Nursing Care for Patients Submitted to Coronary Transluminal Angioplasty: An Integrative Review

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Authors' contributions

This work was carried out in collaboration among all authors. Author GFC designed the study, performed data collection and analysis and wrote the protocol. Authors GFC, FSB, PHVS, INPM, LCO and TFSL wrote the first draft of the manuscript. Authors DMS, VMLPO and MCAN managed the analysis of the study. All authors read and approved the final manuscript.

Mini-review Article

ABSTRACT

Aims: To verify the scientific evidence in the literature about nursing care after coronary transluminal angioplasty, from 2005 to 2019.
Methodology: This is an Integrative Review, performed in the LILACS, MEDLINE and Google Scholar databases, including original and review articles, theses, dissertations and monographs published in Portuguese or English in the last 15 years (2005-2019). Data were collected using the Ursi's instrument and data analysis was carried out by the use Bardin's Content Analysis.
Results: 06 articles were found and two categories emerged: Nursing diagnoses after coronary transluminal angioplasty and Nursing interventions after coronary transluminal angioplasty. The

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nursing process should be carried out in its entirety so that the results of nursing care are effective and the improvement of the quality of the services provided is continuous.

Conclusion: it is concluded that nursing actions are beyond bedside care, as they also include management services of inputs and human resources.

1. INTRODUCTION

Currently, cardiovascular diseases are the main cause of death in Brazil and the world, and developing countries are responsible for about 80% of cases. These diseases bring with them negative repercussions to the economy and health systems of these countries that, in most cases, already face overload problems [1].

Acute ischemic heart disease is the main cause of morbidity and mortality in the group of cardiovascular diseases and primary angioplasty is the most effective strategy to reduce damage caused by this disease, preserve ventricular function and improve prognosis patients affected by ST-Segment Elevation Acute Myocardial Infarction (STEMI) [2].

The high incidence of cardiovascular events caused an increase in procedures performed in the hemodynamics sector, including revascularization of the compromised artery through percutaneous transluminal coronary angioplasty. Due to the need for intensive care for these patients in critical conditions and the use of highly technological devices, this complex sector lacks a highly competent team technically and scientifically, and able to deal with the most diverse situations. Among the professionals who work in this sector are the nurses [3].

Nursing practice is exercised based on a clinical and critical look that seeks to promote and restore the physical, psychological and social well-being of individuals, having in the care the essence of their exercise. For this, specific knowledge, skills and attitudes committed to ethics and respect for people and their entire set of beliefs and values are necessary [4]. Hemodynamic nurses play a fundamental role since their practice is not restricted to bedside care for patients, but also includes the entire management process-related and necessary for the operation of the service [3].

Given the importance of nursing in these services, the epidemiology of cardiovascular diseases, such as acute myocardial infarction, and the increase in the number of procedures performed, the research question arose: what is nursing care provided to patients undergoing coronary transluminal angioplasty? Thus, the aim of this study was to verify the scientific evidence existing in the literature on nursing care after coronary transluminal angioplasty, from 2005 to 2019.

2. METHODOLOGY

This is a descriptive research of type integrative review (IR) of the literature. IR is a method of reviewing the literature that arose with the need to incorporate into clinical practice the best existing scientific evidence from several studies conducted in a synthesized, systematized, orderly and broadly way [5].

IR has six steps that must be followed by the researcher to guarantee the methodological rigor that this type of review needs, which are: 1) definition of the research question; 2) sampling or searching in the literature; 3) data collection; 4) critical analysis of the included studies; 5) discussion of results; 6) presentation of the integrative review [6].

In the first stage, the research question was established: what is the scientific evidence on nursing care existing in the literature after coronary transluminal angioplasty? In the second stage, the researched databases were established, the inclusion and exclusion criteria adopted and thus the sample of the included studies was defined. The databases chosen were *Literatura Latino-Americana e do Caribe em Ciências da Saúde (LILACS)*, Medical Literature Analysis and Retrieval System Online (MEDLINE) and Google Scholar. The inclusion criteria were original and review articles, theses, dissertations and monographs published in Portuguese or English in the last 15 years (2005-2019) available in full, and exclusion criteria have been reports of experience, case report, manuals, books and studies that did not respond to the question of the research proposed. The searches were performed in the databases using the keywords "nursing care" and "angioplasty".

