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Implementation of Obstetric Nursing Residency Programs in Brazil Using the Consolidated Framework for Implementation Research

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Abstract
Implementing evidence-based training for nurses is crucial for improving maternal health, especially in low- and middle-income countries. In Brazil, the Obstetric Nursing Residency Program of Pernambuco (ONRPP) was established to promote humanized childbirth care by developing the nursing workforce. This study used the Consolidated Framework for Implementation Research (CFIR) to analyze key factors affecting the program's implementation. We conducted a qualitative, multiple-case study at two reference hospitals in Pernambuco. Data were collected through document analysis, semi-structured interviews with managers and preceptors, and a focus group with residents. We performed a directed content analysis based on the five domains and 39 constructs of the CFIR. Data were coded and synthesized using MAXQDA to assess the valence and strength of each construct. Our findings revealed several facilitators, including the strong scientific basis of the training, high resident engagement, and a flexible program structure. However, we also identified significant barriers: lack of infrastructure and funding, weak inter-institutional communication, resistance from some clinical staff, and limited opportunities for feedback. Although residents reported increased autonomy and alignment with evidence-based practices, their role remained ambiguous for some staff. The ONRPP is a promising model for strengthening obstetric nursing and humanized care in Brazil. However, its long-term success requires strategic investment in leadership, communication, and organizational learning. This study contributes to the use of implementation frameworks like CFIR in nursing education and highlights their importance for guiding future scale-up strategies.

Keywords Health evaluation · Implementation science · Internship and residency · Obstetrics · CFIR

Introduction

Improving indicators related to the quality of obstetric care remains a pressing global challenge, particularly in low- and middle-income countries such as Brazil (Barreto, 2021). Each year, an estimated 2.2 million birth-related deaths – comprising intrapartum stillbirths and first-day neonatal deaths – occur worldwide, with 99% of these deaths concentrated in these settings (Gurung et al., 2019). In Brazil specifically, maternal mortality and an exceptionally high cesarean section rate of 56% persist, sharply contrasting with the global average of 21% (United Nations Population Fund et al., 2021).

Improving these indicators, and thereby the overall quality of maternal and newborn care, requires strategic investments and the implementation of evidence-based interventions or practices (Duncombe, 2018; Gurung et al., 2019). Strengthening the use of scientific evidence in nursing is critical, particularly given that nurses constitute the largest segment of the healthcare workforce (Wu et al., 2018).

Despite their pivotal role in maternal and childcare, the global obstetric nursing workforce remains limited, necessitating efforts to promote training, regulation, and professional empowerment tailored to the realities of each country (Oliveira et al., 2021). The evolving roles of nurses and midwives in modern healthcare demand critical thinking, interprofessional collaboration, and problem-solving skills (Dearnley et al., 2018; Swan et al., 2023; Ward et al., 2018;

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Zhang & Cui, 2018). In this context, expanding training programs grounded in evidence-based practice (EBP) represents a strategic path for transforming clinical care in obstetric nursing (Wu et al., 2018).

In Brazil, key policy milestones – such as the 2011 launch of the Rede Cegonha initiative and the 2012 establishment of the National Scholarship Program for Residency in Obstetric Nursing – have advanced the training and integration of nursing professionals within public health services (Schreck & da Silva, 2022). These residency programs, regarded as the gold standard in Brazilian postgraduate education, employ interactive, clinically embedded pedagogical models considered essential for cultivating EBP competencies among nurses (Horntvedt et al., 2018).

Although the availability of international clinical guidelines for obstetric care has increased in recent years (Verschueren et al., 2019), there remains a paucity of research examining the role of teaching and learning strategies in fostering EBP implementation within nursing education – particularly in low- and middle-income countries (Horntvedt et al., 2018; Levine, 2020; Swan et al., 2023). Existing evidence suggests that obstetric residency programs strengthen nurses' confidence and foster a shift from interventionist to more holistic, evidence-based care models (Silva et al., 2020). Nonetheless, the role of the organizational environment in enabling or constraining the implementation of these educational strategies remains underexplored in Brazil.

The improvement of maternal and child health outcomes hinges on the successful implementation of context-sensitive, evidence-based clinical guidelines, especially through innovative educational approaches grounded in transformative pedagogy (Dearnley et al., 2018). In this regard, it is imperative to better understand how implementation occurs within specific healthcare settings (Stokes et al., 2016).

This study aims to analyze the implementation of the Obstetric Nursing Residency Program of Pernambuco (ONRPP), drawing on the perceptions of managers and residents involved in the program. The analysis is guided by the Consolidated Framework for Implementation Research (CFIR) (Damschroder & Lowery, 2013), a comprehensive and theory-informed framework that identifies the multilevel factors affecting the implementation of complex interventions.

By applying the CFIR within a qualitative research design, this study offers original insights into the organizational, contextual, and individual factors influencing the adoption of EBP in obstetric care. Furthermore, it demonstrates the framework's potential as a versatile tool for guiding implementation strategies in structurally unequal, institutionally complex environments – thus extending its relevance to middle-income countries such as Brazil.

The CFIR consolidates key constructs from established implementation theories across disciplines (e.g., psychology, sociology, organizational change), offering a structured taxonomy for analyzing implementation effectiveness (Damschroder et al., 2009; Damschroder & Lowery, 2013). It encompasses five core domains – intervention characteristics, outer setting, inner setting, characteristics of individuals, and implementation process – each comprising multiple constructs, such as evidence strength, leadership engagement, resource availability, and evaluation strategies. This comprehensive framework serves as a robust lens for understanding the implementation of the ONRPP and its broader implications for health system strengthening.

Methods

Type of Study

This study employed a qualitative, multiple-case design to capture the complexity of participants' lived experiences and explore their perceptions and actions regarding the implementation of the program. This approach is particularly well-suited to implementation research, as it supports deeper insight into the organizational and subjective dynamics involved in adopting new practices (Benzer et al., 2013). The study population consisted of managers and residents affiliated with the Pernambuco Obstetric Nursing Residency Program (ONRPP).

