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Conceptual and operational definition of the components of the nursing diagnosis hypothermia (00006) in the perioperative period

Definição conceitual e operacional dos componentes do diagnóstico de enfermagem hipotermia (00006) no período perioperatório

Definición conceptual y operativa de los componentes del diagnóstico de enfermería de hipotermia (00006) en el período perioperatorio

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ABSTRACT

Objective: to construct the conceptual and operational definitions of the defining and conceptual characteristics of the related factors of the nursing diagnosis (ND) hypothermia (00006) of NANDA-I, 2015-2017, in adult patients in the perioperative period. **Method:** an integrative literature review in the Medical Literature Analysis and Retrieval System Online, Cochrane Library, The Cumulative Index to Nursing and Allied Health Literature and in Latin & American Literature in Health Sciences databases. **Results:** 2,041 articles were found, 95 selected for reading in full and 24 used to construct such definitions. Gay literature was also explored to ensure robustness to the elucidation of topics not found in articles. **Conclusion:** such definitions will assist nurses in surgical practice in information collection, in accurate determination of the referred ND, in teaching and in future research related to this theme, as well as in the next validation stages of such ND to the referred population.
Descriptors: Hypothermia; Validation Studies; Nursing Diagnosis; Perioperative Period; Review.

RESUMO

Objetivo: construir as definições conceituais e operacionais das características definidoras e conceituais dos fatores relacionados do Diagnóstico de Enfermagem (DE) Hipotermia (00006) da NANDA-I, versão 2015-2017, em pacientes adultos no perioperatório. **Método:** revisão integrativa da literatura nas bases de dados: *Medical Literature Analysis and Retrieval System Online* (MEDLINE via Pubmed), *Cochrane Library, The Cumulative Index to Nursing and Allied Health Literature* (CINAHL) *e Literatura Latino-Americana em Ciências da Saúde* (LILACS). **Resultados:** 2.041 artigos foram encontrados, 95 selecionadas para leitura na íntegra e 24 utilizadas na construção de tais definições. Foi explorada a literatura cinzenta para garantir robustez à elucidação dos tópicos não encontrados nos artigos. **Conclusão:** tais definições auxiliarão os enfermeiros da prática cirúrgica na coleta de informações, na determinação acurada do referido DE, no ensino e em pesquisas futuras relacionadas a esse tema, bem como nas próximas etapas de validação de tal DE à população referida.
Descritores: Hipotermia; Estudos de Validação; Diagnóstico de Enfermagem; Período Perioperatório; Revisão.

RESUMEN

Objetivo: construir las definiciones conceptuales y operativas de las características definitorias y conceptuales de los factores relacionados del Diagnóstico de Enfermería (DE) Hipotermia (00006) de NANDA-I, versión 2015-2017, en pacientes adultos en el período perioperatorio. **Método:** revisión integradora de la literatura en las bases de datos: MEDLINE vía Pubmed, Cochrane Library, CINAHL y LILACS. **Resultados:** se encontraron 2.041 artículos, 95 seleccionados para lectura íntegra y 24 utilizados en la construcción de dichas definiciones. Se exploró la literatura gris para garantizar la solidez de la elucidación de temas que no se encuentran en los artículos. **Conclusión:** dichas definiciones ayudarán al enfermero en la práctica quirúrgica en la recolección de información, en la determinación precisa de dicho DE, en la docencia y en futuras investigaciones relacionadas con este tema, así como en las próximas etapas de validación de dicho DE a la población referida.
Descriptores: Hipotermia; Estudios de Validación; Diagnóstico de Enfermería; Período Perioperatório; Revisión.

INTRODUCTION

The surgical experience involves three moments: the preoperative, intraoperative and/or intraoperative and anesthetic/postoperative recovery, thus constituting the perioperative period. In this context, nursing care should be based on the concepts of holistic, continuous, participatory, individualized, documented and assessed care[1].

Therefore, it is necessary to understand that surgical interventions alter the body's homeostasis, hydroelectrolytic balance, vital signs and body temperature, regardless of the surgical time, which will contribute to the risk of surgical complications in all interventions[2].

Hypothermia, a phenomenon explored in this study, is the reduction of core blood temperature below 36ºC[2,3-5] and is a surgical complication that has been the target of several national and international studies[6-11]. This can also be classified as unintentional (accidental) and therapeutic; the first - focus of this study - comes from several isolated or associated factors, such as excessive heat loss, inhibition of physiological thermoregulation or lack of adequate care for its prevention. Unintentional hypothermia can also be classified as mild (32°C to 35°C), moderate (30°C to 32°C) and severe (less than 30°C). Therapeutic hypothermia, also called "provoked", is consciously instituted by the medical and/or surgical team, aiming at treatment[5-6].

