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Cross mapping between clinical indicators for assistance in intensive care and nursing interventions

Mapeamento cruzado entre indicadores clínicos para a assistência em terapia intensiva e intervenções de enfermagem

Mapeo cruzado entre indicadores clínicos para la asistencia en terapia intensiva e intervenciones de enfermería

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ABSTRACT

Objective: Identify the main clinical indicators for assistance in the Intensive Care Unit (ICU) and map them in the nursing interventions described by the Nursing Interventions Classification (NIC). **Methods:** Integrative literature review study, followed by cross-mapping between clinical indicators for assistance in the ICU care and NIC nursing interventions and activities. **Results:** 36 articles were identified, which resulted in 285 clinical indicators for ICU care, with mechanical ventilatory assistance, pain, sedation, psychomotor agitation, delirium, anxiety, altered heart rate, diet by naso tube / oroenteral and diarrhea the clinical indicators for assistance in the ICU the most prevalent. These were mapped in 12 Nursing Interventions Classification interventions and 130 nursing activities. **Final considerations:** It is concluded that the clinical indicators for ICU care associated with Nursing Interventions Classification are concrete data that assist intensive care nurses in their clinical practice.

Descriptors: Signs and Symptoms; Intensive Care Units; Nursing Care; Health Status Indicators; Standardized Nursing Terminology.

RESUMO

Objetivo: Identificar os principais indicadores clínicos para a assistência em Unidade de Terapia Intensiva (UTI) e mapeá-los nas intervenções de enfermagem descritas pela *Nursing Interventions Classification* (NIC). **Métodos:** Estudo de revisão integrativa de literatura, seguido de mapeamento cruzado entre os indicadores clínicos para assistência em UTI e as intervenções e atividades de enfermagem da *Nursing Interventions Classification*. **Resultados:** Foram identificados 36 artigos, que resultaram em 285 indicadores clínicos para a assistência em UTI, sendo a assistência ventilatória mecânica, a dor, a sedação, a agitação psicomotora, o *delirium*, a ansiedade, a frequência cardíaca alterada, a dieta por sonda naso/oroenteral e a diarreia os indicadores clínicos para assistência em UTI mais prevalentes. Estes foram mapeados em 12 intervenções e 130 atividades de enfermagem da *Nursing Interventions Classification*. **Considerações finais:** Conclui-se que os indicadores clínicos para a assistência em UTI associados à *Nursing Interventions Classification* são dados concretos que auxiliam o enfermeiro intensivista em sua prática clínica.

Descritores: Sinais e Sintomas; Unidades de Terapia Intensiva; Cuidados de Enfermagem; Indicadores de Saúde; Classificação de Intervenções de Enfermagem.

RESUMEN

Objetivo: Identificar los principales indicadores clínicos para la asistencia en Unidad de Terapia Intensiva (UTI) y los mapear en las intervenciones de enfermería descriptas por la *Nursing Interventions Classification* (NIC). **Métodos:** Estudio de revisión integrativa de literatura, seguido de mapeo cruzado entre los indicadores clínicos para asistencia en UTI y las intervenciones y actividades de enfermería de la *Nursing Interventions Classification*. **Resultados:** Han sido identificados 36 artículos, que resultaron en 285 indicadores clínicos para la asistencia en UTI, siendo la asistencia respiratoria mecánica, el dolor, la sedación, la agitación psicomotora, el *delirium*, la ansiedad, la frecuencia cardíaca alterada, la dieta por sonda naso/enteral y la diarrea, los más predominantes. Estos han sido mapeados en 12 intervenciones y 130 actividades de enfermería de la *Nursing Interventions Classification*. **Consideraciones finales:** Se ha concluido que los indicadores clínicos para la asistencia en UTI asociados a la NIC son datos concretos que auxilian el enfermero en su práctica clínica.

Descriptores: Signos y Sintomas; Unidades de Cuidados Intensivos; Atención de Enfermería; Indicadores de Salud; Terminología Normalizada de Enfermería.

