ORIGINAL ARTICLE

REVISTA ENFERMAGEM ATUAL IN DERME

CLINICAL INDICATORS FOR DECREASED CARDIAC OUTPUT

INDICADORES CLÍNICOS DE DISMINUCIÓN DE PERFUSIÓN TISULAR CARDIACA

INDICADORES CLÍNICOS PARA PERFUSÃO TISSULAR CARDÍACA DIMINUÍDA

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ABSTRACT
Aim: to construct and evaluate clinical indicators for patients with decreased cardiac tissue perfusion. Method: this is a methodological study of construction and evaluation of clinical indicators. In the first stage, the theoretical pole, an integrative bibliographic review and survey was carried out with 34 nurses. The second stage, experimental, aimed to evaluate the content of the defining characteristics by 9 judges. In the analytical pole, the evaluation of the agreement of the judges was used, adopting the Content Validity Index >0.8. Results: 38 characteristics were constructed and 29 were evaluated in relation to their relevance, being discomfort or pain in the chest, left arm, shoulder, neck, back, jaw and gastric region, discomfort in the retrosternal region with sensation pressure, crushing or burning sensation radiating to the left side, shortness of breath, central and peripheral cyanosis, sweating, dizziness, fatigue, tachycardia, nausea and vomiting, palpitation, tachypnea, indigestion, hypotension, decreased capillary refill <3s, malaise being, cold and clammy skin, abnormal pathological heart sounds, increased mean arterial pressure, elevated cardiac markers, ischemic electrocardiogram changes, fear, anxiety, and stress. Conclusion: this study collaborates in the preposition of the definition of defining characteristics for the risk of decreased cardiac tissue perfusion.
Keywords: Nursing Diagnosis; Coronary Disease; Myocardial Infarction; Nursing Process; Signs and Symptoms.

RESUMEN
Objetivo: construir y evaluar indicadores clínicos para pacientes con perfusión tisular cardiaca disminuida. Método: se trata de un estudio metodológico de construcción y evaluación de indicadores clínicos. En la primera etapa, el polo teórico, se realizó una revisión bibliográfica integradora y encuesta con 34 enfermeras. La segunda etapa, experimental, tuvo como objetivo evaluar el contenido de las características definitorias por parte de 9 jueces. En el polo analítico, se utilizó la evaluación del acuerdo de los jueces, adoptando el Índice de Validez de Contenido >0,8. Resultados: se construyeron 38 características y se evaluaron 29 en relación a su relevancia, siendo malestar o dolor en el tórax, brazo izquierdo, hombro, cuello, espalda, mandíbula y región gástrica, malestar en la región retroesternal con sensación de presión, aplastamiento o ardor. sensación que irradia al lado izquierdo, dificultad para respirar, cianosis central y periférica, sudoración, mareos, fatiga, taquicardia, náuseas y vómitos, palpitaciones, taquipnea, indigestión, hipotensión, disminución del relleno capilar <3s, malestar general, piel fría y húmeda, sonidos cardíacos patológicos anormales, aumento de la presión arterial media, marcadores cardíacos elevados, cambios en el electrocardiograma isquémico, miedo, ansiedad y estrés. Conclusiones: este estudio colabora en la preposición de la definición de características definitorias para el riesgo de disminución de la perfusión del tejido cardíaco.
Palabras clave: Diagnóstico de Enfermería; Enfermedad Coronaria; Infarto del Miocárdio; Proceso de enfermeira; Signos y sintomas.