Hypothermia is also a recurrent physiological change among trauma victims, critically ill hospitalized patients and those undergoing anesthetic-surgical procedures, the focus of this investigation[2,5-6].

In the perioperative period, this condition usually occurs after anesthetic induction, since these pharmacological agents promote a decrease in metabolism and inhibition of thermal regulation. This change may also occur due to the type of surgery to which patients have undergone, as well as surgery length, making scientific research essential in terms of body temperature, especially in the study population[2-3,5-6,8].

Its incidence varies in literature between 4% and 90%[2,7,11], which may lead to an increase in morbidity rate, incidence of surgical site infection, cardiac demand and oxygenation in the presence of tremors, causing numerous discomforts and postoperative complications, in addition to impaired platelet function[2,6-8,11-13]. Thus, both unintentional hypothermia and therapy have important systemic effects, whether desired or adverse[2-3,11,14-15].

In this perspective, the operating room becomes a real challenge for the body[2-3,6,16], having to maintain temperatures of not less than 20º-23ºC according to the Association of Perioperative Registered Nurses (AORN) recommendations[17].

Knowing that hypothermia is frequent in the perioperative period, being one of the main complications found with this patients[8-9,17], team preparation by nurses becomes one of the best ways to decrease these rates. The management of this unit is a comprehensive part of its duties[11-12].

Thus, nurses should be able to identify risk factors for the development of hypothermia in the pre, intra and postoperative period[8-11], which, individually or together, can be controlled to ease morbidity and mortality of patients undergoing surgical procedures. The effects of this condition can be minimized and/or even avoided, contributing significantly to the unit dynamics, in addition to providing patient safety[6,9-10].

Considering these peculiarities, surgical patients are often exposed to a very cold environment, with little protection and, most importantly, with pharmacologically inhibited thermo-regulatory responses[3,6-9,12,18]. This culminates in hypothermia, which, even without offering a risk of death, may cause physiological suffering, prolong the stay in a Post-Anesthetic Care Unit (PACU), in addition to contributing to postoperative morbidity[8,11,19].

A study conducted in Brazil aiming to analyze the frequency of unintentional hypothermia in patients undergoing elective surgery in the perioperative period found that 50 patients (94.4%) had hypothermia in operating rooms, while 48 patients (94.1%) had hypothermia in PACUs[11].

Another study conducted in Brazil[7] found, together with 20 patients who underwent abdominal surgery lasting more than two hours, an average body temperature after surgery of 34.5°C and an average discharge from PACU of 35.7°C. Patients over 40 years old had an average of 1.0°C lower than the group below the end of surgery, and the group of patients under 70 kg also had a lower average temperature.

The theme was also the subject of a multicenter, cross-sectional study, carried out with adults in 24 hospitals in Beijing. The study showed an overall incidence of involuntary intraoperative hypothermia of 39.9%, and, when assessed with regard to surgical duration, found an incidence of 17.1% in operations with less than two hours of procedure and 44.8% % in operations with more than two hours[3].

That said, to offer individualized assistance directed to surgical patients' needs, it is necessary for nurses to use a nursing process (NP), whose objective is to organize the nursing service, ensuring professional autonomy through systematization of nursing actions[4].

NP consists of five interrelated, cyclical and non-linear steps that consist of research, nursing diagnosis (ND), planning, implementation and assessment, and application of each of these steps helps nurses in care organization and prioritization, forming habits of clinical reasoning[20]. In the surgical context, NP is called Systematization of Perioperative Nursing Care (SAEP)[21].

ND, the focus of this study, is the second stage of NP. Through ND, nurses will elaborate the clinical reasoning regarding the responses observed in patients, family or community[4,20].

Knowing that hypothermia is frequent in patients undergoing anesthetic-surgical procedures[2-3,10-11,16] and that ND allows nurses to trace scientific interventions through evidence raised from individuals' history[4], it is believed that constructing conceptual (CD) and operational (OD) definitions of the defining characteristics (DC) and conceptual of related factors (RF) will subsidize nurses through scientific knowledge to identify an ND that represents, in fact, the response presented by patients[22-23]. Associated with this, knowledge about such conceptual and operational definitions may also subsidize nursing teaching and in future research on the phenomenon studied.

In this context, it is necessary to study all elements that make up ND regarding its review and assessment in different populations for the scientific identification of accuracy, in order to contemplate the largest number of possible indicators and terms, facilitating its use by nurses in diverse populations and thus improving DC (signs and symptoms) and RF (contributing factors) commonly identified for ND[23-24].

Studies of this nature, proposed by nurses today, have sought to encompass all elements that comprise ND in specific populations so that ND can be based on evidence, capable of being generalized[20,23-24] and capable of being used by these professionals.

