are linked to the Unified Health System (SUS). Limited availability, significant access barriers, and the essential role of professionals in Basic Health Unit (BHU) — that is, community-based facilities that deliver primary healthcare services — impact CR's reach in Brazil.

*Aim:* To explore the perspectives and experiences of BHU professionals regarding CR and the management of cardiovascular diseases (CVDs) in Adamantina, Brazil.

*Methods:* A qualitative approach was used, involving nine focus groups with 71 BHU healthcare providers, including nurses, physicians, nursing assistants, community health workers, physiotherapists, and nutritionists. Thematic analysis was conducted.

*Findings:* Participants had an average age of 39.5 years and 9.9 years of professional experience; 71.8% held a university degree or higher. On average, they managed 584 patients monthly, with 53% diagnosed with CVD. Five main themes were generated: (1) comprehensive management of CVD, (2) roles of BHU professionals, (3) awareness of CR, (4) challenges in patient adherence to behaviour change, and (5) obstacles in accessing CR services. Participants demonstrated limited knowledge of CR, with inadequate referral processes and infrastructure challenges impeding effective CR integration.

*Discussion:* Findings highlight the need to address knowledge gaps, improve referral pathways, and enhance infrastructure to better integrate CR into primary healthcare. Despite recognising CR's importance, BHU professionals face significant challenges in its implementation and promotion.

*Conclusion:* Strengthening professional education, optimising referral systems, and improving infrastructure are critical to increasing CR accessibility and improving outcomes in primary care settings.



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**Summary of relevance**

**Problem or Issue**

Cardiovascular disease (CVD) is a leading cause of death globally, including in Brazil. Despite the proven benefits of cardiovascular rehabilitation (CR), its utilisation remains low. With only 75 CR centres in the country, access to services is limited.

**What is already known**

Barriers to CR participation include healthcare providers' scepticism and concerns about program quality, mainly studied in high-income countries.

**What this paper adds**

This study examines primary healthcare professionals' perspectives in Brazil's Basic Health Units on CR. It explores their understanding, referral challenges, and the broader context of CVD management. Identifying these barriers can help improve CR access and optimise primary care services.

## 1. Introduction

Cardiovascular disease (CVD) is the leading cause of morbidity and mortality worldwide, including in Brazil (World Health Organization, 2021). Cardiovascular rehabilitation (CR) plays a crucial role in the secondary prevention of CVD by integrating medical evaluation, physical exercise, risk factor management, psychosocial support, and patient education (Brown et al., 2025; Carvalho et al., 2020). CR has been proven to enhance cardiorespiratory fitness, reduce cardiovascular risk factors, improve mental health, and encourage long-term adherence to healthy lifestyle habits (Li et al., 2024). Despite these well-established benefits, CR remains significantly underutilised globally (Grace, Kotseva, & Whooley, 2021). In Brazil, there are only 75 CR centres, most of which focus primarily on exercise-based programs, while some offer comprehensive services that include lifestyle education, dietary counselling, and psychological support (Britto et al., 2020). Alarmingly, there is only one CR spot available for every 99 ischaemic heart disease patients in Brazil (Turk-Adawi et al., 2019).

Barriers to CR are multilevel and include issues related to distance, cost, and transportation (Borges et al., 2022; Ghisi et al., 2013; Sérvio et al., 2019). Additionally, medical referral presents a significant barrier (Ghanbari-Firoozabadi et al., 2020). Ghisi and Grace (2019) examined the challenges associated with CR referral in Canada and identified that the main reasons for nonreferral are physician scepticism about the benefits of CR, the perceived low quality of available programs, and negative experiences with certain CR programs. These findings, however, primarily reflect the situation in high-income countries, a category to which Brazil does not belong.

Brazil has a unique health system that offers both public and private CR programs, with public programs linked to the Unified Health System (SUS) (Brazil, 1988; Instituto Brasileiro de Geografia e Estatística, 2020). Public CR programs, funded by the government, aim to provide accessible rehabilitation services for all, while private programs may impose higher costs and differ in eligibility, potentially limiting access for lower-income individuals. The SUS ensures universal health coverage in Brazil through a decentralised structure, with administrative responsibilities distributed across federal, state, and municipal levels (Roman, 2023). Primary care, or basic care, serves as the main point of access for SUS services, responsible for organising and integrating healthcare networks. To fulfil its role effectively, basic care requires logistical support, including adequate physical infrastructure, communication resources, and skilled professionals. Furthermore, Basic Health Units (BHUs) need greater autonomy and decision-making authority to optimise their roles within the healthcare network. This includes integrating with other healthcare facilities, managing a diverse workforce, and recognising healthcare workers as essential social actors in reshaping healthcare delivery (Franco et al., 2024). Health professionals operating within BHUs hold a pivotal responsibility in facilitating referrals for individuals in need of CR. They serve as frontline gatekeepers, assessing patients' health statuses and identifying those who could benefit from CR services.