RESUMO
Objetivo: construir e avaliar indicadores clínicos para pacientes com perfusão tissular cardíaca diminuída. Método: trata-se de estudo metodológico de construção e avaliação de indicadores clínicos. Na primeira etapa, polo teórico, realizou-se revisão bibliográfica do tipo integrativa e sondagem com 34 enfermeiros. A segunda etapa, experimental, objetivou avaliar o conteúdo das características definidoras por 9 juízes. No polo analítico, utilizou-se a avaliação da concordância dos juízes, adotando o Índice de Validade de Conteúdo >0,8. Resultados: foram construídas 38 características e 29 foram avaliadas em relação a sua relevância, sendo o desconforto ou dor no tórax, no braço esquerdo, no ombro, no pescoço, nas costas, na mandíbula e na região gástrica, desconforto na região retroesternal com sensação de pressão, esmagamento ou queimação que irradia para o lado esquerdo, falta de ar, cianose central e periférica, sudorese, tontura, fadiga, taquicardia, náusea e vômito, palpitação, taquipneia, indigestão, hipotensão, enchimento capilar diminuído <3s, mal-estar, pele fria e úmida, sons cardíacos patológicos anormais, aumento da pressão arterial média, marcadores cardíacos elevados, alterações isquêmicas no eletrocardiograma, medo, ansiedade e estresse. Conclusão: este estudo colabora na prepositiva da definição de características definidoras para risco de perfusão tissular cardíaca diminuída.
Palavras-chave: Diagnóstico de Enfermagem; Doença das Coronárias; Infarto do Miocárdio; Processo de Enfermagem; Sinais e Sintomas.

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INTRODUCTION

The defining characteristics are the set of clinical indicators evidenced in the patient, which guide decision-making regarding diagnoses and, consequently, the planning of nursing interventions[1,2].

Different clinical indicators are associated with the condition of decreased cardiac tissue perfusion, such as pain or discomfort in the chest region or in other areas of the upper body, dyspnea, sweating and nausea, which are the main symptoms described in the literature[3-6].

Nursing diagnoses constructed through clinical reasoning and predictive interpretation of an individual's susceptibility to developing an undesirable human response assist in nurses' decision-making[1]. In order to achieve accuracy in the process of reliable diagnostic inference, clinical indicators, when interpreted correctly, allow greater precision in directing actions and prevent or delay serious complications, thus improving the quality of nursing care within the scope of clinical judgment[2,7].

The North American Nursing Diagnosis Association International, Inc. (NANDA-I) taxonomy consists of a standardized terminology for nursing diagnoses that aims to assess health problems, risk states, and readiness for health promotion. Although the diagnosis of decreased cardiac tissue perfusion is not described, in order to understand the severity of this clinical condition and the need to institute emergency measures, a summarized description of the defining characteristics associated with this condition is necessary[1]. This description helps to control the risk of decreased cardiac tissue perfusion, when the susceptibility condition evolves to a reduction in cardiac circulation (coronary artery disease), compromising the health status[1,8,9].

The decrease or interruption of blood flow in the coronary arteries interferes with myocardial tissue perfusion. This process occurs in individuals with coronary artery disease, with the main etiologies being atherosclerosis, coronary artery spasm, imbalance between oxygen supply and coronary thrombosis[8]. Furthermore, coronary diseases can manifest in a chronic form, which is stable angina, or as an acute coronary syndrome, which includes unstable angina and myocardial infarction[9].

Therefore, developing clinical reasoning and determining nursing diagnoses is still a challenge, especially with regard to the use of taxonomies. A facilitating strategy is to build, for nursing diagnoses, defining characteristics that are appropriate to the different scenarios. However, in order for the nurse to diagnose with greater accuracy during the execution of the nursing process, appropriate updates can be made to the NANDA-I taxonomy, contributing to improvements in diagnostic power and in the planning of interventions, promoting quality care.

Therefore, the objective of this study is to construct and evaluate clinical indicators in patients with decreased cardiac tissue perfusion.

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METHODOLOGY

This is a methodological study focused on the construction and evaluation of the defining characteristics for decreased cardiac tissue perfusion. The research was carried out from February 2022 to November 2022. To this end, the construction and validation process involved three stages: theoretical, experimental and analytical, according to the Pasquali model[10]. The first stage aimed to list the main clinical indicators related to decreased cardiac tissue perfusion and, for this, an integrative bibliographic review was first carried out. The search was carried out in PuBMed, the Virtual Health Library and the Latin American and Caribbean Health Sciences Databases (LILACS), Nursing Database (BDENF), Scientific Electronic Library Online (SciELO) and Medical Literature Analysis and Retrieval System Online (MED-LINE), with the aim of answering the following guiding question: What are the clinical indicators evidenced in patients with decreased cardiac perfusion?