OBJECTIVE

To construct the conceptual and operational definitions of the defining and conceptual characteristics of the related factors of nursing diagnosis hypothermia (00006) of NANDA-I, 2015-2017, in adult patients in the perioperative period.

METHODS

This is an integrative review (IR), the first stage of the ND hypothermia (00006) of NANDA-I validation process in patients in operating rooms. To this end, the Preferred Reporting Items for Systematic Reviews and Meta-Analyzes (PRISMA) recommendations[25] were followed, comprising problem identification, research in the literature, assessment and selection, analysis and presentation.

The guiding questions for the development of this IR were: what is the clinical evidence of hypothermia found in patients undergoing anesthetic-surgical procedures? what are the contributing factors to hypothermia in patients undergoing anesthetic-surgical procedures?

A search was carried out between March 20 and April 24, 2018. The following descriptors were used for the referred databases: Medical subject Headings of US National Library of Medicine (MeSH Terms) for the Cochrane and Medical databases Literature Analysis and Retrieval System Online (Medline) via Pubmed; Health Sciences Descriptors (DeCS) for the Latin American & Caribbean Health Science Literature (LILACS); titles for The Cumulative Index to Nursing and Allied Health Literature (CINAHL).

Articles related to hypothermia in patients undergoing anesthetic-surgical procedure in the perioperative context and studies that addressed the topic of hypothermia as a main phenomenon, understood between 2007 and 2017, in English, Spanish, or Portuguese were included. Articles in editorial formats, letters to the reader, comments, previous notes and abstracts published in congresses were excluded from the scope of this study.

The articles were pre-selected by titles. Possession of national and international bibliographic material in the form of abstracts. An exploratory reading was started, followed by a detailed and reflective reading of the selected articles in an objective and impartial manner.

The data of all articles were organized in a table based on an instrument developed and validated in Brazil, listing authors, identification of the institution hosting the study, title, journal, country, language, year of publication, methodology, objective, and result[26].

Subsequently, these were classified into seven levels of evidence[27], which are: level I, evidence from systematic review or meta-analysis encompassing all relevant randomized controlled trials, controlled or from systematic reviews whose clinical trials had undergone randomization and control; level II, evidence from at least one well-defined, controlled randomized clinical trial; level III, evidence from an outlined and controlled study, however, not randomized; level IV, evidence from cohort or case control studies; level V, evidence of systematic review of descriptive and qualitative studies; level VI, evidence from a descriptive or qualitative study; level VII, evidence from the opinion of authorities or expert reports.

Ten of the 18 DC of hypothermia (00006) of NANDA-I[4], namely, "Increase in oxygen consumption", "Increase in metabolic rate"; "Cyanotic nail beds""Skin cool to touch"; "Slow capillary refill"; "Decrease in ventilation"; "Decrease in blood glucose level"; "Peripheral vasoconstriction"; "Accidental low body temperature"; "Low body temperature in injured adults", when used in full as controlled descriptors, they did not provide results, with the need to use uncontrolled descriptors such as oxygen consumption, metabolic rate, cyanosis, cool skin, capillary refill time, ventilation, blood glucose levels, vasoconstriction, low body temperature, injury.

The same process occurred with two of the 16 RF of hypothermia (00006)[4], namely: "Insufficient caregiver knowledge of hypothermia prevention" and "Insufficient supply of subcutaneous fat", using the following uncontrolled descriptors: knowledge; caregiver; hypothermia prevention; fat supply and subcutaneous fat.

All descriptors and or keywords raised and used from the 18 DC and 16 RF of the ND hypothermia (00006) of NANDA-I[4] were crossed with the terms hypothermia, definition, surgery and anesthesia according to the results obtained.

As it was not possible to construct all the conceptual and operational definitions of the components of hypothermia (00006), gray literature was explored only with IR article use, which carries unpublished literature. Then, a dictionary[28], four dissertations[24,26,29-30], six books[4,14-15,20,31-32], and five guidelines[17,21,25,33-34] were included. There was then a total of 16 items that supported developing the conceptual and operational definitions of the 18 DC and 16 RF of the hypothermia (00006) of the 2015-2017 version of NANDA-I.

The present study was submitted to the Research Ethics Committee of *Universidade Estadual de Campinas* (UNICAMP).

This study is the first stage of the NANDA-I validation study of hypothermia (00006), version 2015-2017, in patients undergoing anesthetic-surgical procedures in the perioperative context.

RESULTS

Figure 1 shows the informative flowchart of the phases that involved this IR. The conceptual and operational definitions of the components of hypothermia (00006) referring to the 2015-2017 version of NANDA-I constructed will be presented next.