Study Context

The ONRPP was developed as part of the State Policy for Obstetric and Neonatal Care in Pernambuco, aiming to improve childbirth and newborn care by training nurse-midwives in regional public hospitals. The program was initially implemented in two referral hospitals located in the IV and V Health Regions of the state, within the II Health Macroregion of Pernambuco. The selection of these units considered criteria such as the annual number of births, the availability of obstetric nurses to serve as preceptors, and the structural capacity to support educational activities.

ONRPP integrates both theoretical and practical components. Theoretical activities are centralized at a regional teaching hub, while practical training takes place across different hospital sectors, depending on the availability of qualified preceptors. The program emphasizes the adoption of evidence-based practices in childbirth care, promoting the qualified role of nurse-midwives in reducing unnecessary interventions and strengthening a humanized model of care.

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Data Collection

Conducted between May and December 2019, the study adhered to domains 2 and 3 of the COREQ checklist (Consolidated Criteria for Reporting Qualitative Research). Data were gathered in two phases: (1) an initial documentary analysis, and (2) the collection of primary data through semi-structured interviews and a focus group. The design and instruments were guided by the Consolidated Framework for Implementation Research (CFIR), which also informed the analytical procedures.

Sampling and Inclusion Criteria

A snowball sampling strategy was used (Vinuto, 2014), suitable for identifying strategic informants in complex implementation settings (Damschroder & Lowery, 2013). Initial "seeds" were identified through an analysis of key program documents, including the Political-Pedagogical Project (PPP), the program handbook, and Federal Nursing Council Resolution No. 516/2016. These informants – comprising general care coordinators from the Pernambuco State Health Department (SES-PE) and Regional Health Administrations (GERES IV and V) – referred additional stakeholders involved in implementing ONRPP, such as academic secretaries, hospital nursing coordinators, preceptors, and hospital administrators.

Inclusion criteria required participants to be actively involved in the management, supervision, or preceptorship of the program at the time of data collection. Individuals with only planning-phase experience and no direct implementation role were excluded.

Participants and Setting

The final sample consisted of 24 participants: 10 key informants who took part in individual interviews, and 14 residents who participated in a focus group. All participants self-identified as women aged 22 to 44 and held undergraduate degrees. Interviews were conducted in person at participants' workplaces – hospitals and administrative units where ONRPP was in operation.

Interview Guide

The semi-structured interview guide was built around CFIR's five domains – intervention characteristics, outer setting, inner setting, characteristics of individuals, and implementation process (see Table 1). It was adapted based on the documentary analysis and designed to capture both contextual insights and personal experiences. The guide allowed for flexibility in probing emerging topics as conversations developed.

Interview and Focus Group Procedures

Individual interviews with managers lasted between 45 and 60 min, while the residents' focus group lasted approximately 90 min. Sessions were audio-recorded with informed consent, and field notes were used to capture non-verbal cues and contextual observations.

Saturation and Validation

Recruitment continued until theoretical saturation was reached – that is, when no new themes emerged. While transcripts were not returned to participants for validation, interpretive rigor was maintained through regular analytic discussions within the research team.

Data Analysis

All interviews and the focus group were transcribed verbatim and analyzed using directed content analysis, following the method proposed by Hsieh and Shannon (2005a). Analytical procedures were structured by CFIR's framework, which also shaped the coding schema. Two researchers independently coded the transcripts, combining deductive coding (based on CFIR domains) with inductive generation of new themes as needed. Coding was managed using MaxQDA software.

Themes were organized around CFIR's five core domains. Constructs were classified according to methodological guidance from the CFIR Technical Assistance website (cfirguide.org), considering two dimensions: *valence* (positive or negative influence on implementation) and *strength* (the degree of support, based on frequency, consensus, language intensity, and concrete examples). When both favorable and unfavorable views were expressed about the same construct, a moderate classification (e.g., weak positive or weak negative) was assigned, depending on prevalence. Constructs lacking sufficient evidence or impact were classified as neutral.

For the domain "characteristics of individuals," when divergent views arose between key informants and residents, the latter's perspectives were prioritized – particularly regarding interpersonal dynamics and workflow concerns.

To facilitate comparative analysis, coded data were synthesized into organizational memos summarizing each construct, its classification, supporting analysis, and illustrative quotes. Four memos were initially developed: one for centralized administrative units (SES-PE and ESPPE), two

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Table 1 CFIR constructs and domains 1