The following keywords registered in the Health Sciences Subject Descriptors (DECs) and Medical Subject Headings (MESH) were used for the search: coronary disease, nursing diagnosis, nursing process, coronary care units, nursing care, cardiovascular nursing and coronary artery disease. The keywords were established after a thorough reading related to the topic investigated. As a search strategy, the association between the descriptors was performed, using the Boolean operators and and or, totaling 4 search engines (Table 1).

Table 1 - Database search strategy.

	DECS Descriptors	MESH Descriptors
PUBMED E BVS	Coronary artery disease or Coronary artery disease and Nursing diagnosis or Nursing process; Cardiovascular nursing and, Coronary artery disease or Coronary artery disease; Nursing care and Coronary artery disease or Coronary artery disease; Coronary care units and Nursing diagnosis or Nursing process.	Coronary disease or Coronary artery disease and Nursing diagnosis or Nursing process; Cardiovascular nursing and Coronary disease or Coronary artery disease; Nursing care and Coronary disease or coronary artery disease; Coronary care units and Coronary disease or Coronary artery disease.

The inclusion criteria were articles that addressed the main clinical findings presented in patients with decreased tissue perfusion between 2015 and 2022, in English, Portuguese and Spanish. Theses, dissertations, monographs and other review studies that did not have a meta-analysis or texts with a theme different from the one proposed and that did not meet the objectives of this study were excluded. The search and selection of articles in the databases were carried out independently by two researchers and occurred on the same day and time, using the same internet program. After the survey of articles, through the search engines and

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the established criteria, the articles that did not meet the criteria and those that were duplicates were eliminated, and the remaining articles were evaluated. After this selection stage was completed, the studies underwent a complete analysis, seeking to highlight the relevant information that would be compiled, in order to respond to the objectives of this review and highlight the main clinical indicators related to the theme of this study. The content validation model[11] was also adopted in this construction and analysis process, emphasizing the importance of the opinion of experienced nurses regarding the defining characteristics for the condition under study. Therefore, in the first stage, an approach was made with nurses who work in different hospitals of a study in the southeastern region of Brazil, through an online questionnaire on Google Form®, valuing the collective knowledge of the professionals involved in the practice. Thus, even though they were not experts in metatheory, but due to their diversity, independence and aggregation, they collaborated with the construction of the content[12]. Sampling was, for convenience, using the snowball recruitment model[13]. As an inclusion criterion, the professional should be a nurse, with experience in assisting cardiac patients in emergency or intensive care. A semi-structured questionnaire was used, which, in addition to the profile of the professional, questioned the main defining characteristics of the patients treated by him/her with the condition of decreased cardiac tissue perfusion. Then, a comparison and association of these indicators reported by the health professionals with those found in the literature was performed.

The second stage, the experimental stage, aimed to assess the content validity of the defining characteristics. Fifteen nurses, known as judges, were invited by email, with the following inclusion criteria: experience in caring for cardiac patients in emergency or intensive care units, stricto sensu postgraduate studies, experience in research and publications in the area, and must obtain at least 5 points in relation to the Fehring criterion.[11] The search for judges was carried out through the Lattes Curriculum platform. The content validation instrument was analyzed in relation to relevance, comprehensiveness and comprehensibility[14], highlighting for each of these attributes the degree to which these characteristics demonstrate the condition studied.

For the third stage, the analytical pole, the assessment of the degree of agreement between the judges was used, adopting the Content Validity Index (CVI), a weighted measure that assigns a linearly stronger weight when the judge believes in the adequacy of the question.14 To conclude this stage, each item was scored according to the Likert scale, considering the degree of importance for the composition of the questionnaire, as follows: 1 = Inadequate, 2 = Needs adaptation and 3 = Adequate. To calculate the IVC, the following formula was applied: IVC = ∑ responses ““3”/∑ responses. The number of judges should be greater than five, and items evaluated with an IVC lower than 0.8, in all items, should be

