NURSING DIAGNOSES IN INDIVIDUALS UNDERGOING PERCUTANEOUS CORONARY INTERVENTION: SCOPING REVIEW

Diagnósticos de enfermagem na pessoa submetida a intervenção coronária percutânea: *scoping review*

Diagnósticos de enfermería en personas sometidas a intervención coronaria percutánea: revisión exploratória

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ABSTRACT

Background: cardiovascular diseases cause approximately 19.8 million deaths per year. Percutaneous coronary intervention is the treatment of choice for acute coronary syndrome and coronary artery disease. **Objective**: to map the nursing diagnoses identified by nurses working in hemodynamic services in the care of patients undergoing percutaneous coronary intervention. **Methodology**: scoping review according to the guidelines of the JBI and PRISMA-ScR statement. The three-phase search was conducted in the Nursing & Allied Health Collection: Comprehensive, CINAHL, and MEDLINE databases, with no time restrictions. **Results**: three categories were identified: nursing diagnoses, theoretical models, and health indicators, covering the pre-, intra-, and post-procedure periods. Thirty-eight nursing diagnoses were identified, formulated according to the North American Nursing Diagnosis Association and the International Classification for Nursing Practice. These diagnoses contribute to physiological indicators, functionality, and adverse events/effects. **Conclusion**: this scoping review contributes to the advancement of knowledge regarding nursing diagnoses in the context of percutaneous coronary intervention. It is recommended that qualitative, quantitative correlational, and experimental studies be conducted to deepen the understanding, validation and impact of nursing diagnoses in this context.

Keywords: cardiac catheterization; nursing diagnosis; percutaneous coronary intervention; standardized nursing terminology

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RESUMO

Enquadramento: as doenças cardiovasculares causam cerca de 19,8 milhões de óbitos por ano. A intervenção coronária percutânea é o tratamento de eleição para o síndrome coronário agudo e para a doença arterial coronária. **Objetivo**: mapear os diagnósticos de enfermagem identificados pelos enfermeiros que atuam nos serviços de hemodinâmica no cuidado à pessoa submetida a intervenção coronária percutânea. **Metodologia**: scoping review segundo as orientações do JBI e do PRISMA-ScR statement. A pesquisa trifásica foi realizada nas bases de dados: Nursing & Allied Health Collection: Comprehensive, CINAHL e MEDLINE, sem restrição temporal. **Resultados**: foram identificadas três categorias: diagnósticos de enfermagem, modelos teóricos e indicadores em saúde, abrangendo os períodos pré, intra e pós procedimento. Identificaram-se 38 diagnósticos de enfermagem, formulados segundo a North American Nursing Diagnosis Association e a Classificação Internacional para a Prática de Enfermagem. Estes diagnósticos contribuem para indicadores fisiológicos, de funcionalidade e eventos/efeitos adversos. **Conclusão**: esta scoping review constitiu um contributo para o desenvolvimento do conhecimento dos diagnósticos de enfermagem no contexto da intervenção coronária percutânea. Recomenda-se, a realização de estudos qualitativos, quantitativos correlacionais e experimentais que aprofundem a compreensão, validação e impacto dos diagnósticos de enfermagem neste contexto.

Palavras-chave: cateterismo cardíaco; diagnóstico de enfermagem; intervenção coronária percutânea; terminologia padronizada em enfermagem

RESUMEN

Marco contextual: las enfermedades cardiovasculares causan alrededor de 19,8 millones de muertes al año. La intervención coronaria percutánea es el tratamiento de elecciõn para el síndrome coronario agudo y la enfermedad arterial coronaria. **Objetivo**: mapear los diagnósticos de enfermería identificados por los enfermeros que trabajan en los servicios de hemodinámica en la atención a personas sometidas a intervención coronaria percutánea. **Metodología**: revisión exploratoria según las directrices del JBI y la declaración PRISMA-ScR. La búsqueda en tres fases y se llevó a cabo en las bases de datos Nursing & Allied Health Collection: Comprehensive, CINAHL y MEDLINE, sin restricciones temporales. **Resultados**: se identificaron tres categorías: diagnósticos de enfermería, modelos teóricos e indicadores de salud, a lo largo del pre, intra y posprocedimiento. Se identificaron 38 diagnósticos de enfermería, formulados según la Asociación Norteamericana de Diagnósticos de Enfermería y la Clasificación Internacional para la Práctica de Enfermería. Estos diagnósticos de enfermería contribuyen a los indicadores fisiológicos, de funcionalidad y de eventos/efectos adversos. **Conclusión**: esta revisión exploratoria ha supuesto una contribución al desarrollo del conocimiento sobre los diagnósticos de enfermería en el contexto de la intervención coronaria percutânea. Se recomienda realizar estudios cualitativos, cuantitativos correlacionales y experimentales que profundicen en la comprensión, la validación y el impacto de los diagnósticos de enfermería en este contexto.