I. Innovation Characteristics	Definitions
A. Source of innovation	Perception of key stakeholders on whether the innovation is developed internally or externally.
B. Evidence Strength and Quality	Stakeholder perceptions of the quality and validity of the evidence that supports the belief that the innovation will have the desired results.
C. Relative advantage	Stakeholders' perception of the advantage of implementing the innovation versus an alternative solution.
D. Adaptability	The degree to which an innovation can be adapted, refined or reinvented to meet local needs.
E. Trialability ("Testability")	The ability to test innovation on a small scale within the organization and reverse course (undo implementation) if necessary.
F. Complexity	Perception of difficulty of innovation, reflected by duration, scope, radicality, disorganization, centrality and complexity and number of steps needed to implement.
G. Quality and Packaging Design	Excellence perceived in how innovation is grouped, presented and assembled.
H. Cost	Innovation costs and costs associated with implementing the innovation, including investment, supply and opportunity costs.
II. **Exterior configuration**	
A. Needs and Resources of those Served by the Organization	The extent to which the needs of those served by the organization (e.g., patients), as well as the barriers and facilitators to meeting those needs, are accurately known and prioritized by the organization. Awareness of the needs and resources of those served by the organization influenced or not the implementation or adaptation of the innovation.
B. Cosmopolitanism	The degree to which an organization is networked with other external organizations.
C. Peer pressure	Mimetic or competitive pressure to implement an innovation, typically because most or other key organizations or competitors have already implemented it or are seeking competitive advantage.
D. Foreign Policy and Incentives	A broad construct that includes external strategies for disseminating innovation, including policies and regulations (government or other central entities), external mandates, recommendations and guidelines, pay for performance, collaborations, and public or benchmark reports.
III. **Internal environment**	
A. Structural features	The social architecture, age, maturity and size of an organization.
B. Networks and Communications	The nature and quality of social network webs, such as the nature and quality of formal and informal communications within an organization.
C. Culture	Basic norms, values and assumptions of a given organization.
D. Implementation Climate	The absorptive capacity for change, the shared receptivity of the individuals involved to an innovation, and the extent to which the use of that innovation will be rewarded, supported, and expected within your organization.
1. Tension for Change	The degree to which stakeholders perceive the current situation as intolerable or in need of change.
2. Compatibility	The degree of tangible fit between the meaning and values attached to the innovation by the individuals involved, how they align with individuals' own norms, values, and perceived risks and needs, and how the innovation fits into existing workflows and systems.
3. Relative Priority	Individuals' shared perception of the importance of implementation within the organization.
4. Organizational incentives and rewards	Extrinsic incentives, such as sharing goals, prizes, performance reviews, promotions and salary increases, and less tangible incentives, such as increased stature or respect.
5. Objectives and Feedback	The degree to which goals are clearly communicated, acted upon, and fed back to the team, and alignment of that feedback with sustained goals can be (double) coded into Goals and Feedback.
6. Learning Climate	A climate in which: (1) Leaders express their own fallibility and need for assistance and input from team members; (2) Team members feel that they are essential, valued and experienced partners in the change process; (3) Individuals feel psychologically safe to try new methods; and (4) There is sufficient time and space for thinking and reflective assessment.
E. Implementation readiness	Tangible and immediate indicators of organizational commitment to your decision to implement an innovation.
1. Leadership Engagement	Commitment, involvement and responsibility of leaders and managers with the implementation of innovation.
2. Available resources	The level of organizational resources dedicated to implementation and ongoing operations, including physical space and time.
3. Access to knowledge and information	Ease of access to digestible information and knowledge about innovation and how to incorporate it into work tasks.
IV. **Characteristics of Individuals**	
1. Knowledge and Beliefs about Innovation	Individuals' attitudes towards the value attributed to innovation, as well as familiarity with facts, truths and principles related to innovation.
2. Self-efficacy	Individual belief in their own capabilities to execute courses of action to achieve implementation goals.
3. Individual Stage of Change	Characterizing the phase an individual is in, how he/she progresses towards skilled, enthusiastic and sustained use of the innovation.

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Table 1 (continued)

I. Innovation Characteristics	Definitions
4. Individual Identification with Organization	A broad construct related to how individuals perceive the organization, and their relationship and degree of commitment to that organization.
5. Other personal attributes	A broad construct to include other personal traits such as tolerance for ambiguity, intellectual ability, motivation, values, competence, ability, and learning style.
V. **Process**	
A. Planning	The degree to which a scheme or method of behavior and tasks for implementing an innovation are developed in advance, and the quality of these schemes or methods.
B. Engagement	Attract and involve appropriate individuals in the implementation and use of the innovation through a combined strategy of social marketing, education, role modeling, training and other similar activities.
1. Opinion Leaders	Individuals in an organization who have formal or informal influence over the attitudes and beliefs of their colleagues regarding the implementation of innovation.
2. Formally Appointed Internal Implementation Leaders	Individuals within the organization who have been formally appointed with responsibility for implementing an innovation as coordinator, project manager, team leader, or other similar role.
3. Champions	"Individuals who are dedicated to supporting, marketing, and 'driving through an [implementation]," overcoming the indifference or resistance that innovation can provoke in an organization.
4. External Change Agents	Individuals who are affiliated with an external entity who formally influence or facilitate innovation decisions in a desirable direction.
5. The main stakeholders	Individuals within the organization who are directly affected by the innovation, for example, personnel responsible for making referrals to a new program or using a new work process.
6. Innovation Participants	Individuals served by the organization who participate in the innovation, for example, patients in a prevention program in a hospital.
1. Running	Carry out or carry out implementation according to plan.
D. Reflecting and Evaluating	Quantitative and qualitative feedback on the progress and quality of implementation, accompanied by a personal and team assessment of progress and experience.

Note: adapted from https://cfirguide.org/, 2022

for each regional hospital, and one reflecting the residents' focus group. As the study aimed to assess the organizational contexts of the hospitals receiving ONRPP, the memos were ultimately integrated into a consolidated comparative document offering a holistic analysis of how each construct shaped the internal implementation environment.

Ethical Considerations

This study followed the guidelines of CNS Resolution 466/2012 and received approval from the Aggeu Magalhães Institute Research Ethics Committee (CAAE: 09128919.8.0000). All participants provided informed consent prior to participation.

Results

Guided by the CFIR, this study explored the actions, beliefs, and lived experiences of key informants regarding the implementation of ONRPP in two reference hospitals for childbirth in the state of Pernambuco. The framework enabled the identification of central dimensions influencing program implementation, structured across its five domains.

The Context of the Research

In Brazil, the organizational strategy of health regionalization, established by the Unified Health System (SUS), aims to decentralize health actions and services by organizing them territorially. This territorial arrangement includes macroregions, health regions, and microregions, each playing a distinct role in structuring access and delivery of care.

Macroregions are broad territories that group together several health regions in order to ensure the availability of medium- and high-complexity services. Health regions are continuous geographic areas formed by clusters of neighboring municipalities that share cultural, economic, and social identities, in addition to transportation and communication infrastructure. Their purpose is to promote integrated health planning and service organization. At a more localized level, health microregions form the basis for planning and delivering primary care and medium-complexity outpatient and hospital services.

In the state of Pernambuco, the SUS is structured around four macroregions, twelve health regions, and eleven microregions. Figure 1 illustrates the distribution of health regions across the state.