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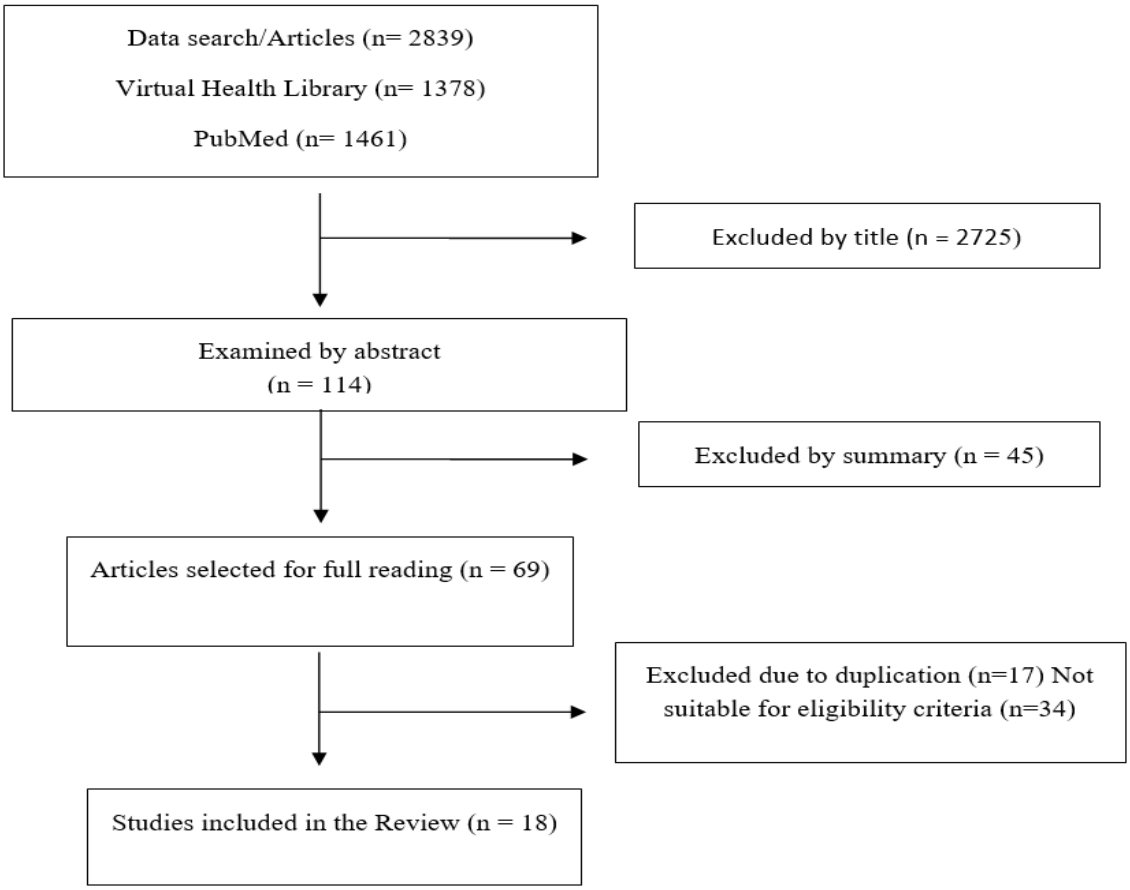
disregarded [10,15]. If the judge considered any item as "Inadequate" or "Needs adjustment", he/she should suggest improvements, as well as propose new activities. Items with IVC<0.8 in only one of the items were discussed by the researchers and underwent adjustments. This analysis was performed by seven judges, who were named J1...J9, according to the order in which they answered the validation questionnaire. After obtaining the final version, it was sent for grammatical review, with regard to cohesion, coherence and adequacy to the Portuguese language.

This study was registered on the Brasil platform (CAEE 2 32064720.8.0000.5060) and approved by the Ethics and Research Committee of the Health Sciences Center of the Federal University of Espírito Santo, under opinion number 4,136,350, following the recommendations of Resolution number 466/2012 of the National Health Council.