In the third stage, the use of the Ursi's validated instrument was used, adapted, for data collection and extraction of the most relevant information for the review [7]. In the fourth stage, for critical analysis of the studies, we chose to use Bradin's content analysis, which aims to analyze key points and list thematic categories for further discussion [8].

In this same stage, the evidence classification system used in other studies was adopted, characterized hierarchically according to the methodology used in the selected studies to determine the strength that evidence has: Level 1: evidence resulting from the meta-analysis of multiple controlled and randomized clinical studies; Level 2: evidence obtained in individual studies with experimental design; Level 3: evidence of quasi-experimental studies; Level 4: evidence of descriptive (non-experimental) studies or with qualitative approach; Level 5: evidence from case or experience reports; Level 6: evidence-based on expert opinions [6].

In the fifth stage, the results found were discussed in the light of the existing literature, as well as studies not included in this review, and finally, the integrative review was presented – sixth and last stage.

3. RESULTS AND DISCUSSION

With the use of the keywords was found, initially 20 articles in the LILACS database, 628 articles in the MEDLINE and 33.000 in Google Scholar. When applying the inclusion criteria, 13 articles remained in the LILACS, 63 in MEDLINE and 16.100 in Google Scholar. After reading the abstracts of the articles found, only 6 articles were selected for the final sample that was within the inclusion and exclusion criteria and answered the proposed guiding question, 2 of the LILACS, 1 from the MEDLINE and 3 of Google Scholar database.

After the selection and collection of the data, the studies were organized according to the database studied, author, year of publication, type of study, level of evidence and results, arranged below (Table 1).

Among the selected studies, all of them are classified as evidence level 4 since the design of the research is qualitative, five studies of review and one original study. It is observed that among the six studies, only one has been published in the last five years, two were published more than

five years ago and three were published more than ten years ago. Due to the difficulty of finding studies in the databases selected and dealing with the proposed theme, specifically, the time limit was enlarged for a 15-year cutout. Despite the scarcity, the presence of two Brazilian studies, both fruits of a master and a doctoral thesis, is emphasized.

The results of the selected studies were carefully analyzed and two thematic categories emerged: 1) Nursing diagnosis in patients post percutaneous transluminal coronary angioplasty; 2) Nursing interventions in patients post percutaneous transluminal coronary angioplasty. The studies that comprised this review and the emerging categories correspond to two stages of the nursing process – nursing diagnoses and nursing interventions. The nursing process is composed of five stages: history, nursing diagnoses, expected results, nursing prescriptions/interventions and evaluation [10].

The Systematization of Nursing Care allows nurses greater control over the health actions instituted because it is an organized method that favors the identification of clinical conditions presented by the patient, as well as the judgment critical of the best measure to be implemented. For this, it requires the determination of nursing diagnoses to plan the expected results and the care plan [11]. The nursing process should occur in pre, trans, and post-procedure. The adequate preparation of the patient preoperatively is essential to minimize anxiety and stress and thereby reduce the possibility of adverse events. Developing, organizing and standardizing patient care according to their individualities is a way to assist them fully [12].

The following are the highlighted thematic categories:

Category 1 - Nursing Diagnosis in patients post percutaneous transluminal coronary angioplasty.

The mean number of nursing diagnoses found per patient submitted to coronary angioplasty with stent placement in Paiva's study was 11, and the highest frequencies for risk of infection (100% of the cases analyzed) were evidenced; impaired dentition (96.1%); activity intolerance (96.1%); deficit in self-care for bath/hygiene and self-care deficit for intimate hygiene (76.5%); disturbed sleep pattern (74.5%); impaired ambulation (70.6%); impaired physical mobility and self-care deficit to dress/tidy up (68.6%);

impaired bed mobility (58.8%); and impaired transferability (54.9%) [13].

The author justifies the presence of such diagnoses due to invasive procedure factors, socioeconomic factors, hemodynamic repercussions, therapeutic need for rest and presence or removal of the femoral sheath on less than 6 hours, which makes it difficult to perform daily tasks [13].

For the diagnoses listed, 126 defining characteristics give support, of which the most frequent were electrocardiographic alterations reflecting arrhythmia or ischemia, absence of some teeth or complete absence, disabilities to perform hygiene, manipulate clothes, wash the body or part of the body, dry the body and get around, restricted movements, limitations imposed by the removal or presence of the sheath, awakening caused by others, etc. [13].