Among the publication journals of the selected articles, 62.5% were from international journal and 37.5% from national journals.

Of these, 66.6% were in English, 29, 1.1% were in Portuguese and 4.1% were in Spanish; 29.1% were conducted in Brazil, 16.6% in the United Kingdom, 8.3% in China and in the USA, 4.1% in India, Colombia, Argentina, Spain, Austria, Switzerland, South Korea, Norway, and Asia.

Concerning the methodological design, studies varied between systematic vision (25%); observational studies (20.8%); cohort studies (12.5%); integrative review (8.3%); descriptive and qualitative studies (8.3%); descriptive and quantitative studies (8.3%); controlled without randomization (4.1%); ND validation (4.1%); non-experimental correlational (4.1%); experimental (4.1%).

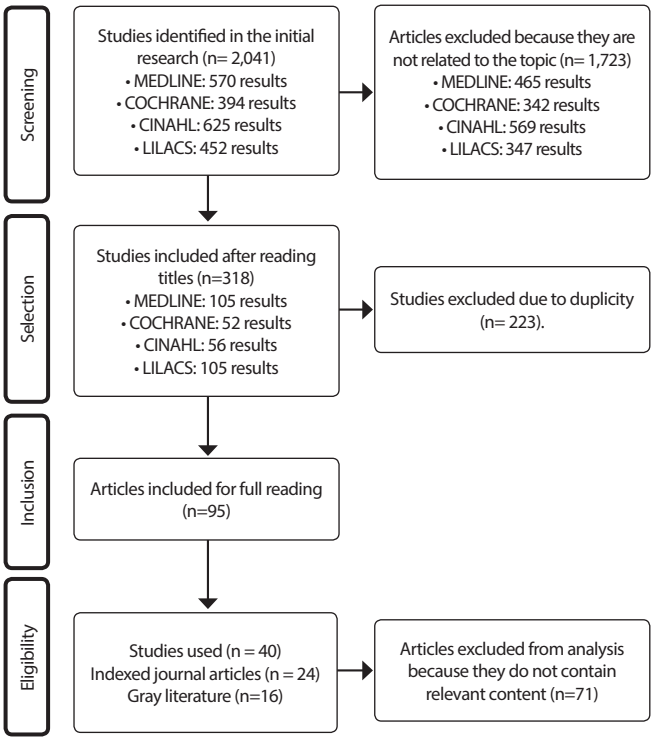

Figure 1 – Flowchart of the integrative review phases

Of these studies, 41.6% were revision and 58.3% clinical, with 58.3% conducted in the adult population and 8.3% in the pediatric population; 45.8% were developed during the perioperative period (pre, trans and postoperative), 41.6% of which referred to hypothermia and none to hypothermia (00006) itself.

However, only 20.8% of the studies had evidence level I and 4.1% evidence level II.

Charts 1 and 2 will be presented in sequence with the respective conceptual and operational definitions of CD (Chart 1) and conceptual definitions of RF (Chart 2) of hypothermia (00006).

Chart 1- Conceptual and operational definitions of the defining characteristics of the nursing diagnosis hypothermia (00006) of NANDA-I, 2018