Palabras clave: cateterismo cardíaco; diagnóstico de enfermería; intervención coronaria percutánea; terminología estandarizada de enfermería

INTRODUCTION

Cardiovascular diseases are the leading cause of death worldwide, responsible for about 19.8 million deaths annually (World Health Organization, 2025). Among these, ischemic heart disease is notable, caused by reduced blood flow to the myocardium due to obstruction of the coronary arteries. This can result in acute myocardial infarction (AMI) when total obstruction occurs (Byrne et al., 2023). In Portugal in 2022, 5.5% of deaths were caused by ischemic heart disease and 3.2% by AMI (Instituto Nacional de Estatística, 2024).

Interventional cardiology has evolved considerably, and percutaneous coronary intervention (PCI) has become the treatment of choice for myocardial revascularization, with a success rate above 98% (Byrne et al., 2023; Feres et al., 2017). In 2023, 8,201 elective PCIs and 3,802 primary PCIs were performed in Portugal (Associação Portuguesa de Intervenção Cardiovascular, n.d.). The main associated complications include post-procedural infarction, stroke, bleeding, and contrast-induced nephropathy (Gomes et al., 2019).

Nursing consultations and the nursing process facilitate the organization and structuring of care. Implementing nursing interventions is associated with fewer complications, reduced anxiety and pain, shorter hospital stays, and higher levels of patient satisfaction (Valverde Bernal et al., 2023). According to Decree-Law No. 161/96 (1996), the nursing process consists of six phases, from identifying the problem to evaluating the care provided.

The use of classifications such as the International Classification for Nursing Practice (ICNP), North American Nursing Diagnosis Association (NANDA), Nursing Interventions Classification (NIC), and Nursing Outcomes Classification (NOC) support clinical reasoning and promote a structured nursing practice, allowing the systematic and evidence-based correlation of data, diagnoses, interventions, objectives, and outcomes. This approach enhances care quality, documentation, and the production of nursing-sensitive indicators (Bertocchi et al., 2023; Dal Sasso et al., 2013; International Council of Nurses [ICN], n.d.). Although they share the same goal, these classifications have conceptual and structural differences: ICNP integrates diagnoses, interventions, and outcomes in a single terminology, while NANDA, NIC, and NOC organize these elements into distinct but complementary classifications (Dal Sasso et al., 2013; ICN, n.d.).

According to the ICN, nursing diagnoses are clinical judgments made by nurses about human responses to health conditions or life processes, which may include physical, psychological, or transitional domains (ICN, n.d.).

The ability to identify, formulate, and name nursing diagnoses is a central step in care delivery, as it underpins clinical reasoning, decision-making, and the selection of the most appropriate interventions, ensuring coherence and integrity in the nursing process (Decree-Law No. 161/96, 1996; ICN, n.d.). Thus, a scoping review of the literature was conducted, showing that, in the field of interventional cardiology nursing, the scientific literature focuses on symptom management, complication prevention, health education, and the identification of both interventions and nursing-sensitive indicators (Kang et al., 2023; Naja et al., 2026; Rolley et al., 2009; Rolley et al., 2010). Despite these contributions, evidence summarization

on nursing diagnoses in the context of PCI remains limited.

Therefore, this scoping review aims to map the nursing diagnoses identified by nurses working in hemodynamics services in the care of patients undergoing PCI.