Nursing diagnoses evidenced here are following those of Lima, Pereira, and Chianca who also present others such as acute pain caused by the procedure, impaired tissue integrity, impaired urinary elimination, and control ineffective therapeutic regimen [14]. Sartori, Gaedke, Moreira, and Graeff also identified in the hemodynamic sector the predominant presence of the diagnosis risk of infection mainly for patients undergoing surgery, however, they also show a risk of bleeding, since complications with the site of puncture in catheterization are evident, risk of impaired cardiovascular function, impaired communication, risk of decreased cardiac perfusion, among others [15].
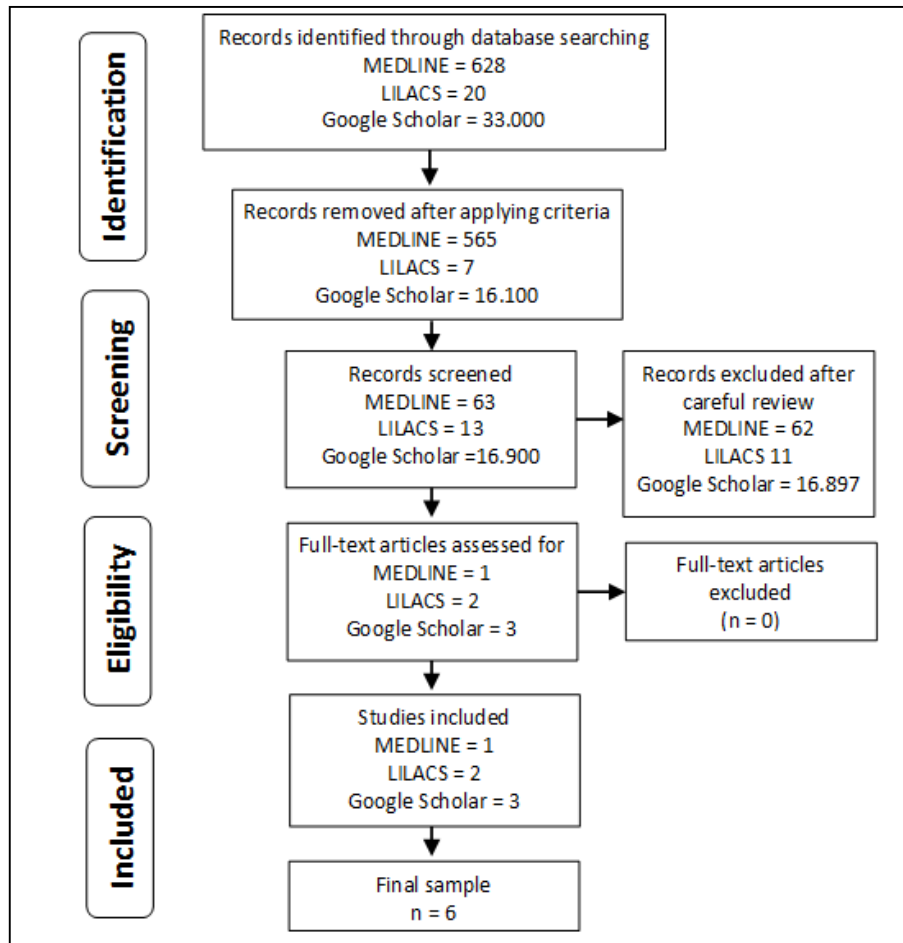

Fig. 1. Study selection flowchart based on the PRISMA recommendation* [9]. Belém, PA, Brazil, 2018
*PRISMA = Preferred Reporting Items for Systematic Reviews and Meta-Analyses

Table 1. The information collected from the sample and organized in tabulation, performed searches in September, Belém-PA. Brazil, 2019