RESULTS

A total of 2,829 scientific papers were found, 1,378 of which were in the Virtual Health Library (LILACS, BDENF, SciELO and MED-LINE) and 1,451 in PubMed. Of these, 2,725 were excluded after title analysis, leaving 104 articles for abstract analysis. Sixty-nine articles were selected for full reading, of which 17 were excluded due to duplication and 24 did not meet the eligibility criteria. For this study, a total of 18 articles published between 2015 and 2020 were fully analyzed (Figure 1).

Figure 1 - Flowchart of inclusion and exclusion of scientific articles.



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The most prevalent clinical indicators in the articles were severe chest pain, which may radiate to the left arm, jaw, back or gastric region; dyspnea; nausea; vomiting; sweating; respiratory rales and crackles; increased heart rate and mean arterial pressure; ischemic changes in the electrocardiogram and elevated cardiac markers; dizziness; unusual fatigue; increased jugular venous pressure; central cyanosis; digital clubbing; abnormal pathological heart sounds; altered angiographic exams; palpitations; and indigestion and emotional complications, such as worry, fear, anxiety and stress.

In the theoretical pole, a questionnaire was also applied to approach the professionals, nurses, based on their professional experience, in order to list the main clinical indicators for the patient in the condition of decreased cardiac perfusion. Thirty-four nurses participated in this phase, the majority of whom were female (79.41%). Among the work sectors, 19 nurses worked in the emergency and urgency unit, 9 in the coronary care unit and 6 in the adult general intensive care unit; all had at least a lato sensu postgraduate degree and more than 2 years of experience in their current work sector. The characteristics listed by these professionals were grouped by frequency of repetition, namely: precordial pain (94%); peripheral cyanosis (88.23); hypotension (82.32%); tachycardia (70.56%); shortness of breath (67.62%); malaise (64.65%); sweating and fatigue (58.8%); bradycardia, slow capillary refill, hypothermia, cold and moist skin, thready pulse, tachypnea and dizziness (2.94%).

After these phases, a list was drawn up with all the clinical indicators listed in the literature review and by the professionals. By combining the indicators, it was evident that the signs and symptoms that appeared in both lists are: discomfort or pain in the chest, shortness of breath, central and peripheral cyanosis, sweating, dizziness, fatigue and tachycardia. The intensity in relation to the frequency of citations can be evidenced in the word cloud, in Figure 2, constructed after the associations of the indicators.

Figure 2 - Word cloud with combinations of clinical indicators

Source: Prepared by the authors.

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For the experimental pole, with the aim of evaluating the clinical indicators, a total of 9 judges participated, 8 of whom had a doctorate and 1 had a master's degree, with an average time of academic training in the nursing area ranging from 12 to 25 years. All of them had experience in scientific research and professional practice in the area of care in the emergency and urgency sectors, in intensive care or in the management of cardiac patients and with an average Fehring score11 of 10.4 points. For the analytical pole, the IVC calculation was applied, whose clinical indicators took into account the adequacy in relation to the relevance, scope and comprehensibility for the condition of decreased cardiac tissue perfusion, which are expressed in Table 1.

Table 1 - Content validity index, proposed by the judges, of the clinical indicators for decreased cardiac tissue perfusion. Vitória-ES, 2023

DEFINING CHARACTERISTICS	CALCULATION OF IVC*
Hypothermia	0,2
Respiratory wheezing	0,2
Respiratory rales	0,2
Digital clubbing	0,4
Altered angiographic exams	0,7
Hypoactivity	0,7
Bradycardia	0,7
Filiform pulse	0,7
Increased jugular venous pressure	0,7
Neck pain	0,8
Tachypnea	0,8
Central and peripheral cyanosis	0,8
Indigestion	0,8
Hypotension	0,8
Tachycardia	0,8
Decreased capillary refill <3s	0,8
Increased mean arterial pressure	0,8

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DEFINING CHARACTERISTICS	CALCULATION OF IVC*
Fear	0,8
Chest discomfort or pain	1
Discomfort in the retrosternal region, with a sensation of pressure, crushing or burning that radiates to the left side	1
Shoulder pain	1
Back pain	1
Pain in the left arm	1
Jaw pain	1
Pain in the gastric region	1
Palpitations	1
Nausea and vomiting	1
Sweating	1
Dizziness	1
Dyspnea	1
Fatigue	1
Discomfort	1
Cold and clammy skin	1
Pathological or abnormal heart sounds	1
Elevated cardiac markers	1
Ischemic changes on the electrocardiogram	1
Anxiety	1
Stress	1

* IVC: Content Validity Index.
Source: Prepared by the authors.