Given the limited availability of CR programs in Brazil and the significant barriers patients encounter in accessing these services, this qualitative study aimed to explore the perspectives and experiences of health professionals working in BHUs regarding CR and the management of CVD. Understanding the viewpoints of these healthcare providers is crucial, as they play a vital role in ongoing patient management and follow-up. By identifying their perspectives and experiences, we can better understand the primary care processes to improve CR referral/services. Ultimately, this study seeks to inform strategies that enhance CR access and improve patient outcomes in cardiovascular care.

## 2. Methods

### 2.1. Design

This study employed a qualitative approach, with approval for the research protocol obtained from the Research Ethics Committee of the UNIMAR (CAAE:69919823.0.0000.5496). Participants were recruited between September and October 2023 and invited to take part in one of the nine focus groups designed to explore the perspectives and experiences of BHU healthcare professionals regarding the secondary prevention and management of CVD.

### 2.2. Positionality statement

This study was informed by the experiences of the leading (MMAC) and senior (GLMG) authors, both female healthcare professionals with extensive expertise in CVD prevention. Together, they have over 25 years of experience in both clinical and academic settings, specialising in CR and prevention programs in underserved regions, particularly within Brazil's public health system. Given their experience working closely with primary healthcare providers in BHUs, they observed a gap in CR referrals and awareness of the role of healthcare providers in facilitating patient access to these services.

Additionally, they bring a wealth of experience in qualitative research methodologies, with a particular focus on group facilitation. With an extensive background in public health and health system research, the other co-authors (JVHG, TSA, MRAC, LCMV) helped guide the study's design and ensure that the qualitative methods used were aligned with best practices. Their expertise in engaging healthcare professionals and analysing qualitative data was crucial in shaping the research approach and facilitating meaningful discussions in the focus groups.

Throughout the study, all authors were mindful of their positionality and the potential influence of their professional backgrounds on the research process. Their prior knowledge of the healthcare system and CR program limitations informed the study design, yet they remained committed to creating a space for healthcare providers to voice their own experiences and insights. Regular team debriefings were held to reflect on any biases and ensure that the findings truly reflected participants' perspectives.

### 2.3. Setting

Adamantina, a city in the interior of the state of São Paulo, Brazil, has a population of approximately 35,000 inhabitants. The city is served by nine BHUs, all of which participated in our research. These

BHUs provide a variety of services, including health promotion, prevention, and disease treatment. When needed, patients are referred to specialised care. For individuals with CVD or those at risk, medical and nursing consultations are conducted to ensure continuous care. Additionally, four BHUs host the 'Hiperdia Program', which provides health education on hypertension, while five BHUs offer a weekly or biweekly walking group to encourage physical activity.

### 2.4. Participants

Healthcare professionals working in BHUs within the city of Adamantina, São Paulo, were invited to participate in this study. Eligible participants included nurses, doctors, nutritionists, physiotherapists, nursing technicians, social workers, and community agents, regardless of gender, as long as they were available to follow the proposed protocol. Individuals in non-healthcare roles, such as administrative staff, clerical workers, and maintenance personnel, were excluded from the study.

The sample size was determined based on the principle of theoretical saturation, where data collection and analysis continue until no new themes or insights are generated (Hennink and Kaiser, 2022). This approach allows for a thorough exploration of all relevant perspectives and themes, with data collection concluding once the breadth and depth of the subject have been fully captured.

### 2.5. Procedures and data collection

Healthcare providers who met the eligibility criteria were personally contacted at their respective BHUs, where they were informed about the study's objectives and assured of the confidentiality of their personal information. Those who agreed to participate provided written informed consent before proceeding. To establish participant demographics, a structured characterisation assessment was conducted, gathering data on age, gender, profession, years of experience, level of education, average number of patients seen per month, and the proportion of patients with CVD or related risk factors. Following this initial assessment, focus groups were scheduled and conducted in person.