The ONRPP program was created to train obstetric nurses for the comprehensive care of women, focusing particularly on the pregnancy and postpartum periods, and operates under a model that is both decentralized and regionally

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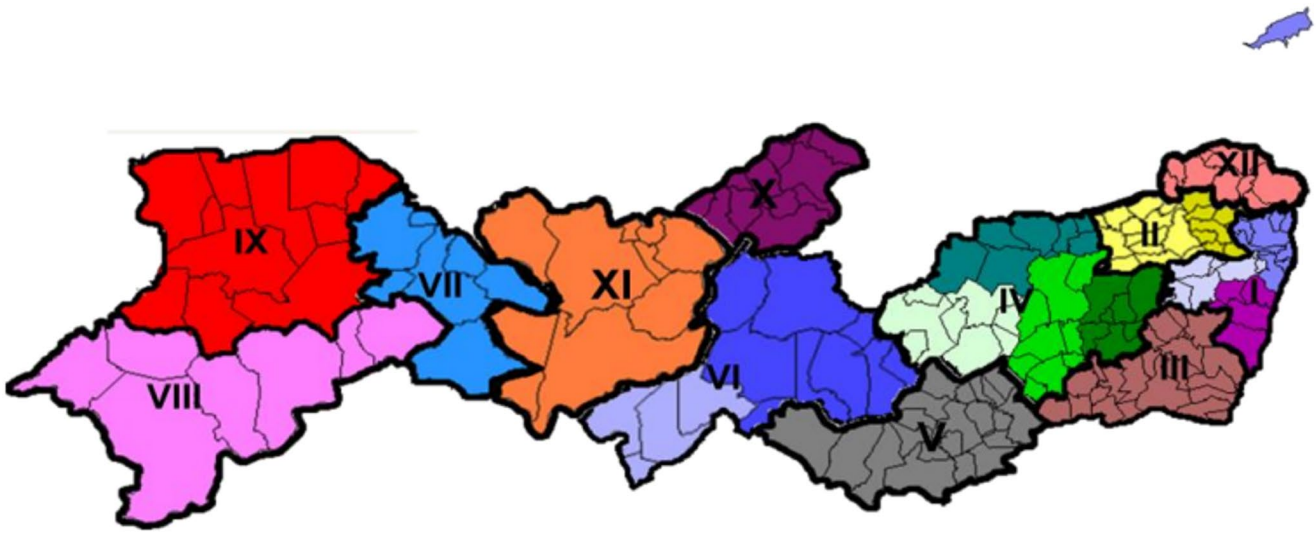

Fig. 1 Health Regions, Pernambuco. Note: From Plano Diretor de Regionalização – PDR/PE 2011 (Health Department of the State of Pernambuco, 2011). Available at https://portal-antigo.saude.pe.gov.br/documentos/secretaria-executiva-de-coordenacao-geral/plano-diretor-de-regionalizacao-2011

integrated. Its implementation spans four health regions in Pernambuco: IV, V, VI, and VII. This distribution aligns with the broader goals of regional health structuring by promoting the integration of educational and service-delivery processes across the state's interior.

Innovation Characteristics (CFIR Domain)

The first domain *innovation characteristics* examines the attributes of the intervention itself. ONRPP was developed not by local hospital teams but by the technical staff of the State Health Department (SES-PE) in collaboration with program coordinators. It is grounded in scientific evidence promoting best practices in childbirth care through the integration of obstetric nurses into maternity clinical teams.

However, key informants emphasized that local implementers, particularly hospital-based staff, were not involved in the program's design:

At no point during the implementation phase were we involved in anything. (Interviewee 01).

While the strength and quality of the evidence supporting the program were acknowledged by all stakeholders, especially SES-PE coordinators, the absence of early participation by frontline teams was seen as a limitation.

The program aimed to disseminate this new childbirth care model in the interior of the state, selecting hospitals based on criteria such as the number of births, structural readiness, and availability of experienced obstetric nurses. Following this selection, SES-PE issued the residency accreditation and funding notice, forwarding it to the Ministry of Health. Local hospital administrations were engaged only during the program's initial rollout (Fig. 2).

Importantly, the program demonstrated a clear relative advantage by fostering training experiences that brought residents into close collaboration with hospital teams, encouraging the adoption of more humanized practices:

(…) the needs that the girls had were met by the staff at the residence. (…) everyone was helpful, everyone helped, everyone never said no, they brought a lot of contribution, since it became a teaching hospital. (Interviewee 02).

The program's adaptability was also noted. For example, theoretical modules are delivered centrally at the HRDM unit (which offers superior infrastructure), and rotations are scheduled around partner availability and preceptor logistics. Despite this, some clinical staff expressed resistance, rooted in prevailing interventionist models of obstetric care.

A commonly cited barrier was the limited communication across program management levels, leading to confusion among regional hospital teams regarding program objectives, activities, and resident roles.

Moreover, the structural fragility of public maternity hospitals was identified as a constraint on implementation, particularly in adapting routines and physical resources. Additionally, several participants raised concerns about the absence of dedicated operational funding beyond stipends:

This is also a difficult factor for residency, for all residency in general, we only have scholarship funding. (Interviewee 03)

Outer Setting (CFIR Domain)

This domain focuses on the external context – the socioeconomic, political, and institutional conditions affecting the program. With regard to how hospitals identify and respond

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to patient needs, no systematic strategy was reported. Residents submit monthly reports to the general SES-PE coordination team, yet participants noted the lack of feedback or evidence of these reports informing improvements.

There was no indication of mimetic or competitive pressure – a typical external driver of innovation – since humanized childbirth care is not yet mainstreamed in Brazil. Additionally, the level of cosmopolitanism, understood as institutional exchange across hospitals, was low. Local coordinators were largely unaware of inter-institutional initiatives, and preceptors expressed a desire for more horizontal exchange:

We wanted to schedule visits to other hospitals. […] Sometimes there is a hospital in a big city that doesn't offer what we offer, and we'll also feel better and get ideas. (Interviewee 03).