Hypothermia (00006) definition Core body temperature below the normal diurnal range due to failure of thermoregulation[4]	
Defining Characteristics	**Description of the Conceptual Definition (CD) and Operational Definition (OD)**[26-50]
Acrocyanosis[31,35-36]	**CD:** functional peripheral vascular disorder, which refers to persistent abnormally deep blue or cyanotic discoloration of the skin in the extremities (hands and feet most commonly) due to decreased oxyhemoglobin[31,35-36]. **OD:** blue or cyanotic discoloration identified by the method of inspection of the nail beds of the nails, hands and feet of patients with the aid of a flashlight, if necessary[31,35].
Increase in oxygen consumption[14,30-31]	**CD:** increased oxygen capacity that an individual can use from inspired air during a certain exercise intensity (from a simple tremor to more intense exercises) that the body is exposed to[14,30-31]. **OD:** presence of tremors, sweating, skin cool to touch and pallor identified by observation and report of shivering patient[30-31].
Increase in metabolic rate[13-14,31,32,34,37]	**CD:** increased energy needs (quantity) to maintain basic vital processes such as: heart rate, blood pressure, breathing and maintaining body temperature[13-14,31-32,34,37]. OD: identification of 2 or more of the following signs: - change in blood pressure values (> 120/80 mmHg or <),- breathing (12 to 20 breaths per minute), heart rate (60 to 100 beats per minute), temperature (34.1º C to 37.8ºC), presence of tremors and sweating[32,34].
Bradycardia[33,38-39]	**CD:** heart rate dysfunction in which the heart rate (HR) is excessively low (usually less than 50 beats per minute) in adults[33,38-39]. **OD:** apical pulse auscultation, where the heart rate is below 50 bpm[31,33].
Accidental low body temperature[3-4,6,10-12,15,32]	**CD:** body temperature below 36º C, which occurs unintentionally, and may be due to prolonged exposure to environments whose temperature is far below a usual standard[3-4,6,10-12,15,32]. **OD:** temperature (axillary, rectal and/or tympanic) below 36ºC, obtained by using digital and or infrared thermometers[10-11,15,31-32].
Low body temperature in injured adults[4,6,14-15,39-40]	**CD:** decrease in body temperature (below 36º C) due to damage inflicted on the body as a direct or indirect result of an external force, with or without disruption of structural continuity[4,6,14-15,39-40]. **OD:** temperature (axillary, rectal and/or tympanic) below 36ºC, obtained by using digital and or infrared thermometers[14-15,31,39-40].
Shivering[5,24,39-40]	**CD:** sudden feeling of being cold, and may be accompanied by tremors and a feeling of cold[5,24,39-40]. **OD:** individuals' report of cold and observation of the presence of tremors[24,31,39].
Cyanotic nail beds[31,35-36]	**CD:** bluish discoloration of the nail beds due to the increase in the amount of deoxygenated hemoglobin in the blood or structural defect in the hemoglobin molecule[31,35-36]. **OD:** blue or cyanotic discoloration of the nail beds of the nails of the hands and feet of patients, identified by means of inspection with the aid of a flashlight, if necessary[31,35].
Hypertension[5,7,14,31,33]	**CD:** persistently high systemic blood pressure (systolic pressure > than 140 mmHg and diastolic pressure equal to or greater than 90 mmHg) based on several measurements[5,7,14,31,33]. **OD:** systolic blood pressure values above 140 mmHg and diastolic blood pressure above 90 mmHg, obtained by means of the technique of verification of palpatory/auscultatory blood pressure or by means of multiparameter devices[5,7,14,31,33].
Hypoglycemia[14,31,34,40-41]	**CD:** presence of low blood glucose levels, <70mg/dl[14,34,40-41]. **OD:** blood glucose value below 70 mg/dl to capillary glycemia or laboratory blood test[14,31,34,40-41].

To be continued

Chart 1 (concluded)

Hypothermia (00006) definition Core body temperature below the normal diurnal range due to failure of thermoregulation[4]	
Defining Characteristics	**Description of the Conceptual Definition (CD) and Operational Definition (OD)**[26-50]
Hypoxia[31-32,38,42]	**CD:** decrease in oxygen supply to tissues and cells that will influence cardiac autonomic modulation, being evaluated by spontaneous fluctuations in heart rate (usually reduction of oxygen supply) and reduction of partial arterial oxygen pressure (PaO_2) leading to decreased arterial oxygen saturation (SaO_2, below 85%)[(31-32,38,42)]. **OD:** dyspnea, fatigue, respiratory rate above 20 respiratory movements per minute with decreased breadth, presence of cytosis in extremities, agitation, mental confusion, in addition to decreased O_2 saturation, HR and blood pressure[31,38,42].
Skin cool to touch[5,14,28,31]	**CD:** decreased skin temperature obtained through palpation with the back of the fingers, indicating a reduction in arterial flow and energy production[5,14,28,31]. **OD:** pallor evidenced by inspection and coldness detected by the examiner upon contact with patients' skin using the back of one hand[5,14,31].
Piloerection[31-32,43-44]	**CD:** indicator of strong emotional experiences manifested by involuntary hair erecting or bristling[31-32,43-44]. **OD:** hair erection, observed by the examiner in the region of arms and forearms[31,44].
Slow capillary refill[5,14,31,42,45]	**CD:** slow refill (above three seconds) of the digitalis distal capillary bed to recover the basal perfusion (its color) after sufficient compression applied by the examiner to cause pallor (its bleaching), being one of the components of peripheral perfusion assessment[5,14,31,42,45]. **OD:** capillary refill time greater than three seconds obtained after compression caused by the examiner with the middle fingers and indicator in patients' digital pulps in order to cause pallor[5,31,45].
Decrease in ventilation[5,14,30-32]	**CD:** decrease in cellular oxygen supply to maintain the body's activities, which may lead to hypoxemia[5,14,30-32]. **OD:** O_2 saturation (SO_2) less than 85%, respiratory rate (RR) greater than 20 respiratory movements per minute, decreased pulmonary expandability and breadth evidenced by inspection and partial arterial oxygen pressure (PaO_2) below 60 mmHg, evidenced by blood gas results[30-32].
Decrease in blood glucose level[14,31,34,41]	**CD:** decrease below the normal content (90 mg/dl) of blood glucose rate[14,31,34,41]. **OD:** blood glucose value below 90 mg/dl, obtained by capillary glycemia or laboratory blood test[31,34].
Tachycardia[5,14,31-33,38]	**CD:** heart rate considered abnormally fast (above 100 beats per minute for adults)[5,14,31-33,38]. **OD:** rapid heart rate, above 100 bpm, obtained through apical auscultation[31-33].
Peripheral vasoconstriction[5,14,31-33,45]	**CD:** narrowing of the light of peripheral blood vessels (arteries, veins and capillaries) of the body by contraction of the vascular smooth muscle, being an integral process of thermoregulation[5,14,31-33,45]. **OD:** discoloration of the skin (pallor), increase in capillary refill time (above three seconds) and decreased temperature of the extremities of hands and feet, identified through inspection, as well as by contact with patients' skin using the back of one hand[31-33].