Focus groups were selected as the primary data collection method to encourage interactive discussions among participants, fostering the exchange of experiences and perspectives regarding CR and CVD management. This approach allows participants to build upon each other's insights, offering a more nuanced understanding of common challenges and potential solutions within the primary care setting (Ryan, Gandha, Culbertson, & Carlson, 2014). Given the team-based nature of healthcare delivery in BHUs, focus groups provided an ideal setting to explore collective viewpoints and professional interactions related to CR referral and management (Tausch & Menold, 2016).

Data collection was conducted by the leading author (MMAC). Each focus group session, lasting approximately 40 min, was conducted in a private room within the respective BHU. Sessions were structured to encourage open discussion in a comfortable and confidential environment. The groups were composed of a mix of healthcare professionals from diverse roles, including nurses, dietitians, physical therapists, and doctors, with the aim of capturing a wide range of professional perspectives. The size of each group typically ranged from 7 to 9 participants, ensuring an optimal number for interaction. To ensure active participation across the entire group, the moderator used open-ended prompt questions to stimulate conversation (Table 1), allowing participants to share their perspectives freely. To engage less involved participants, the moderator encouraged them by asking specific, nonthreatening questions and giving them ample time to respond. In cases where disagreements arose, the moderator facilitated respectful dialogue, ensuring that all voices were heard while maintaining a collaborative atmosphere. If necessary, the moderator rephrased or clarified points to ensure understanding and agreement among participants.

A semistructured focus group guide, developed using the Consolidated Framework for Implementation Research (CFIR) (Damschroder, Reardon, Widerquist, & Lowery, 2022), was utilised to explore participants' perspectives and experiences with CR (Table 1). The CFIR was chosen because it encompasses a broad range of domains and constructs that help assess the internal and external factors affecting healthcare professionals' decision-making processes and their ability to implement evidence-based interventions, such as CR programs (Damschroder et al., 2022). By using CFIR, we were able to systematically capture the complexities involved in the implementation of CR, considering both organisational and individual-level influences. This structured approach facilitated in-depth discussions, prompting participants to share insights, personal anecdotes, and reflections on their professional roles and experiences with CR implementation.

To refine the focus group questions and assess their clarity, a pilot session involving five participants was conducted before formal data collection commenced. The pilot session was also led by the leading author (MMAC) and included healthcare providers who met the study's eligibility criteria. However, data from this session were not included in the final analysis. The session helped identify minor adjustments to question phrasing to enhance clarity and ensure that participants fully understood the topics being explored, though no major structural changes were required. All focus group discussions were recorded using a digital device and subsequently transcribed in their entirety by the two authors (MMAC and JVHG). To ensure the validity of the transcripts and to mitigate the risk of significant errors that could affect the quality of the research, transcripts were shared with the participants for verification (Rowlands, 2021). Participants reviewed their responses, and no changes were requested, indicating that the transcripts accurately reflected their contributions. Participant anonymity was maintained in the transcripts, with identification being attributed solely by numbers.

### 2.6. Data analysis

First, each focus group transcript was cleaned to ensure accuracy and anonymity. We employed inductive thematic analysis based on Braun and Clarke's six-phased iterative and reflexive process (Braun & Clarke, 2006; Braun & Clarke, 2013) to identify, analyse, and report themes from the focus groups. This approach allowed the themes to be created organically from the data, without preconceived notions, ensuring that the analysis was grounded in the participants' perspectives and experiences. Two authors (MMAC and GLMG) reviewed the transcripts, and systematic coding and categorisation were conducted through repeated readings and line-by-line analysis by two independent coders. Preliminary themes and subthemes were generated, grouping meaningful segments or phrases by their thematic similarity. These themes were reviewed during biweekly team meetings throughout the analysis process, with consensus reached through discussion and debate among the authorship team. Thematic saturation was confirmed when no new ideas or themes were generated from the data. Trustworthiness of the findings was ensured through team consensus, and credibility was supported by the well-established criteria for reporting qualitative research (O'Brien, Harris, Beckman, Reed, & Cook, 2014).