The clinical indicators that obtained a CVI score lower than 0.8 and were disregarded, in ascending order, are: hypothermia, respiratory wheezing, respiratory rales, digital clubbing, altered angiographic exams, hypoactivity, bradycardia, thready pulse and increased jugular venous pressure.

As a suggestion for adaptation, there was an accepted change in the description of the clinical indicator slow capillary refill to

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decreased capillary refill <3s. Regarding the physical nursing examination, J5 suggested including adventitious lung sounds instead of wheezing and respiratory rales, since the nursing assistant may have difficulty classifying the sounds. Regarding increased jugular venous pressure, J4 reported that it is unusual, and J7 claimed that it is difficult to verify this sign in clinical practice. In the clinical and laboratory exams, judges J1 and J7 suggested removing the indicator related to altered angiographic exams, due to the lack of resources and the difficult access to this clinical exam by the nursing professional.

In the emotional conditions, none of these defining characteristics found were excluded by the CVI calculation; however, J6 suggested that the fear symptom needs to be better characterized to be associated with the diagnosis researched. Thus, of the 38 defining characteristics constructed, 29 were evaluated as pertinent to the condition of decreased cardiac tissue perfusion, with the appropriate semantic adjustments suggested.

DISCUSSION

This study demonstrated the evaluation of the content of clinical indicators, based on a literature review, the collective knowledge of professionals working in the healthcare area, and the assessment of expert judges in the area, factors that contribute to adapting to the reality that nurses encounter in their daily clinical practice. It is essential that the Nursing Diagnostic Taxonomy includes clinical judgment and clinical indicators for patients with decreased cardiac tissue perfusion, making clinical reasoning and decision-making assertive[16].

The main clinical indicator for decreased cardiac tissue perfusion found was chest discomfort or pain, which emphasizes the importance of nurses being aware of this symptom and instituting immediate intervention measures, such as the chest pain protocol and mobilizing the team for immediate care. Effective, multidisciplinary care, respecting the needle and/or balloon holder time, is crucial for patient prognosis and management of myocardial infarction conditions[17,18].

A study conducted with individuals from Europe, Southern Africa and China highlights that despite the different clinical manifestations associated with ethnicity and other intrinsic factors, the classic presentation in patients with coronary artery disease or acute coronary syndrome includes intense or moderate pain or discomfort in the retrosternal region in the majority[19], reinforcing the results presented and the need to pay attention to the patient's manifestations.

Chest discomfort can radiate to other upper regions of the body, such as the neck, jaw, arms, shoulders, back and epigastric region. This reflects the common origin of the sensory neurons that supply the heart and these areas from the posterior horn of the spinal cord[18]. It is worth noting that, even though it is the most recurrent symptom, retrosternal pain may be

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absent in approximately one third of cases in patients with acute coronary syndrome[6,20].

Clinical indicators, which include signs and symptoms, are correlated, and it is uncommon to find them isolated in patients with decreased cardiac tissue perfusion. The stimulus of severe retrosternal pain with or without irradiation involves the neurological system, which induces the release of hormones such as adrenaline, cortisol, noradrenaline, among others. In addition, there is hyperactivity of the sympathetic nervous system, leading the individual to develop tachypnea, sweating, and tachycardia[2,18,21]. Nausea and vomiting were not reported by professionals; these are considered atypical signs and symptoms of myocardial ischemia, which may occur due to reflex stimulation of the vomiting center by pain or due to vasovagal reflexes[18]. Fatigue may also be associated with pain and emotional complications, such as anxiety[18,22].

In addition to these signs and symptoms, coronary artery disease patients may present low self-esteem, stress, and anxiety, as the disease requires a regulated lifestyle based on diet, physical activity, and continuous use of various medications[23]. Furthermore, these psychosocial factors, when not treated correctly, may be the cause of the emergence or intensification of other defining characteristics, especially those associated with the fear of dying. Therefore, in clinical practice, all this information is important so that the nursing team can implement relief measures for the clinical manifestations found[24].