Chart 2- Conceptual definitions of the related factors of hypothermia (00006) of NANDA-I, 2018

Hypothermia (00006) definition Core body temperature below normal the diurnal range due to failure of thermoregulation[4]	
Related Factors	**Description of conceptual definition (CD)**
Pharmacological agent[8,14,28]	Any oral, parenteral or topical substance used to relieve symptoms and to treat or control a pathological process or to facilitate recovery from an injury.
Low environmental temperature [6,16-17,46]	Feeling of absence of an energy source that transmits heat, resulting from prolonged exposure to an environment whose temperature is well below a normal temperature usual (below 18°C).
Insufficient caregiver knowledge of hypothermia prevention[28]	Insufficient information on actions to eliminate or reduce the impact of low body temperature (below 36ºC) by people who provide care for those who need supervision or assistance in the state of illness or disability.
Alcohol consumption[14,28,47]	Consumption of alcoholic beverages that usually contains between 10 and 12 grams of ethanol in a dose (equivalent to a unit of pure alcohol) and does not harm individuals' health.
Damage to hypothalamus[5,28,32,43]	Complete loss or decrease in the qualities of the ventral part of the diencephalon that extends from the region of the optic chiasm to the caudal edge of the mammillary bodies, forming the lateral and inferior walls of the third ventricle.
Malnutrition[31-32,48-49]	The state of nutritional imbalance, resulting from insufficient intake of nutrients to meet the normal physiological needs where patients are slimmed down, usually due to lack of food or a consumptive disease. Nutrient deficiency that compromises individuals' adequate nutritional status.
Decrease in metabolic rate[32,34]	Decreased energy needs (quantity) to maintain basic vital processes such as heart rate, blood pressure, breathing and maintaining body temperature[13-14,31-32,34,37].
Economically disadvantaged[28]	People who find themselves in an underprivileged economic and social circumstance.
Extremes of age[28,31]	Age points very far from each other, neonates (1 to 28 days of life) and elderly (over 60 years).
Extremes of weight[28,48-49]	Mass or amount of weight of an individual expressed in units of Kg that is obtained from the calculation of BMI (ratio between body weight, in kilograms and height measurements, expressed in meters squared Kg/m^2) very far from each other low body weight/thinness (BMI < 18.5Kg/m^2) and obese (BMI > 29.9 Kg/m^2).
Inactivity[28,32]	A person who does not perform activities that promote an energy expenditure far beyond the basal metabolic rate (BMR).
Insufficient clothing[28.32]	Shortage (lack) of clothes.
Insufficient supply of subcutaneous fat[31,40,43]	Decreased amount of nutrient responsible for providing energy and vitamins to the body in the Hypodermic region (under the skin).
Radiation[14,28,31]	A therapeutic process of ionizing and non-ionizing radiation, including using radioisotope therapy for certain diseases.
Heat transfer (e.g., conduction, convection, evaporation, radiation) [14,29]	Transmission of thermal energy from a warmer mass (body) to a colder mass.

To be continued

Chart 2 (concluded)

Hypothermia (00006) definition Core body temperature below normal the diurnal range due to failure of thermoregulation[4]	
Related Factors	**Description of conceptual definition (CD)**
Trauma[14-15]	Damage infringed on the body as a direct or indirect result of an external force, with or without disruption of structural continuity.

DISCUSSION

Hypothermia (00006) Defining Characteristics

It is noticed that hypothermia has been occurring in the Operating Room (OR), often due to lack of adequate preventive measures; resulting in important physiological changes that, when identified early and accurately, can help nurses in the proper management of this condition in environments more vulnerable to its occurrence, such as in OR[2-3,6,10-11,13,16].

Cold environment, characteristic of OR, contributes to the appearance of numerous changes. Among these, "Acrocyanosis"[31,35-36] and "Cyanotic nail beds"[31,35-36], both DC of hypothermia (00006), present very similar evidence, requiring thorough assessment of nurses, which requires mastery of these concepts (Chart 1).