## 3. Results

### 3.1. Participants' characteristics

A total of 72 healthcare providers were invited to participate in this study, of whom 71 (99%) signed the consent form and

**Table 1**
Focus group questions, prompts, and corresponding CFIR domains and constructs.

| # | Focus group questions | Prompts | CFIR domains and constructs applied |
|---|---|---|---|
| 1 | In your profession, what is your patients' main complaint? | Can you describe the most common issues you deal with? | Domain: Intervention characteristics<br>Construct: Intervention source |
| 2 | When you see a patient with heart disease or risk factors, what is your indication for treatment? Do you refer patients for CR? | How do you decide if a patient is suitable for CR? | Domain: Outer setting<br>Construct: Patient needs and resources<br>Domain: Inner setting<br>Construct: Organisational culture |
| 3 | Are all eligible patients referred for CR at your workplace? | If not, what are the barriers you face in referring patients? | Domain: Outer setting<br>Construct: Patient needs and resources<br>Domain: Inner setting<br>Construct: Climate of implementation |
| 4 | Where you work, is there a standard referral protocol for CR? | What does the protocol look like, and do you follow it? | Domain: Inner setting<br>Construct: Structural characteristics |
| 5 | What do you know about CR? | Can you describe any personal experiences or information that informed your knowledge? | Domain: Intervention characteristics<br>Construct: Evidence strength and quality |
| 6 | What are the components of CR? | Which components do you consider most important? | Domain: Intervention characteristics<br>Construct: Adaptability |
| 7 | Do you know about the results/benefits promoted by CR? | Could you share any positive outcomes you have observed or heard about? | Domain: Intervention characteristics<br>Construct: Relative advantage |
| 8 | Do you know of any CR programs here in the region? If so, have you had any contact/experience with this CR program? | Can you elaborate on your experience with any programs? | Domain: Outer setting<br>Construct: Patient needs and resources<br>Domain: Inner setting<br>Construct: Implementation climate |
| 9 | What are the most important factors that affect your referral of patients for cardiac rehabilitation? | Are these factors related to your professional environment, your patients, or other aspects? | Domain: Outer setting<br>Construct: Patient needs and resources<br>Domain: Inner setting<br>Construct: Organisational culture<br>Domain: Process<br>Construct: Planning |
| 10 | When you assess that a patient is unable to exercise, what is your approach? | Do you consider other alternatives for rehabilitation or management? | Domain: Inner setting<br>Construct: Implementation climate |
| 11 | Is there anything else you would like to say? | Do you have additional insights or thoughts on how CR could be improved? | Domain: Process<br>Construct: Engaging |

Abbreviations: CR, Cardiac Rehabilitation; CFIR, Consolidated Framework for Implementation Research.

participated in one of the nine focus groups. The characteristics of the participants are presented in Table 2.

### 3.2. Key themes

Five overarching themes were developed, each encompassing 17 subthemes that reflect the complexity and multifaceted nature of the topic under investigation (Fig. 1).

#### 3.2.1. Theme 1: Comprehensive management of CVDs

This theme explores the integrated and multifaceted approach to managing CVDs within the BHUs. Healthcare professionals across various roles adopt a comprehensive management strategy that includes not only pharmaceutical interventions but also essential lifestyle modifications, such as dietary education, physical activity, and psychosocial support. In addition, they highlight the importance of timely referrals to specialists when necessary. By coordinating care through continuous monitoring and follow-up, healthcare teams ensure that treatment plans remain adaptable to the evolving needs of patients.

Healthcare professionals emphasised that their approach to CVD management was holistic, aiming to treat the whole patient rather than just the disease. As participant 7, a doctor explained, "We adopt a dual approach… medication and lifestyle changes are essential components of treatment." However, the focus remains on prevention as much as treatment, with primary care practitioners particularly focused on early detection and proactive management. As one practitioner (participant 18) put it, "We focus on preventing disease before it develops, ensuring that at-risk individuals are educated and supported in adopting healthy habits.".

In addition, lifestyle modifications were central to the treatment strategy. Practitioners emphasised the importance of nutritional guidance and exercise, tailoring their advice to individual patient needs. As one doctor (participant 35) described, "Physical activity and dietary modifications must be personalised, considering the patient's capacity and preferences." The comprehensive care is continually adjusted, with regular follow-ups ensuring that patients remain on track with their treatment plans.

#### 3.2.2. Theme 2: Role and responsibilities of healthcare professionals in BHU

This theme examines the diverse responsibilities of healthcare professionals in the BHU setting and the collaborative approach to patient care. Professionals across roles, including doctors, nurses, community agents, and physiotherapists, play an essential part in monitoring patients, offering guidance, and contributing to the holistic management of CVDs. These responsibilities are not only medical but also educational, as professionals provide patients with knowledge and tools to make lifestyle changes.