METHODOLOGICAL REVIEW PROCEDURES

Scoping review according to the method proposed by the JBI manual (Aromataris et al., 2024), following the assumptions proposed by Peters et al. (2020) and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR statement) (Tricco et al., 2018). The guiding question: What nursing diagnoses are identified by nurses working in hemodynamics services in the care of individuals undergoing PCI?

The protocol for this scoping review is registered in the Open Science Framework (osf.io/j3g5x) (Sá et al., 2024), and has been published (Sá et al., 2025).

A critical appraisal of the methodological quality of the studies included in this scoping review was not carried out, since its aim is to map and provide a comprehensive understanding of sources of evidence related to nursing diagnoses within the context of PCI, and not to assess the risk of bias or to synthesize evidence on effectiveness (Aromataris et al., 2024; Tricco et al., 2018).

Eligibility criteria

To defining the inclusion criteria, the mnemonic Population, Concept, and Context (PCC) and types of sources were used (Peters et al., 2020).

Participants

Studies including nurses who provide care in hemodynamics services were considered.

Concept

For this review, the concept considered was that of nursing diagnoses documented by nurses related to PCI, formulated with any internationally accepted classification (Herdman et al., 2021; ICN, n.d.).

Context

Hemodynamics services that perform PCI on adults aged 18 years or older, with no restrictions regarding gender or socioeconomic status.

Types of sources

Primary studies (quantitative, qualitative, and mixed methods), secondary reviews, opinion documents, institutional texts, editorials, theses, reports, and clinical trials were included.

Search strategy

The search strategy was organized into three distinct phases by the authors. In the first phase, Medical Subject Headings (MeSH), keywords, and the most recurring common/natural terms in the titles and abstracts of published articles on the topic and relevant to the research were identified. In the second phase, the following Boolean phrase was constructed: Nurses OR Nursing AND Nursing diagnosis OR Standardized Nursing Terminology OR Taxonomy OR Nursing diagnoses OR Nursing terminology AND Percutaneous Coronary Intervention OR Cardiac Catheterization OR Percutaneous Coronary Revascularizations OR Heart Catheterizations NOT child* OR pediatric OR neonatology. In the third phase, the actual search was carried out using search engines and databases with the structured Boolean phrase,

including analysis of the reference lists of all studies selected for inclusion in the scoping review, as recommended by Peters et al. (2020).

The search was conducted using the Nursing & Allied Health Collection: Comprehensive and CINAHL databases, both via EBSCOhost, and MEDLINE via PubMED, in November 2025, considering the specificities of each database for this review. Studies published in Portuguese, English, and Spanish were included, as the authors are proficient in these languages. No time restriction was applied.

Selection of sources of evidence

The selection of articles followed the phases: identification, selection, and inclusion. All identified results were imported into the Mendeley® reference manager and later exported to the Rayyan® digital tool. A pilot test was conducted with five studies to assess the percentage of agreement among reviewers regarding the eligibility criteria at each selection stage (title, abstract, and full text). Reviewers proceeded to the selection of sources of evidence when 100% agreement was achieved. Article selection involved reading the title, abstract, and full text. The reason for article exclusion is presented in the PRISMA-ScR flowchart (Page et al., 2021). This selection was performed independently by two reviewers, with disagreements resolved through discussion or, if necessary, by a third reviewer. An exclusion criterion related to language was applied. Articles that met all inclusion criteria continued to the data extraction phase.

Data extraction

Data extraction was performed independently by the authors, using a tool created in Microsoft Word® for this purpose, according to the guidelines proposed by the JBI manual and after a pilot test with three studies (Aromataris et al., 2024). After the pilot test, the authors agreed on the following criteria for the data extraction table: a) citation details (authors, year, and country); b) method (study design); and c) nursing diagnoses. Disagreements during the data extraction process were resolved with the involvement of a third reviewer.

Data analysis and presentation

Data were independently extracted using qualitative analysis strategies. After data extraction, the data were analyzed to identify patterns and recurring similarities among the different sources of evidence. These patterns were manually grouped into categories through an inductive process. Subsequently, a deductive approach was used to organize and interpret the identified categories in light of existing nursing theoretical models and classification systems (Dodd et al., 2018; Herdman et al., 2021; ICN, n.d.). The data were summarized and analyzed narratively and descriptively, allowing the richness of qualitative data to be preserved.