One example of policy-level support was the inclusion of a preceptorship declaration in the State's Positions, Careers, and Salaries Plan (PCCV) for permanent staff. However, most preceptors do not hold permanent contracts, limiting the reach of this incentive.

Intervention Evnironment (CFIR Domain)

This domain refers to structural and cultural characteristics of the organizations where the program was implemented. Both hospitals studied function as regional references for childbirth care in Pernambuco. They are established institutions with the availability of obstetric nurses for preceptorship; however, they also present structural and material deficiencies that affect the quality of services. In both units, elements of an interventionist and cesarean-centric care model remain dominant in professional conduct, shaping the prevailing institutional culture.

Communication dynamics within the organizations were described as fragile. Informants pointed to considerable difficulties in the flow of information between local actors and SES-PE coordination. A systematic communication strategy was lacking, leading to misalignments in expectations and role clarity among stakeholders. Residents themselves acknowledged that the absence of dialogue undermined the effectiveness of the implementation process:

If we had effective communication, it would change our situation so much. Because then, I think that with simple communication between the hospital management and the nursing coordination and our coordination. If these preceptors had been prepared to receive us, it would make all the difference. And we see that a simple communication, a meeting with the preceptors, would solve so many things and yet it doesn't exist." (Resident 01),

Regarding the implementation climate, there was a perceived tension for change, particularly among program coordinators and preceptors. However, this perception was not uniformly shared across hospital teams. Nursing staff, especially those newer to the institution, were more receptive to the program's aims. In contrast, groups such as veteran nursing technicians were more resistant to innovation, viewing changes as challenges to long-established professional norms:

The nurses at our institution love change, it's clear to see. They welcome everything new that comes along very well. However, the team of nursing technicians, which is very old, the oldest ones in the institution, are more closed. Sometimes they perceive the change as an affront to their professional conduct. (Interviewee 02).

The program's compatibility with the hospitals' routine was recognized, yet its implementation was still seen as a low organizational priority. Structural conditions did not favor a learning environment. The absence of physical spaces for rest, professional discussion, or reflection hindered integration into daily workflows:

Sometimes they don't get, I don't know, a rest, a place for them, a place for them to debate, because there isn't one, now there isn't one for anyone, there isn't one for the doctor, there isn't one for the nursing staff. So much so that those from wing B stay here at this little table, those from D stay downstairs that I think they still have a sofa, but there isn't a small room where they can debate. (Interviewee 03).

Monitoring and feedback practices specific to the residency were not reported. Low access to information among preceptors and limited involvement of nursing coordinators, who face multiple competing responsibilities, indicated a weak learning climate. Engagement with the program appeared to be reactive rather than planned:

But what is the work that we do here with the residency, as coordination? Only when the boys ask for something… Because we know very little about the residence… but we ask if everything is ok down there, but that's it. I try to find out like this with our colleagues, to find out if they are having any difficulties, anyway, but for us to discuss something. (Interviewee 04)

Characteristics of Individuals (CFIR Domain)

This domain focuses on the individuals responsible for implementing the innovation. In this case, it includes clinical staff and especially preceptors who interact directly with residents. Across both hospitals, only a few preceptors demonstrated in-depth understanding of the program or active engagement with its pedagogical mission. Most accompanied residents only during specific shifts, reflecting a fragmented and often inconsistent mentorship experience.

Weaknesses in the preceptorship process were attributed to rotation of professionals, competing workload demands,

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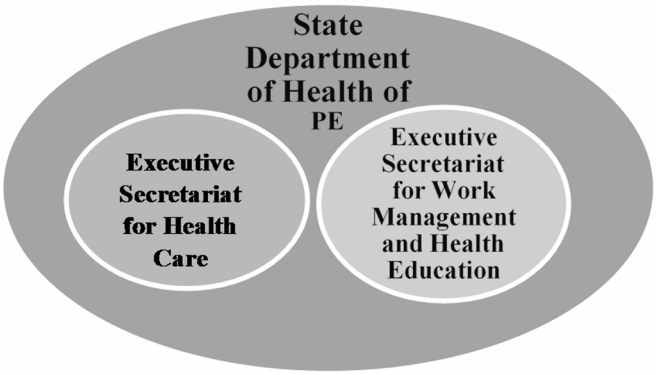
State context for encouraging the training and absorption of obstetric nurses

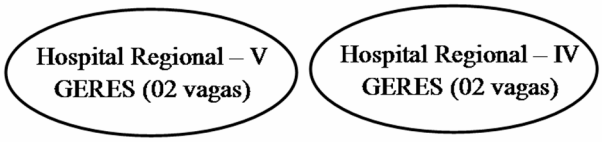
- Conducting a public competition with vacancies for obstetric nurses;
- Expansion of residency vacancies in women's health;
- Movement to decentralize and internalize training in obstetrics.

Program planning

2015



- Situational analysis (selection of hospitals among the eleven regional health departments located in the interior of the state): number of births, staff of effective obstetric nurses (preceptorship), installed capacity.



Approval
- ➔ Collegiate Forum of COREMU (ESPPE)
- ➔ CIR → CIB
- ➔ Promotion notice (MEC)

2016

Launch of notice for selection of residents and implementation of the program in regional hospitals of the II Macroregional Health of Pernambuco

- Local directories;
- Training with obstetric nurses (evidence-based birth care).

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Fig. 2 Flowchart of Implementation of ONRPP

and a lack of formal guidance. Residents reported heterogeneity in clinical encounters, alternating between supportive and outdated practices:

It depends on the team, it depends on the professional who is there on the day of the shift. And then you will find up-to-date professionals, who have up-to-date practices, and you will find old professionals who have not updated themselves. (Resident 02).

Perceptions of residents as inexperienced rather than as change agents were widespread. This belief perpetuated traditional practices and discouraged the adoption of evidence-based care:

The issue of recognition of residence here is very lacking. They don't see us as professionals who are there to transform the reality of those women. They see us as people who are there without experience, so that we have to perpetuate what they are doing. That is the right thing for us to perpetuate the mistakes they are making. So, everyone on duty acts precisely by teaching the wrong thing. So, if we are not residents who study and research what is right, we will perpetuate it too. (Resident 03).