**Table 2**
Characteristics of participants (N=71).

| | Total (N=71) | Medical Doctors (n=6; 8.5%) | Nurses (n=12; 16.9%) | Nursing assistants (n=11; 15.5%) | Community agents (n=38; 53.5%) | Physiotherapists (n=2; 2.8%) | Nutritionists (n=2; 2.8%) |
|---|---|---|---|---|---|---|---|
| Age (years) | 39.46 ± 11.16 | 38.83 ± 11.60 | 39.50 ± 12.16 | 43.18 ± 15.22 | 40.03 ± 9.09 | 25.50 ± 2.12 | 24.00 ± 1.41 |
| Years of service | 9.86 ± 7.35 | 13.33 ± 10.80 | 14.25 ± 9.64 | 12.27 ± 9.27 | 8.13 ± 3.81 | 1.15 ± 0.71 | 1.00 ± 0.00 |
| Level of education | | | | | | | |
| Less than elementary school | 2 (2.81%) | 0 (0.00%) | 0 (0.00%) | 0 (0.00%) | 2 (5.26%) | 0 (0.00%) | 0 (0.00%) |
| Incomplete high school | 1 (1.41%) | 0 (0.00%) | 0 (0.00%) | 0 (0.00%) | 1 (2.63%) | 0 (0.00%) | 0 (0.00%) |
| High school diploma | 11 (15.50%) | 0 (0.00%) | 0 (0.00%) | 0 (0.00%) | 11 (28.95%) | 0 (0.00%) | 0 (0.00%) |
| Incomplete university | 6 (8.45%) | 0 (0.00%) | 0 (0.00%) | 0 (0.00%) | 6 (15.80%) | 0 (0.00%) | 0 (0.00%) |
| University diploma | 32 (45.07%) | 3 (50.00%) | 3 (25.00%) | 11 (100%) | 15 (39.47%) | 0 (0.00%) | 0 (0.00%) |
| Incomplete graduate studies | 3(4.22%) | 0 (0.00%) | 2 (16.67%) | 0 (0.00%) | 1 (2.63%) | 0 (0.00%) | 0 (0.00%) |
| Graduate degree | 16 (22.54%) | 3 (50.00%) | 7 (58.33%) | 0 (0.00%) | 2(5.26%) | 2 (100%) | 2 (100%) |
| Number of patients seen per month | 584.56 ± 594.64 | 456.33 ± 217.55 | 854.42 ± 877.93 | 961.82 ± 614.44 | 458.11 ± 468.40 | 35.00 ± 21.21 | 27.50 ± 17.68 |
| Percentage of patients with CVD | 53% | 66% | 45% | 65% | 50% | 40% | 75% |

**Legend:** % = percentage; n = number of participants; CVD: cardiovascular diseases.

Healthcare professionals described their roles as both collaborative and individualised. For example, nurses highlighted their responsibility for continuous monitoring, stating, "We assess vital signs, provide medication guidance, and encourage patients to make changes based on their individual health conditions" (participant 44). On the other hand, community agents described their role in symptom recognition and health education in the community. As participant 48, a community agent explained, "We visit homes and assess patients for symptoms, especially those linked to CVDs, and offer advice on prevention."

Additionally, the role of physiotherapists in the BHU varied, with a clear division of labour between musculoskeletal and CR. While physiotherapists in some settings focused on shoulder injuries, their role in supporting CVD management was recognised as crucial for promoting exercise and overall physical health. "We support patients with physical activity, but nutritional guidance also plays a significant role in treating cardiovascular issues," shared one physiotherapist (participant 31). However, there is a degree of variation in the degree of responsibility across healthcare roles, with some professionals feeling more equipped than others to handle specific aspects of care. This variation often stems from resource constraints and the lack of specialised training in some BHUs.

### *3.2.3. Theme 3: Awareness and understanding of CR*

This theme addresses the varying levels of awareness among healthcare professionals about CR programs and the factors influencing referrals for CR. Overall, there was a notable lack of understanding about the scope of CR programs, with many healthcare professionals, including doctors, nurses, and community agents, admitting unfamiliarity with CR. As participant 59, a doctor candidly shared, "We've heard about CR in college, but we're not sure how it works in practice." Nurses expressed a similar lack of awareness, with one stating, "I've never heard of it."

Despite this lack of awareness, healthcare professionals acknowledge the potential benefits of CR if implemented correctly. However, misconceptions about CR's scope and purpose were common. One nurse (participant 25) believed that CR was "mainly about physiotherapy for the elderly," which was echoed by a community agent who said, "There's a perception that physiotherapy only targets specific injuries or older people" (participant 66).