RESULTS

This section begins with the inclusion of the sources of evidence and their characteristics, followed by the presentation of the results according to the following categories: a) nursing diagnoses; b) theoretical models; and c) health indicators, which are developed in three stages: pre-, intra-, and post-procedure.

Inclusion of sources of evidence

A total of 39 sources of evidence were identified in three databases. After manually removing 11 duplicates, 28 sources of evidence remained for title

and abstract analysis, of which 20 were excluded. This was followed by the full-text reading of 8 sources of evidence, one of which was excluded for not meeting the inclusion criterion related to language. The search of the reference lists of the included studies did not result in the inclusion of new sources. In total, 7 sources of evidence were included (Figure 1).

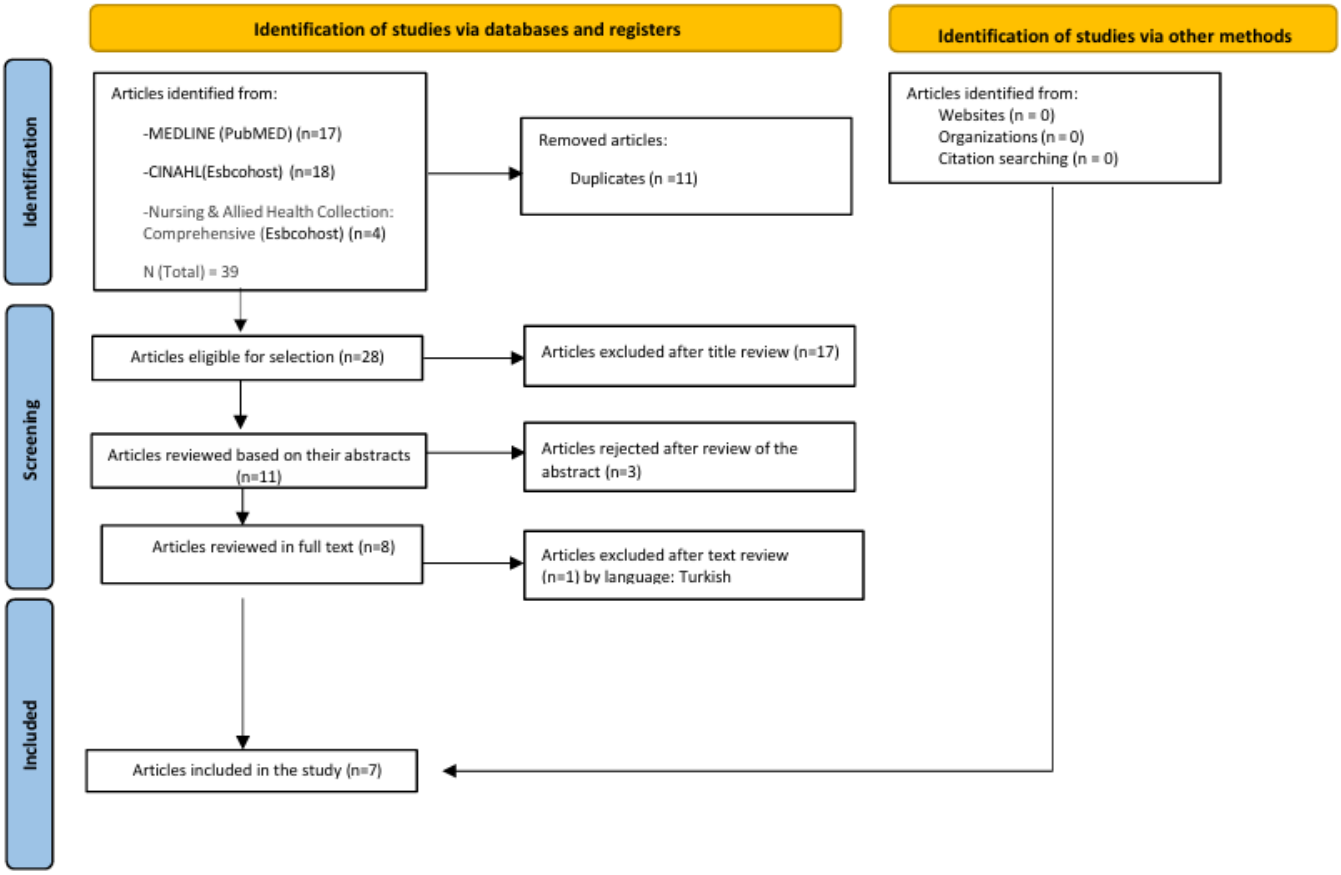

Figure 1

PRISMA-ScR *(Page et al., 2021)*

Characteristics of the sources of evidence

The seven sources of evidence included were published between 2006 and 2021, distributed across qualitative methodologies (Aquino et al., 2014; Chianca et al., 2006; Freitas & Oliveira, 2006; Lima et al., 2006; Vilamala et al., 2021; Zarrabeitia, 2016) and one integrative review (Gomes et al., 2019), from Brazil (Aquino et al., 2014; Chianca et al., 2006; Freitas & Oliveira, 2006; Gomes et al., 2019; Lima et al., 2006) and Spain (Vilamala et al., 2021; Zarrabeitia, 2016), showing a geographic concentration of scientific output on this topic. This distribution suggests limited representation of other sociocultural contexts, which may restrict the understanding of the diversity of nursing diagnoses.

The temporal distribution of the sources of evidence shows a scattered scientific output. The first set of publications appeared in 2006, followed by a period with no evidence until 2014, after which more regular publication occurred, with studies from 2016 to 2021. This pattern suggests a progressive and sustained interest in the topic over the past decade, although it

remains little explored in nursing research (Figure 2). Table 1 presents the data extracted for each of the sources of evidence, relating them to the study objective and research question.