It is believed that "Increase in oxygen consumption"[14,30-31] of the referred ND does not offer consistent subsidies to indicate it, considering that for its determination nurses will need the hard technology (calibrated ergospirometer) available in the unit; a fact that is not the reality present in Brazilian hospitals.

"Increase in metabolic rate"[13-14,31-32,34,37], "Cyanotic nail beds"[31,35-36], "Skin cool to touch"[5,14,28,31], "Piloerection"[31-32,43-44], "Peripheral vasoconstriction"[5,14,31-33,45] and "Shivering"[5,24,39-40] of the referred ND can subsidize nurses in accurate inference; however, it is necessary for these professionals to appropriate fundamental concepts to minimize or even avoid the harmful effects caused by low temperature in the surgical environment.

It is worth remembering that "Peripheral vasoconstriction"[5,14,31-33,45] and "Slow capillary refill"[5,14,31,42,45] (above three seconds), occur simultaneously, thus indicating, reduction of peripheral perfusion and requiring attention by nurses.

It is also noteworthy that during moderate hypothermia (between 30ºC to 32°C) with "Decreased metabolic rate"[32,34] (RF of ND hypothermia) in 25% to 30%, there is a significant "Decrease in ventilation"[5,14,30-32] (DC of the referred ND) for the maintenance of PCO_2 at normal levels[5,14,31-32]. This is even more aggravated by the anesthetic-surgical procedure, which, in itself, may alter the main mechanisms responsible for cellular oxygenation (SO_2 <85%, RF> 20, PaO_2 <60mmHg)[5,14,32].

"Hypoxia"[31-32,38,42] may also cause a decrease in PaO_2, which will lead to a decrease in SaO_2 to values below 85%[14,32] in addition to also decreasing heart rate.

"Tachycardia" (fast HR> 100bpm)[5,14,31-33,38] and "Bradycardia"[33,38-39] (HR <50bpm) also deserve special attention. They are related to different phases of hypothermia onset and/or progression, which occur in the initial phase of the hypothermia picture (temperature between 32ºC and 35ºC), moment of excitation to fight the cold and in moderate hypothermia onset (temperature between 30°C to 32°C).

Tremor was evidenced in several studies[14,39,45] that supported this IR as a physiological compensatory mechanism to hypothermia, having a high metabolic cost, "increasing oxygen consumption too much"[14,39] by up to 700% and if this if not properly corrected may cause arterial hypoxemia and cardiovascular instability.

This phenomenon was an evidence found even in the construction of the OD of "Shivering"[5,24,39-40], "Increase in metabolic rate"[13-14,31-32,34,37] and "Increase in oxygen consumption"[14,30,31], with an incidence in the postoperative period ranging from 6.3% to 66%. Together with nausea and vomiting[24,39], it was considered one of the worst feelings of discomfort reported by patients in PACU, in addition to being potentially harmful as it generates increased metabolic demand.

"Hypertension"[5,7,14,31,33] and "Hypoglycemia"[14,31,34,40-41] of hypothermia (00006), which consist of "Increase in blood pressure" and "Decrease in capillary glycemia", respectively, can guide nurses in the perioperative period in decision-making for accurate inference of such ND. They are pointed out in the literature as frequent evidence in individuals with hypothermia; therefore, its early detection may also prevent, as well as avoid complications arising from hypothermia onset, favoring safe and quality care for patients.

"Accidental low body temperature"[3-4,6,10-12,15,32] and "Low body temperature in injured adults"[4,6,14-15,39-40] are evidence recognized in surgery, because in addition to the physiology of thermoregulation being depressed by drugs, the body is still exposed to the cold surgical environment, generating greater heat loss[5-6,29].

Hypothermia (00006) related factors

"Pharmacological agents"[8,14,28], especially anesthetics, which alter the thermoregulation center by inhibiting tremors and "Low environmental temperature"[6,16-17,46], especially below 21°C, are treated are very relevant contributing factors for hypothermia onset[6,8,10,12,16-17] in surgical patients, and are often overlooked by the team.

"Decreased metabolic rate"[32,34], also RF of the referred ND will lead to changes in heart rate, blood pressure, breathing and especially in the maintenance of body temperature, which may generate more complications for patients in the perioperative period.

"Inactivity"[28,32], also a RF, is frequent when a patient is in OR under the effect of anesthetic drugs. Thus, a greater amount of heat comes from the metabolic activity of the brain and other major organs, and all the heat generated by the metabolism is dissipated into the environment (mainly through the skin) in order to maintain a stable thermal condition, thermal regulation mechanisms are inhibited by pharmacological agents, the central compartment undergoes a progressive loss of heat that is transmitted to the peripheral compartment[5,14,32], causing hypothermia.