Resistance among staff often stemmed from a lack of confidence or unfamiliarity with newer practices. Residents interpreted some behaviors as defensive, reinforcing the idea of low self-efficacy among preceptors:

You know what I notice? I notice that sometimes they are embarrassed to do some practice when we are around. And then what we change, I think it's more about that, they know they're going to be doing it wrong, so often when we're there in that place they either try to do it in a disguised way or they don't even do it. (Resident 04).

This perceived discomfort was especially pronounced when residents asked questions:

Or let's say, if the resident asks a lot, 'Wow, that resident will come and ask a lot.' Sometimes the professional is not prepared, so they feel embarrassed for not knowing. (Resident 05).

Despite these limitations, changes in obstetric care routines were reported. Residents noted progress in labour positioning, patient mobility, and the presence of a chosen companion, signalling shifts in institutional practices influenced by the residency:

I think we gained a lot in terms of freedom of movement during labour, position. That was a gain that I think was for the residence. Because we even see stories of older people who said that women had to stay in bed all the time and were restricted there. And we are the ones who bring this change and nowadays we see even old professionals encouraging women to walk, to walk, in short, to encourage this. And the question of the companion of choice too. (Resident 06)

Implementation Process (CFIR Domain)

This final domain considers the planning, execution, and management of the intervention. No systematic or sustained planning practices were reported among hospital actors. Implementation roles were largely assigned based on existing administrative responsibilities rather than voluntary involvement or strategic delegation.

Nursing teams and nursing technicians emerged as central to shaping peer engagement. While some staff facilitated program activities, resistance was more strongly associated with nursing technicians. Only one individual across both hospitals was clearly identified as an implementation leader, someone who displayed consistent commitment to the program. Still, examples of individual preceptors advocating for the program were present in both sites.

SES-PE coordinators acted as external change agents responsible for organizing academic activities, mitigating challenges, and mediating conflicts. However, their limited availability and competing duties diluted their ability to lead the implementation in practice. Across both units, the absence of a clearly communicated implementation plan and lack of systematic feedback loops was a notable gap.

The findings presented across these CFIR domains provide a detailed account of the factors that shape the implementation of ONRPP from the perspective of those most directly involved. Table 2 summarizes the key results of the study, organized by the CFIR constructs (2009 version), and identifies areas where program managers, policymakers, and administrators should focus efforts to support successful scaling and sustainability.

Discussion

The findings of this study reinforce the relevance of residency programs as strategic mechanisms to support the transition of newly graduated nurses into obstetric practice under the guidance of experienced professionals (Kesten & El-Banna, 2021). In the case of ONRPP, mentors in obstetric nursing were instrumental not only in supervising residents but also in shaping the program's planning and implementation.

Nurses have been internationally recognized as key agents in advancing healthcare quality, particularly in contexts marked by limited resources (Bvumbwe & Mtshali, 2018). Given that they comprise the largest segment of the health workforce, the incorporation of scientific evidence into nursing care practices is essential (Wu et al., 2018). However, research suggests that nurses are not always adequately prepared to apply Evidence-Based Practice (EBP), in part due to limitations in undergraduate education. A

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pedagogical hierarchy has been proposed for EBP teaching, in which interactive, clinically embedded learning opportunities are crucial, features commonly embedded in residency programs (Horntvedt et al., 2018).

Within this framework, obstetric nursing residency programs emerge as promising strategies to optimize human resources, improve access, and foster models of care grounded in best available evidence (Kesten & El-Banna, 2021). The instructional approaches adopted in such programs, particularly those based on interprofessional learning, have demonstrated positive impacts on patient outcomes and healthcare system costs (Fawaz et al., 2018). These findings align with preliminary evidence from this study, which suggests improved care quality and user satisfaction in the hospitals where ONRPP was implemented.

Collaborative learning has also proven effective in enhancing the training experience and developing interpersonal competencies among nursing postgraduates (Zhang & Cui, 2018). In this study, collaborative learning was evident in the sustained engagement between residents and multidisciplinary teams, a dynamic that resonates with recent educational reforms focused on promoting intra- and interprofessional teamwork in nursing (Zhang & Cui, 2018). These active learning environments foster skills critical to safe and effective care delivery, including clinical judgment, interdisciplinary communication, critical thinking, problem-solving, and team-based practice (Dearnley et al., 2018; Ward et al., 2018).

Nurses who have participated in EBP-focused programs report gaining practical strategies to translate evidence into practice (Wu et al., 2018). Such programs have also been linked to greater satisfaction and retention among newly hired nurses (Eckerson, 2018). Despite the promising nature of ONRPP, this study identified limited institutional support compared to other initiatives (Kesten & El-Banna, 2021). Notably, the absence of dedicated funding and administrative backing emerged as a key barrier, mirroring broader evidence that highlights financial constraints as one of the main obstacles to implementing EBP in clinical settings (Duncombe, 2018).

While scholarships represent a foundational incentive for participation (Horntvedt et al., 2018), broader organizational investment is needed to ensure sustainability. Prior studies emphasize that adequate infrastructure, consistent funding, and access to continuing education are critical enablers for effective program implementation in hospital settings (Hasanpoor et al., 2019; Sebastian et al., 2020).

Another significant challenge revealed by this study was the fragmentation of communication between implementers, decision-makers, and institutional partners – an issue also observed in other hospital-based implementation initiatives (Brody et al., 2019). Added to this is the persistent influence of the cesarean-centric model of care prevalent in Brazilian maternity hospitals. This hegemonic model contributed to resistance among some clinical staff, particularly nursing technicians, which residents perceived as rejection or lack of collaboration. Similar tensions between students, clinical educators, and peers have been widely reported in the literature as a key source of stress during clinical placements (Mathieson et al., 2019; McCarthy et al., 2018).