The lack of knowledge about CR was compounded by communication barriers, which prevented healthcare workers from referring patients to available programs. "We are unaware of CR programs in the city, so we can't refer patients," lamented a nurse (participant 69). This theme illustrates the significant gap in knowledge and highlights the need for improved communication and education within the healthcare system to support the referral process for CR.

### *3.2.4. Theme 4: Challenges in adherence to behaviour change*

This theme focuses on the challenges healthcare professionals face when encouraging patients to adopt healthier lifestyle habits, particularly in relation to exercise, diet, and medication adherence. Health professionals identified various obstacles that impede patients' ability to make sustainable behaviour changes. These barriers include physical limitations, time constraints, and cultural preferences, all of which hinder the adoption of healthier habits.

Community agents described the difficulty patients face in integrating lifestyle changes into their routines, especially with respect to physical activity. "Some patients can't engage in exercise because of knee problems," one community agent (participant 2) noted. "Others struggle with time because of their work schedule or convenience issues", participant 2 continued.

Additionally, cultural and educational factors play a role in hindering adherence. Many elderly patients in the BHUs still prefer non-pharmaceutical treatments, such as herbal remedies, which presents a challenge for healthcare professionals trying to promote

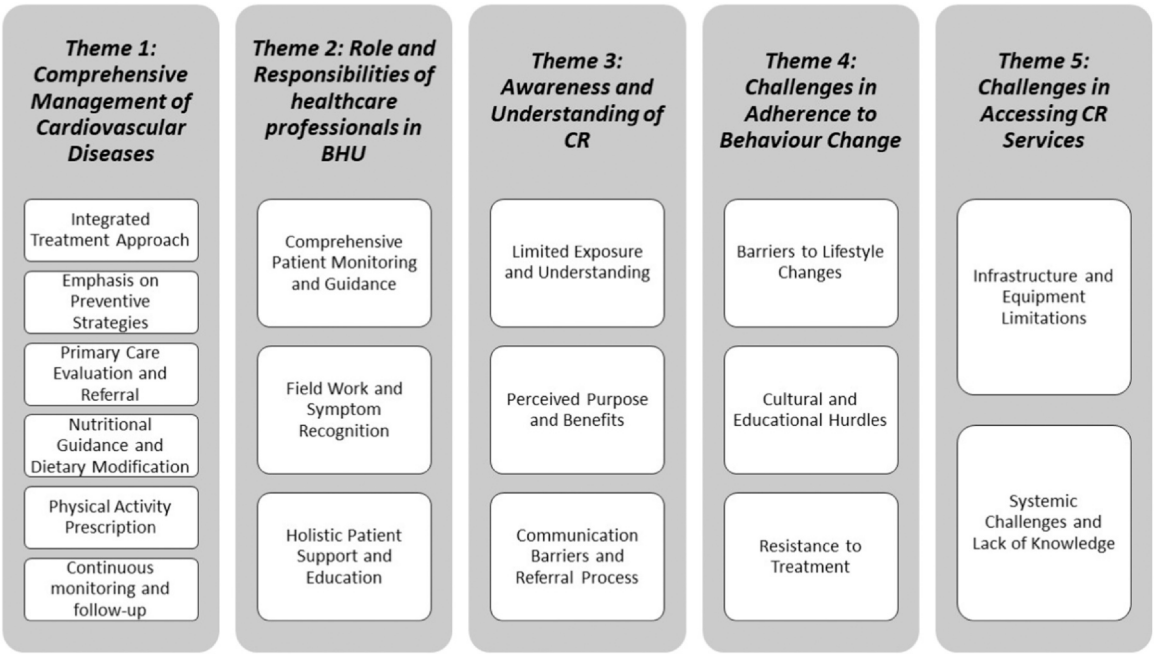


**Fig. 1.** Extracted themes and subthemes from focus groups.

medication adherence. As participant 25, a nurse explained, "There's a cultural resistance to taking medication, and many prefer natural solutions." Educational barriers also contributed to this resistance, as some patients lacked the necessary understanding of how to follow treatment regimens. "Many patients don't know how to take their medications properly," another nurse pointed out.

Healthcare professionals also noted significant resistance from patients in adhering to prescribed treatments. "Some patients resist taking medication, especially the elderly, due to a lack of family support or understanding," one nurse (participant 50) shared. This resistance is a critical issue that requires focused attention and tailored interventions to overcome.