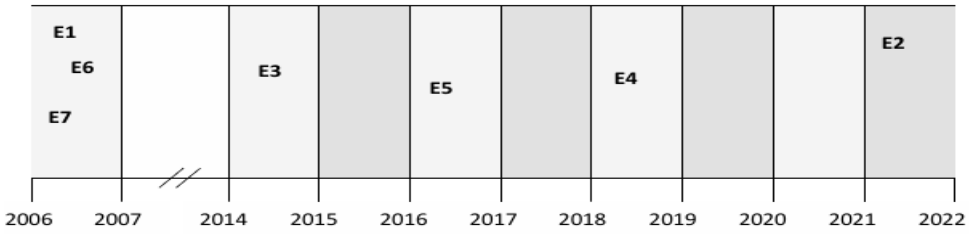

Figure 2

Temporal distribution of sources of evidence included in the scoping review

Table 1

Sources of evidence included in the scoping review

Sources of evidence (E)	Citation details/Method	Diagnoses
E1	Lima et al. (2006), Brazil Qualitative (Case study)	Impaired tissue integrity; Risk for infection; Acute pain; Impaired physical mobility; Bathing self-care deficit; Impaired urinary elimination; Deficient knowledge; Risk for injury; Ineffective health self-management; Risk for overweight; Anxiety; Fear; Disturbed sleep pattern; Ineffective peripheral tissue perfusion; Ineffective home maintenance behaviors; Situational low self-esteem; Hopelessness; Risk for loneliness; Risk for decreased cardiac output; Impaired skin integrity; Disturbed auditory sensory perception; Perceived health-seeking behavior;
E2	Vilamala et al. (2021), Spain Qualitative (Case study)	Decreased cardiac output; Risk for peripheral neurovascular dysfunction; Risk for infection; Anxiety; Risk for bleeding;
E3	Aquino et al. (2014), Brazil Qualitative (Descriptive study)	Impaired bed mobility; Risk for ineffective renal perfusion; Risk for adverse reaction to iodinated contrast media; Risk for ineffective peripheral tissue perfusion; Risk for infection; Risk for bleeding; Risk for impaired skin integrity; Acute pain; Impaired comfort;
E4	Gomes et al. (2019), Brazil Integrative literature review	Impaired urinary elimination; Ineffective breathing pattern; Risk for decreased cardiac tissue perfusion; Risk for ineffective cerebral tissue perfusion; Decreased cardiac output; Acute confusion; Impaired skin integrity; Impaired tissue integrity;
E5	Zarrabeitia (2016), Spain Qualitative (Case study)	Fear; Deficient knowledge; Risk for peripheral neurovascular dysfunction;
E6	Freitas e Oliveira (2006), Brazil Qualitative	Anxiety; Fear; Ineffective health maintenance behaviors; Interrupted family processes;
E7	Chianca et al. (2006), Brazil Qualitative (Case study)	Impaired tissue integrity; Risk for infection; Acute pain; Impaired physical mobility; Self-care deficit; Risk for injury;