Team dynamics, especially the prevailing culture, interprofessional relationships, and degree of collaboration, play a pivotal role in shaping the implementation of programs like ONRPP. These factors have been identified in previous studies as both major barriers and critical facilitators (Hasanpoor et al., 2019). Although cultural change within clinical settings is often gradual, evidence suggests that supportive environments, encouraged by institutional, medical, and academic stakeholders, can drive the adoption of new standards of practice (Torrens et al., 2020). This highlights the need for continuous education and institutional engagement to reduce resistance and foster integration of programs such as the one evaluated here.

Persistent implementation barriers such as limited monitoring, insufficient evaluation practices, and time constraints for preceptors were also evidenced in this study. These factors have been similarly observed in other training initiatives (Tannenbaum et al., 2020), where the absence of structured follow-up mechanisms and lack of protected time for mentorship have negatively impacted fidelity and sustainability. Mathieson et al. (2019) stress the role of supportive strategies, including regular briefings, resource allocation, and managerial backing, in facilitating successful implementation, which was not consistently observed across the study settings.

Another significant challenge relates to the physical environment. Structural limitations and inadequate infrastructure, which restricted both pedagogical activities and the adoption of best practices in childbirth care, were evident. Comparable difficulties have been documented elsewhere, particularly in hospital environments with insufficient spatial and logistical accommodations for nursing development programs (Mathieson et al., 2019; Torrens et al., 2020). These limitations are especially prevalent in low- and middle-income contexts (Bvumbwe & Mtshali, 2018).

New residency programs inherently require changes in service workflows and redistribution of responsibilities. Yet, in this study, a widespread lack of clarity was observed regarding the role of residents and the quality of care they provide, an issue also identified in other newly implemented programs (Swan et al., 2023). Ambiguity regarding residents' clinical identity and contributions contributed to tensions within hospital teams, potentially undermining their integration.

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Table 2 Analysis of the implementation of the obstetric nursing residency program (PREO-ESPPE) according to the CFIR constructs

Innovation Characteristics	Strengths (Facilitators)	Challenges (Barriers)
B. Source of innovation		The program's provision by an external entity (SES-PE) created a disconnect between centralized planning and local execution, limiting the engagement of professionals working in the hospitals.
C. Evidence Strength and Quality	The program is considered well-founded in evidence-based practices.	
D. Relative advantage	Providing qualifications to work teams and encouraging changes in undesirable practices.	
E. Adaptability		Complicated by structural problems in regional hospitals
F. Testability	Not applicable. Research carried out post-implementation of the program.	
G. Complexity		The complexity of the implementation process does not derive from the nature of the training program, but rather from the resistance of the clinical staff to the practices it aims to promote.
G. Quality and Packaging Design		Lack of clarity about the organization of the program among interested parties.
I. Cost		Lack of specific financial resources to support the program. Financial support is only provided through scholarships to residents.
Exterior configuration		
B. Needs and Resources of those Served by the Organization		There are no established practices to capture patients' needs. In relation to residence, a monthly sector report is sent by residents, however no feedback of this material was mentioned.
C. Cosmopolitanism		No coordination movement between the hospitals receiving the program and other organizations was mentioned.
D. Peer pressure	Not applicable. The intervention was developed with the aim of improving professional training and ultimately improving health indicators.	
E. Foreign Policy and Incentives	The inclusion of preceptorships in the Position, Career, and Salary Plan (PCCV) for statutory employees is a positive development, as it recognizes the activity and can impact career progression.	However, most preceptors do not have permanent contracts, limiting the scope of this incentive. Furthermore, recognition does not translate into direct financial incentives, which represents a barrier to the appreciation and engagement of these professionals.
Internal environment		
B. Structural features	Regional reference hospitals	
C. Networks and Communications	.	Great difficulty in communication between actors working inside and outside hospitals
D. Culture		Cesarean and interventionist care culture prevails
E. Implementation Climate		Receptivity to the residence is more localized among the nursing team.
2. Tension for Change	Also associated with the nursing team.	
3. Compatibility	Activities integrated into service routines.	Only clashing with the cultural values of the work teams.
4. Relative Priority	.	Low priority in organizations as a whole
5. Organizational incentives and rewards	.	Insufficient incentives
6. Objectives and Feedback		There are no specific mechanisms established for the program.
7. Learning Climate		Referred among the nursing team.
F. Implementation readiness		They have not been established.
2. Leadership Engagement		Limited by the competition of demands delegated to nursing coordinators.
3. Available resources		No specific spaces designated for the program were mentioned.
4. Access to knowledge and information		Made difficult by fragility in networks and communications.
Characteristics of Individuals	**Results**	
2. Knowledge and Beliefs about Innovation		Few preceptors know the intervention in detail.
3. Self-efficacy		Outdatedness and insecurity among preceptors.
4. Individual Stage of Change	Promote the change of some unwanted practices.	

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Table 2 (continued)

Innovation Characteristics	Strengths (Facilitators)	Challenges (Barriers)
5. Individual Identification with Organization		It was not addressed.
6. Other personal attributes		High turnover of preceptors between shifts.
Process		
B. Planning		No practices were mentioned.
C. Engagement	The professionals who work in implementation are involved because they work as obstetric nurses in organizations.	
2. Opinion Leaders	Nurses and nursing technicians	
3. Formally Appointed Internal Implementation Leaders	Nursing coordination	
4. Champions	Some preceptors were identified	
5. External Change Agents	General and assistance coordination (SES-PE)	
6. The main stakeholders	Nursing team	
7. Innovation Participants	Residents and users of the service.	
2. Running	There is no clearly established plan.	
E. Reflecting and Evaluating		Despite the assistance and qualification changes promoted, the program is still seen as a low priority by organizations and requires a greater increase in human and financial resources for its full development.