Number, title, year and base	Authors	Type of study	Level of evidence	Results
1. Basic nursing care protocol for coronary transluminal post-angioplasty clients 2018 LILACS	Lima VCGS	Review Qualitative	Level 4	The main findings were grouped into three categories: 1) Care and complications after coronary transluminal angioplasty; 2) Basic care and comfort; 3) Health guidance and education.
2. Nursing Diagnoses in infarcted submitted to coronary angioplasty with stent 2007 LILACS	Paiva GDS.	Original Qualitative	Level 4	Performed with 51 patients submitted to angioplasty with stent placement, where 37 nursing diagnoses, 126 defining characteristics, and 52 related factors were identified.
3. Management of Patients After Percutaneous Coronary Interventions 2008 MEDLINE	Shoulders-Odom B.	Review Qualitative	Level 4	Addresses nursing management with the patient undergoing percutaneous coronary intervention and guidance to patients and family members after the procedure.
4. Coronary angioplasty: patient management and nursing care 2014 Google Scholar	Young S.	Review Qualitative	Level 4	It presents interventions such as Vascular closure devices (VCDs) use, antithrombotic therapy and hemodynamic monitoring.
5. Nursing clinical practice guidelines to improve care for people undergoing percutaneous coronary interventions 2011 Google Scholar	Rolley JX, Salamonson Y, Wensley C, Dennison CR, Davidson PM.	Review Qualitative	Level 4	The guidelines are presented in four categories: pre-procedural nursing practice, postprocedural nursing practice, post-percutaneous coronary interventions nursing practice, post-percutaneous coronary interventions secondary prevention practice.
6. Review of nursing care for patients undergoing percutaneous coronary intervention: a patient journey approach 2009 Google Scholar	Rolley JX, Davidson PM, Salamonson Y, Fernandez R, Dennison CR.	Review Qualitative	Level 4	Presents management after percutaneous coronary intervention.

Source: Authors' research, 2019

In a review of the literature, the most evident nursing diagnoses were: acute pain, risk of decreased cardiac output, impaired tissue perfusion and risk of deficient fluid volume. Other diagnoses of lower prevalence are mentioned in the study: impaired physical mobility, impaired skin integrity, self-care deficit for intimate hygiene, risk of (renal) injury, risk of infection and others [16].

In another study, it was found that nursing diagnoses were concentrated in the psychobiological category of Basic Human Needs (BHN) of Wanda Horta, with the risk of cardiovascular function impaired the most prevalent, followed by a risk of ineffective renal perfusion, risk of gastrointestinal perfusion, risk of intolerance to activity, risk of ineffective cerebral tissue perfusion, etc. [17]. These findings are in agreement with the results of other research showing the predominance of diagnoses in the category of psychobiological BHN, as well as the presence of diagnoses classified as psychosocial and psychospiritual BHN [18].

The author also draws attention to the updates of the NANDA II Taxonomy, which can cause a difference between the diagnoses established between different studies with a considerable temporal difference, either by name change or by the emergence of non-existent diagnoses previously the update [17].

Category 2 - Nursing Interventions in patients post percutaneous transluminal coronary angioplasty.

In a review of the literature [19] Lima founds as nursing interventions: observation of the vascular access point and care of sealing devices; hemodynamic and electrocardiogram monitoring for immediate recognition of cardiac tamponade; pulse oximetry; concern with insertion site and related complications such as active bleeding and hematomas; the maintenance of position in supine position, time for ambulation after removal of the introducer sheath and use of arterial occlusion devices are referred to as measures to prevent hematomas and bleeding, provided that offered assistance for ambulation and prevention of postural hypotension and vasovagal reactions and dressing displacement (in the femoral approach); adequate compression and guidance to avoid flexion in the radial approach of the procedure [19].

Shoulders-Odom's study use the electro-cardiogram (ECG) where 12 variations were indicated to detect possible ischemic events. It compare the current result with previous ones and inform the medical team in case of changes or chest pains. Regarding immediate removal of the sheath after the procedure, the author refers to the use of tourniquet at the puncture site for a gradual release of blood flow until the range of hemostasis, in order to reduce the risk of bleeding. In cases where the procedure is performed in an upper limb, the use of the affected arm to verify blood pressure is contraindicated by the risk mentioned above [20].

The use of Vascular Closure Devices (VCD) is used to reach hemostasis more quickly and perform ambulation earlier compared with the use of manual compression, can improve patient comfort, optimize nursing time and decrease the individual's hospitalization time. The use of these devices should be done by well-trained nursing staff as there are risks of infection and leg ischemia. Any hemodynamic changes such as lowering blood pressure or increasing pulse may be indicative of cardiac tamponade or bleeding [21].