*3.2.5. Theme 5: Challenges in accessing CR services*

This theme highlights the systemic and infrastructural challenges healthcare professionals face in accessing and delivering CR services. Many health professionals pointed out the lack of communication and referral pathways for CR programs within the public health system. One nurse (participant 44) described the problem succinctly: "There is no referral system for CR within the SUS." Physiotherapists also highlighted the lack of training and equipment necessary to conduct effective CR. "Our BHU lacks the equipment, like treadmills and exercise bikes, to offer effective CR treatment," a physiotherapist (participant 10) noted.

In addition to these resource constraints, healthcare professionals mentioned the absence of CR programs within the public health system as a significant barrier to providing comprehensive care. As participant 7, a doctor reflected, "I don't know of any CR programs in the city that I could refer patients to." These limitations are further compounded by a lack of knowledge and awareness, which significantly impedes access to CR services for those who could benefit.

## 4. Discussion

This study provides valuable insights into the integration of CR within Brazil's primary healthcare system, particularly through the role of BHUs. These units, as primary care hubs, are crucial for providing essential health services to communities, particularly in remote areas (Franco et al., 2024). The multidisciplinary teams within BHUs, consisting of doctors, nurses, physiotherapists, and community health workers, are at the forefront of managing cardiovascular health and promoting preventive care. Given their direct interaction with patients, especially those eligible for CR, and their responsibility for referrals, BHUs are pivotal in shaping the success of CR programs. This study highlights several key challenges, knowledge gaps, and opportunities that can improve the integration of CR into primary healthcare settings in Brazil.

One of the key findings of this study is the critical need for healthcare professionals in BHUs to have a more comprehensive understanding of CR, its components, and its implementation strategies. Although healthcare professionals actively engage in cardiovascular care, their limited knowledge about CR hinders their ability to properly inform patients or make timely referrals (Sérvio et al., 2019). This knowledge gap is significant, as healthcare providers are often the first point of contact for patients and play an essential role in guiding them through available rehabilitation options (Ghisi et al., 2019). It is clear from our findings that training healthcare providers in CR components and benefits is vital for fostering better interdisciplinary collaboration and improving patient outcomes (Babu et al., 2022). This training should focus on CR's role in enhancing patient care and supporting its integration into routine clinical practice (Moghei, Oh, Chessex, & Grace, 2019).

Another novel finding is the evident gap in the availability of specialised healthcare professionals, such as physiotherapists and nutritionists, within BHUs. The Brazilian Cardiology Guidelines (Carvalho et al., 2020) stress the importance of these professionals in prescribing and supervising physical exercise, yet many BHUs reported insufficient staffing in this area. The lack of physiotherapists, in particular, was a recurring theme in our data, which significantly limits BHUs' ability to offer comprehensive CR services. This highlights a systemic issue within primary healthcare settings in Brazil (Chueiri et al., 2020), where infrastructure and resource constraints hinder the full implementation of CR programs. Given the importance of these specialists in delivering effective cardiovascular care, addressing these gaps is crucial for improving the integration of CR into BHUs and enhancing the overall quality of care.

Additionally, our findings underscore the challenges healthcare professionals face in promoting behaviour change among patients, which is essential for the success of CR. Barriers such as physical limitations, time constraints, and cultural preferences for natural remedies often interfere with patients' willingness to adopt healthier lifestyle habits (Subramaniam et al., 2022). Particularly among elderly patients, there is a strong preference for non-pharmaceutical solutions (Collado-Mateo et al., 2021), which presents a challenge in encouraging adherence to prescribed exercise regimens and dietary changes. These barriers to behaviour change are compounded by the lack of resources and referral pathways for CR services within the SUS (Britto et al., 2020). The absence of clear referral systems, coupled with inadequate knowledge about available CR programs, further limits patients' access to necessary rehabilitation services. Addressing these interconnected challenges will require systematic improvements in the infrastructure of BHUs and greater coordination between healthcare providers to ensure patients have access to appropriate rehabilitation services.

### 4.1. Implications for practice

The findings of this study have several important implications for practice. First, the need for targeted training of healthcare professionals on CR components, benefits, and implementation strategies is paramount. This training should be a key focus of continuing medical education programs, with an emphasis on how healthcare providers can identify eligible patients, provide informed recommendations, and facilitate timely referrals to CR programs. Interdisciplinary collaboration should be encouraged, fostering teamwork between doctors, physiotherapists, nutritionists, and other healthcare professionals involved in CR.