With regard to clinical indicators related to the cardiorespiratory systems, dyspnea was the second most frequently found defining characteristic in the results of this study. This indicator may be related to the imbalance between the supply and demand of oxygen by the myocardium, and is considered a strong anginal equivalent with regard to the manifestations of myocardial ischemia[18,22]. Central and/or peripheral cyanosis may be associated with a decrease in the oxygenation status of hemoglobin[25].

Hypothermia, digital clubbing, and respiratory wheezing and rales were eliminated according to the analysis made by the judges. Cases of hypothermia occur more frequently in anesthetic-surgical procedures, trauma victims, and critically ill hospitalized patients[26]. When associated with anesthesia, cardiovascular disease is considered a risk factor for the development of hypothermia. In the postoperative period, inadvertent hypothermia can cause complications, such as myocardial events, and is therefore a causal factor and not an indicator per se[27].

No studies were found that prove the relationship between digital clubbing and decreased cardiac tissue perfusion, since, in relation to the condition of digital clubbing, there is no consensus on its pathophysiology, despite the association with changes in vascularization, chronic inflammation, and hypoxia, and it may be just an isolated manifestation or it may be part of a syndrome[28].

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Wheezing and respiratory rales are respectively the result of narrowing of the air passage in the tracheobronchial region and the collision of air with secretions in the alveoli, characteristics that are more related to individuals with respiratory system disorders or congestive alterations[2].

In clinical and laboratory examinations, in patients with suspected acute coronary syndrome, the 12-lead electrocardiogram is the first line of deliberate evaluation that will allow the assessment of acute ischemia in most cases related to precordial pain, accompanied, of course, by data collection directed at cardiovascular needs, and should be performed within a maximum of 10 minutes of the initial care[22,29]. Meanwhile, inflammatory biomarkers can be useful in discriminating patients with less typical symptoms of acute coronary syndrome. Increased levels of inflammatory markers cause the sensation of pain and are associated with a possible cardiovascular complication[30]. Professionals who know how to interpret the results of the patient's examinations can help prevent the occurrence of more serious manifestations. Decreased cardiac perfusion is directly associated with coronary heart disease and the development of myocardial infarction.

CONCLUSION

Through the construction and evaluation process described in this study, it is recommended, for the clinical condition of decreased cardiac tissue perfusion, attention to the following clinical indicators, now represented by signs and symptoms: discomfort or pain in the chest, left arm, shoulder, neck, back, jaw and gastric region, discomfort in the retrosternal region with a sensation of pressure, crushing or burning that radiates to the left side, shortness of breath, central and peripheral cyanosis, sweating, dizziness, fatigue, tachycardia, nausea and vomiting, palpitations, tachypnea, indigestion, hypotension, decreased capillary refill <3s, malaise, cold and clammy skin, abnormal pathological heart sounds, increased mean arterial pressure, elevated cardiac markers, ischemic changes in the electrocardiogram, fear, anxiety and stress. It is also worth noting that hypothermia, respiratory wheezing, respiratory rales, digital clubbing, hypoactivity, bradycardia, thready pulse, increased jugular venous pressure, and altered angiographic exams, despite being associated with decreased cardiac perfusion, are not initial priorities in data collection.

Therefore, this study contributes to the construction of defining characteristics for decreased cardiac tissue perfusion, highlighting 29 clinical indicators.

As a limitation of the study, it is worth noting that the clinical condition of decreased cardiac tissue perfusion was used to signal when the risk diagnosis is evolving into a real problem. It is worth noting that this study is not intended to propose a new nursing diagnosis, since the methodology used presents gaps for this purpose, but it will support the nursing professional in the nursing process for patients at risk for decreased cardiac tissue perfusion.

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All authors participated collectively in all of these contributions: 1. contributed substantially to the conception and/or planning of the study; 2. in obtaining, analyzing and/or interpreting the data; 3. as well as in the writing and/or critical review and final approval of the published version.

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