Care such as measurement of vital signs and administration of anticoagulant medications, such as heparin, were related to a higher risk for the development of complications such as bleeding and bruising. The maintenance of venous and oral hydration, observing contraindications, and obtaining creatinine levels after 48 h can prevent contrast-induced nephropathy [19]. Nurses need to know which anticoagulant is being used as this may influence the access site bleeding and the risk of subsequent bleeding [21].

Clinical guidelines for nursing practice after percutaneous transluminal coronary angioplasty recommend monitoring of vital signs, continuous monitoring of ST-segment elevation, and 12-variation electrocardiogram and cardiac enzymes for patients with symptoms suggestive of myocardial ischemia or with complications during or after performing this type of procedure. Comprehensive assessment of the puncture site and limb circulation, as well as the patient's report of pain, tenderness, and orientation is considered the most effective method for detecting localized vascular complications such as bleeding, hematoma, swelling, bruising, and pseudoaneurysm. Monitoring of renal function

through fluid balance is critical in nursing care, patients with a history of renal failure or IV contrast sensitivity, diabetes and pacemakers undergoing primary percutaneous coronary intervention have a higher risk of developing renal failure [22].

Corroborating those studies found in this review, the measures and care actions mentioned in different studies include hemodynamic monitoring (vital signs), care and withdrawal of the introducer, performing the occlusive and compressive dressing on the puncture site, local compression techniques to favor hemostasis, observe bleeding or bruising, evaluate peripheral pulses, temperature, color, capillary filling, paresthesia, and punctured limb pain, absolute rest for an established time after procedure [23,24].

Vascular complications after coronary angioplasty are more likely to occur in elderly patients over 75 years of age, as well as in women with chronic renal failure, and people with low Body Mass Index (BMI). Most of the bleeding stemming is from an iatrogenic cause, mainly related to the choice of a femoral artery as an access route that, even so, is still considered the most effective and safe [25].

Pain management is indicated because virtually all patients experience pain and discomfort during sheath removal requiring individualized assessment. Hemostasis through manual pressure should be by constant digital compression at 1 cm above the puncture site for a time of 15 to 20 minutes until bleeding is stopped. In cases of mechanical devices, attention should be paid to the limitations of each device. Regarding the time of deabulation after sheath removal studies show that 3 hours is considered a safe time, but caution is recommended because there is heterogeneity between the methods employed in these studies [22].

Pain relief related to the use of the dressing and the removal of the femoral sheath and the promotion of comfort to the patient, such as early ambulation, are also indicated as one of the nursing interventions to these patients [19]. Taets outlines important measures for pain management: a comprehensive assessment that includes pain location, characteristic, onset, duration, frequency, quality, intensity, severity, and beginner factors, as well as observing

nonverbal pain indicators, ensuring analgesia, promoting sleep and adequate rest, decreased anxiety level and institute non-pharmacological measures for pain relief [16].

Other nursing interventions are related to guidance to the patient and family members on their health condition, the use of medications and modification of risk factors are present in both studies [19,20]. In a literature review, one of the most recurring issues found relates to the educational activity of nursing to patients, such as support for greater knowledge of the disease, education on prevention of disease progression and referrals to post-discharge rehabilitation services, such as secondary prevention programs for cardiac events [22]. Emphasis should be placed on recognizing the symptoms of acute myocardial infarction and the importance of seeking specialized care in the face of chest discomfort [26].

4. CONCLUSION

The nursing process should be carried out in its entirety so that the results of nursing care are effective and the improvement of the quality of the services provided is continuous. For this, nurses must make use of what is proper to their profession and makes it a scientific knowledge, guided by theories through a methodological and systematized process: the Systematization of Nursing Care.

Through this review, it is concluded that nursing actions are beyond bedside care, as they also include management services such as inputs and staff. It can also be concluded that there are still limitations regarding the studies produced specifically on nursing care with the patient submitted to coronary intervention because the studies found in the defined databases were few and some published more than ten years ago, which makes them questionable due to technological advances and also because they are mostly qualitative review studies which do not allow them to make generalizations and therefore have a low degree of recommendations given their levels of evidence. So, there is evidence of the need to produce more studies in the area, which present results that will impact the reality and quality of care.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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