Nursing diagnoses

In total, 38 nursing diagnoses were identified. Of these, 35 were formulated according to the NANDA taxonomy and 31 according to the ICNP terminology, with 28 being common to both classification systems (see Figure 3). The nursing diagnoses identified reflect the multidimensional nature of the care provided to people undergoing PCI and highlight the complexity of human responses to health conditions, life processes, and therapeutic interventions. Additionally, they cover clinical risk situations associated with the procedure, encompassing physiological, psychological, and behavioral dimensions.

Theoretical models

The nursing diagnoses identified in this review were supported by nursing models and theories (see Figure

3), namely: Orem's Self-Care Deficit Nursing Theory (Orem, 2001), Henderson's 14 Fundamental Needs Theory (Henderson, 1958), Marjory Gordon's 11 Functional Health Patterns Theory (Gordon, 1994), and the Roy Adaptation Model (Roy, 2011). The diversity of theoretical models identified demonstrates that nursing diagnoses can be understood through different conceptual perspectives. However, the absence of a predominant theoretical framework suggests heterogeneity in the foundation of care and in the structuring of nurses' critical thinking.

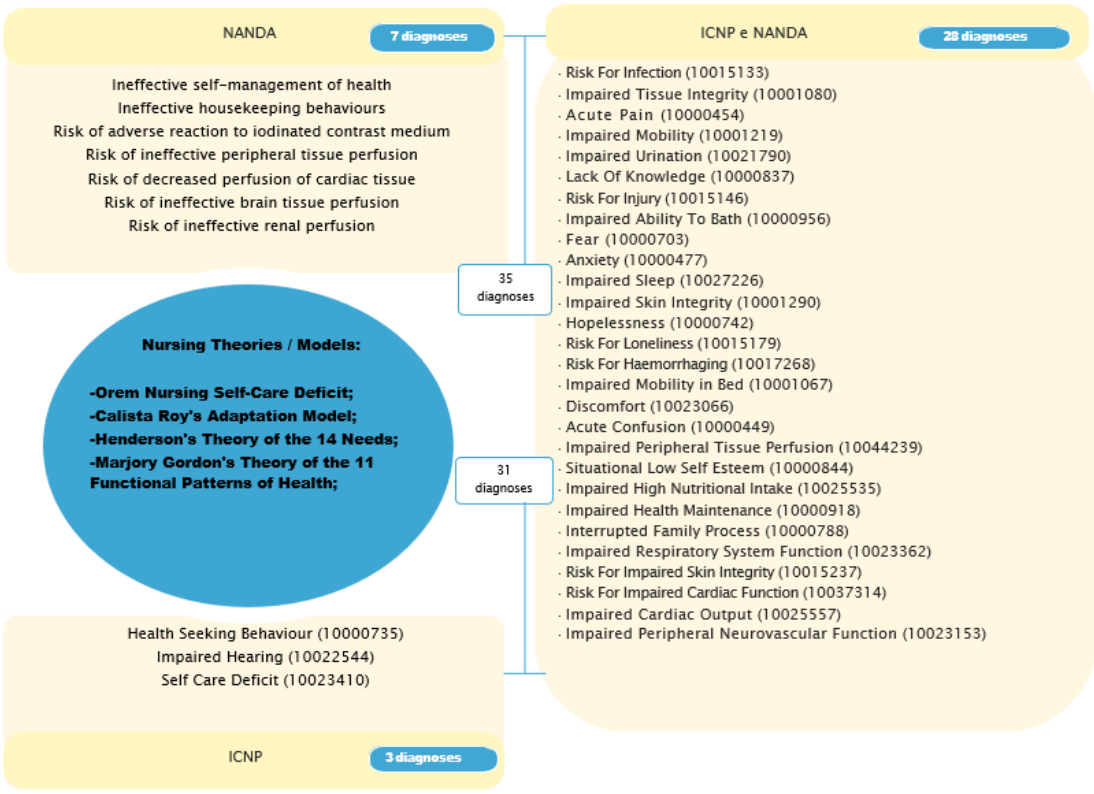

Figure 3

Nursing diagnoses and theoretical models

Health indicators

With reference to the taxonomy of health indicators developed by Dodd et al. (2018), it was possible to identify three domains associated with health indicators: a) physiological (e.g., impaired tissue integrity, acute pain); b) functionality (e.g., anxiety, fear); and c) events/adverse effects (e.g., risk of infection, risk of bleeding). These domains suggest a person-centered approach, simultaneously integrating clinical, functional, and psychosocial dimensions relevant to recovery and adaptation to the disease process.

DISCUSSION

The present discussion was divided into three parts in order to facilitate understanding of the results. The first focuses on the identified nursing diagnoses, the second on theoretical models, and the third on the relevance of health indicators associated with the diagnostic activities of nurses in the context of PCI.

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Nursing diagnoses

Regarding nursing diagnoses, the diagnosis "Risk of infection" stood out, appearing in four of the seven sources of evidence (Aquino et al., 2014; Chianca et al., 2006; Lima et al., 2006; Vilamala et al., 2021). Although infection is an uncommon complication in people undergoing PCI, it is associated with worsened prognosis and increased length of hospital stay (Chen et al., 2020).

Diagnoses beginning with the prefix "Risk" confirm a systematic and prudent approach, which is particularly relevant given potential complications of PCI such as post-procedure infarction, stroke, vascular complications, contrast-induced nephropathy, bleeding, or the need for urgent revascularization (Gomes et al., 2019).