"Alcohol consumption"[14,28,47] another RF of hypothermia considerably increases the risk of onset by dilating blood vessels close to the skin (vasodilation), thus decreasing the efficiency of the tremor mechanism (inhibited by agents anesthetics) and the body's ability to compensate for exposure to cold; therefore, it should be considered by nurses when collecting data.

"Trauma"[14-15], "Damage to hypothalamus"[5,28,32,43] and "Heat transfer"[14,29] considerably increase the risk of hypothermia onset by interrupting the thermoregulatory center, requiring nurses to

have knowledge of concepts that involve contributing factors to the occurrence of this condition in the perioperative period.

"Radiation therapy"[14,28,31], also RF of the referred ND deserves considerable attention in view, which may cause damage or loss of large areas of skin, which can cause severe systemic changes, including hypothermia.

"Extremes of weight"[28,48-49] and "Malnutrition"[31-32,48-49], both RF of the referred ND, also confer an increased risk for hypothermia onset. Body Mass Index (BMI) plays an important role in thermal control, as this mass acts as insulation or thermal barrier, mainly the subcutaneous adipose tissue[40].

Thus, patients with lower body mass are more likely to drop body temperature[40,48-49].

"Extremes of age"[28,31] (newborns and elderly people), also a RF of that ND, considerably increasing the risk for hypothermia due to the decreased competence for thermoregulation[5,9,50].

"Extremes of age" and "Extremes of weight", in addition to other RF previously highlighted in this IR, when associated with the "Insufficient supply of subcutaneous fat"[31,40,43] and "Insufficient clothing"[28,32], can foster development, as well as aggravate hypothermia. Special attention from nurses is required for the accurate indication of the referred ND, allowing the early identification of these contributing factors (RF), as well as the signs and symptoms (DC) presented by individuals, offering assistance based on individuality, providing security and quality needed for surgical patient care[22].

This IR did not consider "Insufficient caregiver knowledge of hypothermia prevention"[28] and "Economically disadvantaged"[28] suggestive for the surgical population. Caregivers, in this case, are health professionals duly trained to provide assistance to this patient, and the economic factor, here referring to patients, will also not be interfering in the assistance, considering that the care is aimed at all patients equally, without distinction.

Considering the context presented, it is worth mentioning that studies of this nature aim to improve and improve ND, favoring the practice by ensuring uniformity in diagnosis assessment and indication[23-24].

That said, patients will benefit, since nurses will have consistent subsidies to indicate the DN and determine the implementation of the next steps of NP[4,23-24,50], envisioning the best treatment, easing suffering and other complications resulting from inadequate management of perioperative hypothermia.

Study limitations

Despite the indisputable importance of the theoretical framework as an encouragement for nurses' clinical and surgical practice and an accurate implementation of NP, studies that contemplate or subsidize the construction of definitions of related components are limited, specifically to ND for patients undergoing anesthetic-surgical procedure in the perioperative context.

Contribution to nursing

It is believed that from the construction of the conceptual and operational definitions of CD and the conceptual definitions of RF of hypothermia (0006) of NANDA-I, subsidized by a literature review and an increase in gray literature, the first stage of a validation study for ND is completed.

Therefore, it is emphasized that studies of this nature will support the standardization of the language used by nurses, facilitating communication between the team, improving diagnostic accuracy and care planning, contributing mainly to research in that area and in nursing education.

CONCLUSION

After reviewing articles that supported the construction of DC and OD of the elements of hypothermia (00006) in patients in the perioperative period, it can be observed that the main CDs (low body temperature, shivering, tremor, cyanotic nail beds, hypertension, skin cool to touch, piloerection, slow capillary refill, and peripheral vasoconstriction) and RF (low environmental temperature, pharmacological agent, extremes of age and weight, insufficient supply of subcutaneous fat and insufficient clothing) are related to this condition and pointed out by the studies analyzed by this IR corroborate with the CD and RF described in NANDA-I.

Although there are few studies that portray hypothermia as ND, the occurrence of this condition is frequent in the perioperative period. As it is a modifiable condition, understand the factors that can contribute to its onset and, above all, correctly identify the signs and symptoms (DCs) presented by patients and their contributing factors (RFs) for an accurate indication of hypothermia (00006) will greatly assist nurses in the proper management of this phenomenon in environments more vulnerable to its occurrence, such as in the environment that involves the perioperative period.

This study will also contribute to the next steps in the process of validating this diagnosis with surgery patients. It can also assist in the determination of the referred ND by nurses in clinical and surgical practice, giving visibility to this subject, which is often neglected by the health team.

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