INTRODUCTION

The Intensive Care Unit (ICU) is the hospitalization sector that has specialized equipment and technologies for maintaining vital functions, continuous monitoring and uninterrupted assistance from health professionals, in order to provide care to critical patients[1]. This type of patient is characterized by a serious or risky clinical situation and may present instability and imbalance in one or more systems of the body, which are identified through changes in signs and symptoms[2].

The signs and symptoms are observable characteristics that reflect the health situation of an individual and are present in specific changes in the organism, directing the actions to be provided by the health team, thus being considered important clinical indicators for health care[2,3]. In nursing care, clinical indicators, also called "defining characteristics", support nursing diagnoses and guide interventions to be provided to critical patients[4].

A survey carried out in the South of Brazil, considering the specificities of the ICU, aimed to identify the priority nursing diagnoses and outline a specific care plan to the real needs of patients with cardiovascular problems, by surveying the main signs and symptoms of this clientele. The authors concluded that nursing diagnoses based on signs and symptoms allow a prioritization of actions; hence, it is inferred that such diagnoses are also the basis for planning interventions[4].

Nursing interventions are composed of a set of systematized and standardized actions and can be implemented by direct and indirect care[5]. However, initially, the nurse needs to identify and interpret the patient's clinical indicators, making an accurate diagnosis that will support the planning of these interventions according to the identified needs, ensuring a holistic and agile care[6-7].

Among the different taxonomies for nursing practice, the Nursing Interventions Classification (NIC) stands out, which is widely used in Brazil and worldwide. The NIC presents standardized language to describe the treatments performed by nurses, which allows the identification, organization and documentation of nursing actions, in addition to enabling the recognition of the main interventions prescribed to a group of patients[5].

Several studies have evaluated and validated the applicability of NIC nursing interventions in different care settings. Examples: study carried out in the chemotherapy sector of a public hospital in São Paulo that validated 35 NIC interventions and 48 nursing activities[8]; another research carried out in the surgical center of a public hospital in São Paulo concluded that the NIC is a sensitive tool to measure the nursing workload[9]; in Spain, researchers identified the main nursing interventions and validated the time needed to perform them in the ICU, concluding that the NIC is a taxonomy appropriate to this reality[10]"given":"Mireia"},{"family":"Mila-Villarroel","given":"Raimon"}],"issued":{"date-parts":[["2017",12]]}}}],"schema":"https://github.com/citation-style-language/schema/raw/master/csl-citation.json"} .

However, there are still several places in which, although steps in the nursing process are used for the organization of care, standardized languages such as NIC are not yet used to name their actions. In this context, identifying the main clinical indicators for the care of a specific clientele, such as the ICU, and mapping them with the nursing interventions of the NIC can favor the systematization of health actions, considering the needs of the patient, in addition to assisting in the forecast and provision of human and material resources[5,9].

OBJECTIVE

Identify the main clinical indicators for ICU care and map them in the nursing interventions described by the NIC.

METHODS

This is an integrative literature review study, followed by cross-mapping.

Literature review is a research method to synthesize previous studies, through a critical and methodological analysis divided into six phases: elaboration of the research question, sample selection, categorization of studies, critical analysis, interpretation of results and presentation of the review to in order to explain the investigated phenomena[11].

To direct the review, the following research question was used: What are the main clinical indicators in the ICU that guide nursing interventions to critical patients? Clinical indicators, signs and symptoms as well as nursing care in the ICU were considered.

The sample included articles published in full, in the time frame from 2013 to 2018, in Portuguese, English and Spanish and that answered the research question. Contents of theses, dissertations, books, review articles and research carried out in the areas of pediatrics and neonatology were excluded.

Data collection was carried out independently and paired by two researchers in November 2018, with the aid of an instrument that contained the data identifying the article, method and results.