Furthermore, it was possible to conduct an interpretative analysis of the mapped nursing diagnoses according to the ICN conceptualization, wherein nursing diagnoses reflect human responses that may involve bodily, psychological, or transitional dimensions (ICN, n.d.). From this perspective, a predominance of diagnoses associated with bodily processes was observed, especially related to the risk of complications and physiological changes, as well as the presence of psychological responses and those related to adaptation and health management (ICN, n.d.).

All seven included studies used the NANDA taxonomy to formulate diagnoses, which is internationally recognized as a structuring reference for diagnostic classification, conceptualizing the nursing diagnosis as a clinical judgment supported by the nurse's critical thinking in response to human reactions to health conditions or life processes, whether individual or collective (Herdman et al., 2021; Silva et al., 2019).

The literature suggests a consolidation of the NANDA taxonomy in the Brazilian context, where it is widely used in nursing education, research, and clinical practice (Santos et al., 2008). Accordingly, the predominance of included studies from Brazil and the absence of studies from other regions limits understanding of the international diversity of nurses' diagnostic activities in the context of PCI.

Despite its wide dissemination, the ICNP terminology was not identified in any of the analyzed studies, even though this classification was developed to standardize professional language for nursing diagnoses, interventions, and outcomes and to facilitate international comparison of these data (Figueira et al., 2018; ICN, n.d.).

The absence of ICNP-classified terminology in the included studies contributes to the fragmentation of nursing language, making it difficult to compare classification systems and consolidate an unified clinical language regardless of care setting (Bertocchi et al., 2023). This finding supports Figueira et al. (2018), which shows that the NANDA taxonomy remains more widely used internationally.

A comparison between the two reveals differences: ICNP terminology is more oriented toward prevention and the context of primary care, while the NANDA taxonomy is more centered on the hospital environment (Crivelaro et al., 2020; Moura et al., 2014).

Nevertheless, it was possible to establish correspondence between 31 of the identified diagnoses, demonstrating conceptual compatibility between the two classifications (Herdman et al., 2021;

ICN, n.d.). The diagnostic practice evidenced in the studies also shows that the nurse's intervention extends to different phases of the procedure, including the pre-PCI period, where the identification of emotional aspects such as fears, doubts, and expectations is essential for identifying emotional support needs (Gomes et al., 2019).