Additionally, efforts should be made to address the staffing gaps in BHUs by advocating for the inclusion of physiotherapists, nutritionists, and other specialists critical to CR programs. This may involve policy changes that promote the recruitment and retention of specialised professionals in primary healthcare settings, particularly in underserved regions. Resource allocation for CR within BHUs should also be prioritised to ensure that adequate infrastructure and equipment are available to support effective rehabilitation.

Furthermore, addressing the cultural and behavioural barriers to lifestyle changes is essential for improving patient adherence to CR programs. Strategies to overcome these barriers should be integrated into patient education and behaviour change interventions. This may involve developing culturally tailored educational materials and support systems that take into account the preferences and limitations of different patient populations, particularly elderly patients and those with cultural preferences for alternative remedies.

Future research should focus on evaluating the effectiveness of training programs for healthcare professionals in enhancing their knowledge of CR and improving referral practices. Longitudinal studies could assess the impact of improved provider education on patient outcomes, including participation in CR programs and adherence to prescribed lifestyle changes. Research could also explore the effectiveness of different models of interdisciplinary collaboration in BHUs, particularly how collaboration between healthcare professionals impacts patient care and rehabilitation outcomes. Additionally, further studies are needed to understand the barriers and facilitators to integrating CR into primary healthcare systems in diverse geographical contexts. Comparative studies could examine the implementation of CR in different regions of Brazil, identifying regional variations in staffing, resource allocation, and patient engagement. Understanding how CR services can be more effectively integrated within the existing healthcare system will be critical for scaling up and improving these programs at a national level.

### 4.2. Strengths and limitations

This study offers several notable strengths. Firstly, the inclusion of 71 healthcare providers from diverse professional backgrounds allowed for a broad range of perspectives, enhancing the richness and diversity of the data. This diversity provided a comprehensive understanding of the barriers and facilitators in CR implementation. Additionally, the use of focus groups encouraged open discussion and allowed participants to share their experiences in a collaborative setting, fostering the exploration of different viewpoints. Finally, the study's focus on healthcare professionals' perspectives provides valuable insights into the practical challenges of CR services, which can inform future strategies for improving CR delivery.

However, several limitations must also be acknowledged. Firstly, the scope was confined to a specific geographical area and population, which may limit the generalisability of the findings. Moreover, while the study focused on healthcare professionals' perspectives, it did not include the experiences and viewpoints of patients. This is a critical area for future research, as understanding patients' needs and perceptions would provide a more holistic view of CR services. Another limitation is the composition of the focus groups, particularly the mix of junior and senior healthcare professionals, which may have influenced the commentary and feedback. Hierarchical dynamics within healthcare settings could have shaped the responses of more junior staff when participating alongside more senior colleagues (Essex, Kennedy, Miller, & Jameson, 2023). Additionally, the study did not extensively explore contextual factors such as cultural, socioeconomic, and healthcare system differences, which could influence the transferability of the findings to other settings (Rogers, De Brún, & McAuliffe, 2020). These limitations highlight the need for further research to address these gaps and provide a deeper understanding of the challenges and opportunities related to the referral and provision of CR services.

## 5. Conclusion

In conclusion, this study provides valuable insights into the current state of CR within BHUs in Brazil. While the multidisciplinary approach and patient-centred care at BHUs are key strengths, significant barriers remain in terms of knowledge gaps, staffing limitations, and challenges in patient adherence to behaviour change. These findings suggest that targeted training for healthcare providers, improved referral pathways, and enhanced resources for BHUs are essential for strengthening the integration of CR within primary healthcare. Addressing these challenges is crucial for improving cardiovascular care and outcomes for individuals with CVD in Brazil.

## Authorship contribution statement

**Mayara Moura Alves da Cruz:** Conceptualization, Methodology, Data curation, Writing – original draft, Supervision, Project administration. **Joaquim Victor Hugo Gabriel:** Formal analysis, Investigation, Writing – review & editing. **Tális Silva Antonini:** Formal analysis, Investigation, Writing – review & editing. **Murilo Reis Alves da Cruz:** Formal analysis, Investigation, Writing – review & editing. **Luiz Carlos Marques Vanderlei:** Methodology, Writing – review & editing. **Gabriela Lima de Melo Ghisi:** Methodology, Data curation, Writing – review & editing. All authors have read and agreed to the published version of the manuscript.

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## Ethical statement

Approval for the research protocol was obtained from the Research Ethics Committee of the UNIMAR (CAAE:69919823.0.0000.5496). Approval date: June 27, 2023.

## Conflict of interest

None.

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