Note: Main findings from the CFIR (2009 version)

Nevertheless, testimonies from ONRPP participants emphasized the program's transformative impact. Residents reported gains in knowledge, autonomy, and a stronger commitment to humanized obstetric care, findings that echo the outcomes of prior evaluations of nursing residency programs in Brazil (Silva et al., 2020). Interdisciplinary, evidence-based training initiatives have also shown measurable improvements in clinical competence and professional self-confidence in managing obstetric emergencies (Chung et al., 2021; Kozhimannil et al., 2015).

There remains a knowledge gap regarding best practices to prepare nurses for obstetric specialization. In this regard, further studies evaluating the implementation and performance of robust nursing residency programs are critical to enhancing the early careers of professionals entering this field (Levine, 2020).

This study employed the 2009 version of the Consolidated Framework for Implementation Research (CFIR) to analyze key facilitators and barriers to program implementation (Damschroder et al., 2009). Since then, the framework has undergone significant revisions, particularly in 2022, introducing refinements that expand its capacity to capture multilevel contextual influences. For instance, the *outer setting* domain now includes constructs related to legal frameworks and local attitudes; the *inner setting* was broadened to cover technology infrastructure and subdivided cultural aspects; and the *process* domain incorporated teamwork and needs assessment strategies (Benzer et al., 2013; Hsieh & Shannon, 2005).

Despite relying on the earlier version, this study benefited from CFIR's comprehensive taxonomy, which offered a robust structure for identifying implementation determinants. Although the framework remains underutilized in Brazil, some evaluations of health professional training programs have successfully adopted CFIR for guiding data extraction and analysis (Sebastian et al., 2020).

As Allchin et al. (2020) argue, implementation drivers are deeply interrelated and must be interpreted as part of a dynamic whole. Understanding the perceptions of different stakeholders, especially in real-world, resource-constrained environments – provides critical insight into the feasibility, acceptability, and sustainability of interventions like ONRPP. From this perspective, CFIR proved essential for mapping barriers and facilitators from the standpoint of coordinators, preceptors, and residents alike.

In light of the widespread expansion of nursing education programs across diverse socioeconomic and cultural contexts, the COVID-19 pandemic introduced significant disruptions and innovations in professional training. Distance learning modalities, though necessary, raised important questions about the development of clinical and relational competencies (Agu et al., 2021; Costa et al., 2020). Multiple adaptations were introduced into residency programs globally (Alsharaydeh et al., 2020), and early evidence suggests that residents played key roles in supporting service delivery innovations during the pandemic surge (Annis et al., 2020). These dynamics underscore the importance of continued

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investment in flexible, evidence-based residency models that prepare nurses to respond to evolving care challenges.

Finally, although this study offers in-depth insights into the implementation of a residency program in obstetric nursing in two regional hospitals in Pernambuco, certain methodological limitations should be acknowledged. As a qualitative, multi-case study, the findings are deeply contextual and shaped by the specific organizational cultures, resource configurations, and interpersonal dynamics of the selected sites. Therefore, while the study provides valuable analytical contributions, its findings are not statistically generalizable to all residency programs or institutional settings.

Additionally, due to time and logistical constraints, the coding process was conducted without the participation of an external validation panel or consensus techniques involving stakeholders. This may have limited the intersubjectivity of construct classification and the refinement of interpretations across all CFIR domains (Damschroder & Lowery, 2013). Moreover, the participants themselves – especially those unfamiliar with implementation science, may have had difficulty recognizing or articulating constructs embedded in the theoretical framework, despite these being included in the interview guide. This reflects both the novelty of CFIR in the Brazilian context and the lack of institutional support for implementation practices it seeks to capture (Squires et al., 2015).

It is also important to note that data collection was conducted in 2019, prior to the publication of the 2022 CFIR revision. As such, the updated framework's expanded domains, such as those involving local policy environments, digital infrastructure, and differentiated professional roles, were not considered in the design or analysis. This temporal gap may have limited the granularity with which contextual and individual-level variables were captured (Damschroder et al., 2022).

Despite these constraints, this research stands as a pioneering application of CFIR to the evaluation of obstetric nursing residency programs in Brazil. Its insights contribute meaningfully to the understanding of EBP implementation in structurally complex environments and reinforce the importance of investing in applied implementation frameworks in the national academic and healthcare landscape.

Conclusions

This study analyzed the implementation of the Obstetric Nursing Residency Program of Pernambuco (ONRPP), focusing on its facilitators and barriers from the perspective of program coordinators, preceptors, and residents. Grounded in the Consolidated Framework for Implementation Research (CFIR), the analysis revealed that, despite the high scientific legitimacy of the intervention, structural, organizational, and cultural constraints continue to challenge its integration into routine care.

Key facilitators included the evidence-based design of the program, the clinical commitment of residents, and the potential of collaborative learning to catalyze professional transformation. However, barriers such as limited infrastructure, weak communication between institutional actors, resistance to change among some staff, and the absence of clear feedback or monitoring mechanisms hindered deeper program integration.

The findings confirm that residency programs can serve as strategic vehicles for promoting humanized obstetric care and advancing evidence-based practice in nursing. Yet, their success depends on sustained political commitment, adequate funding, institutional coordination, and the strengthening of learning environments. The limited diffusion of implementation science concepts in Brazil, along with the underuse of frameworks like CFIR, points to the need for expanding academic and professional training in this area.

Future research should assess the longitudinal effects of residency programs on care quality and maternal health outcomes, especially in resource-limited settings. Comparative analyses across regions or implementation models may also offer valuable insights. This study contributes to a growing body of knowledge on the implementation of nursing education programs and reinforces the importance of aligning organizational readiness with pedagogical innovation.

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Declarations

Conflict of interests The authors have no relevant financial or non-financial interests to disclose.

Ethical approval This research complies with all ethical principles described in Resolution CNS 466/2012, it was approved by the Ethics Committee for Research with Human Beings of the Aggeu Magalhães Institute, obtaining CAAE: 09128919.8.0000. The procedures used in this study follow the principles of the Declaration of Helsinki

Informed consent form Informed consent was obtained from all individual participants included in the study.

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