Theoretical models

The second part of this discussion refers to theoretical models that supported the formulation of nursing diagnoses, revealing the diversity and complementarity of the conceptual foundations used by the authors. One study used Orem's Self-Care Deficit Nursing Theory (Lima et al., 2006), while another used the Roy Adaptation Model (Freitas & Oliveira, 2006). In addition, two studies structured clinical assessment based on two different models: Henderson's 14 Fundamental Needs (Vilamala et al., 2021) and Gordon's 11 Functional Health Patterns (Zarrabeitia, 2016). These theoretical frameworks, coming from different schools of nursing thought, allow for a comprehensive assessment of the person's needs and strengthen the basis of the diagnoses formulated, resulting in more complete and robust clinical reasoning (Wayne, 2026). The heterogeneity of identified models reinforces that the nurse's critical thinking is structured in a dynamic relationship among focuses, diagnoses, interventions, and outcomes, supported by solid conceptual foundations (Dal Sasso et al., 2013).

Health indicators

The results of this scoping review also demonstrate that the identified nursing diagnoses serve as a foundation for the construction of health indicators, which are essential for monitoring the quality of health care (Brito-Brito et al., 2022; Dodd et al., 2018). These indicators cover domains such as adverse events, physiological outcomes, functionality, and quality of life (Brito-Brito et al., 2022; Dodd et al., 2018). The nurse's role proved decisive not only in preventing complications associated with PCI but also in promoting self-care, reducing cardiovascular risk, and improving psychological well-being, contributing to the reduction of anxiety, depression, and emotional burden, and thus promoting better quality of life (Zhang & Qi, 2021). Accordingly, nursing diagnoses emerge as central elements for achieving positive health outcomes, particularly in increasing patient satisfaction, improving health literacy, and strengthening health education and promotion (Zhang & Qi, 2021).

Thus, the articulation between diagnostic activity, theoretical models, and health indicators reinforces the central role of the nurse in ensuring safety, efficacy, and humanization of care in the context of PCI. Evidence-based practice, combined with structured classification systems and solid conceptual models, contributes to the continuous improvement of care quality.

Limitations

The main limitations of this scoping review are the restriction of the search to three databases, which may have affected the identification of potentially relevant sources of evidence. Additionally, the inclusion of sources written only in Portuguese, English, and Spanish may have contributed to the exclusion of evidence produced in other languages. Another important point to note is that the small number of included sources of evidence and their concentration

in only two countries are factors that limit the scope of the results obtained.

Finally, the predominance of qualitative studies restricts the methodological diversity of the evidence identified, preventing a comprehensive understanding of the frequency and distribution of nursing diagnoses in different populations undergoing percutaneous coronary intervention.

CONCLUSION

The completion of this scoping review made it possible to identify the following categories: nursing diagnoses, theoretical models, and health indicators. Thirty-eight nursing diagnoses were identified in the care of patients undergoing percutaneous coronary intervention, with a predominance of the NANDA taxonomy in their formulation, as well as the use of nursing theoretical models. Identification of the health indicator category highlights the direct contribution of nurses' diagnostic activity to achieving health outcomes, particularly in physiological indicators, functionality, and adverse events/effects.

This study contributed both to the development of knowledge and to the methodological advancement associated with nursing diagnoses in the context of PCI by organizing the evidence identified in the existing literature into categories. As an innovative contribution, this study integrates and categorizes the identified diagnoses, linking them with nursing theoretical models and health indicators, which allows for a more structured and comprehensive understanding of the available evidence. Gaps in knowledge production and publication are identified, as evidenced by the small number of sources of evidence found. Additionally, gaps are observed at the contextual level, as the analyzed sources of evidence are concentrated in only two specific contexts, which may limit the transferability of the results to other contexts and populations.

It is recommended that qualitative, quantitative correlational, and experimental studies be conducted to deepen the understanding and validation of nursing diagnoses in this context, favoring the translation of knowledge into clinical practice and the strengthening of evidence-informed decision-making.

CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest, financial or personal, that could have affected the research, analysis, or conclusions presented in this manuscript.

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