The databases accessed were Medical Literature Analysis and Retrieval System Online (MEDLINE), Latin American and Caribbean Health Sciences Information Literature (LILACS) and Cummulative Index to Nursing and Allied Health Literature (CINAHL). The articles indexed in CINAHL were accessed through the CAPES portal; those published in LILACS were searched by the Virtual Health Library (VHL); and MEDLINE studies were researched through the VHL and PubMed. Thus, in Portuguese and Spanish, the Health Science Descriptors (DeCS) and, in English, the Medical Subject Headings (MeSH) were used, with the Boolean AND resource, which took place between the first, second, third and fourth descriptor: "signs and symptoms", "intensive care units", "nursing care" and "critical care".

The analysis and interpretation of the results were carried out in an organized and synthesized manner in a synoptic table with the following items: article number, year of publication, database and journals, methodology and clinical indicators for ICU care.

Clinical indicators were identified and selected in the item "Results" of the articles, being typed and stored in a Microsoft Office Excel® 2013program spreadsheet. Then, cross-mapping was performed between the main clinical indicators for ICU care and the nursing interventions/ activities described in the NIC[5].

Cross-mapping is a method of identifying terms that can be used, compared or understood from a standardized language. It allows comparing different nursing records to standardized nursing classifications[12].

For cross-mapping, six rules were determined based on the characteristics of the data obtained and the classification used[13], adapted from the Moorhead and Delaney (1997) and Lucena and Barros (2005) references: 1) select, at least, one NIC nursing intervention for each clinical indicator for ICU care found in the integrative review; 2) determine a keyword that clearly describes the clinical indicator that will assist in identifying the most appropriate NIC intervention; 3) select NIC interventions based on their similarity to the clinical indicator or its definition, according to the dictionaries of health care practices; 4) list the activities corresponding to the NIC interventions based on the similarity between these and the clinical indicator or the keyword and that describe the reality of nursing care practice in the ICU; 5) map the clinical indicator in different NIC interventions, when the actions and or results are different; 6) identify the clinical indicator that, for whatever reason, cannot be mapped.

RESULTS

Of the 1,084 articles found in the databases, 36 were selected to compose the integrative literature review, according to the flowchart described in Figure 1.

Of the 36 articles, four (11%) were published in 2013; six (17%) in 2014; three (8%) in 2015; eight (22%) in 2016; 11 (31%) in 2017; and four (11%) in 2018.

As for the databases, two (6%) of the studies were found in LILACS, 10 (28%) in CINAHL and 24 (66%) in MEDLINE. Among the journals, Intensive and Critical Care Nursing stood out, with six (25%) indexed surveys and the UFPE Online Journal of Nursing with four (17%). Of the 24 journals accessed in this review, 13 (54%) were specific to the nursing area.

Regarding the methodology, 35 (97%) articles had a quantitative approach. Nine (25%) articles were based on the cross-sectional method, seven (19%) in descriptive research, six (17%) in a cohort, five (14%) in observational studies, two (6%) in clinical trials, two (6%) in randomized research, and the other studies were based on quasi-experimental, documentary, methodological, exploratory and multicenter methods.

In this review, 285 clinical indicators for ICU care were identified, with a total of 141 different terms. The most common clinical indicators found in the 36 articles were: mechanical ventilation assistance (MVA) present in 17 (47%) articles; pain, in 10 (28%); sedation, in nine (25%); psychomotor agitation and delirium, in eight (22%); anxiety and altered heart rate, in seven (19%); and diet by naso / oroenteral tube as well as diarrhea, in six (16%) (Chart 1).

After cross-mapping the main clinical indicators and NIC interventions, 12 nursing interventions and 130 activities were identified, five (42%) interventions and 43 (33%) activities in the Physiological: Basic domain, in three classes (Elimination Management, Nutritional Support, Physical Comfort Promotion); five (42%) interventions and 65 (50%) activities in the Physiological: Complex domain, in three classes (Drug Management, Respiratory Management, Tissue Perfusion Management); one (8%) intervention and eight (6%) activities in the Behavioral domain, in one class (Psychological Comfort Promotion); and one (8%) intervention and 14 (11%) activities in the Safety domain, in one class (Risk Management). No indicators were mapped in the Family, Health Systems and Community domains, as described in Chart 2.

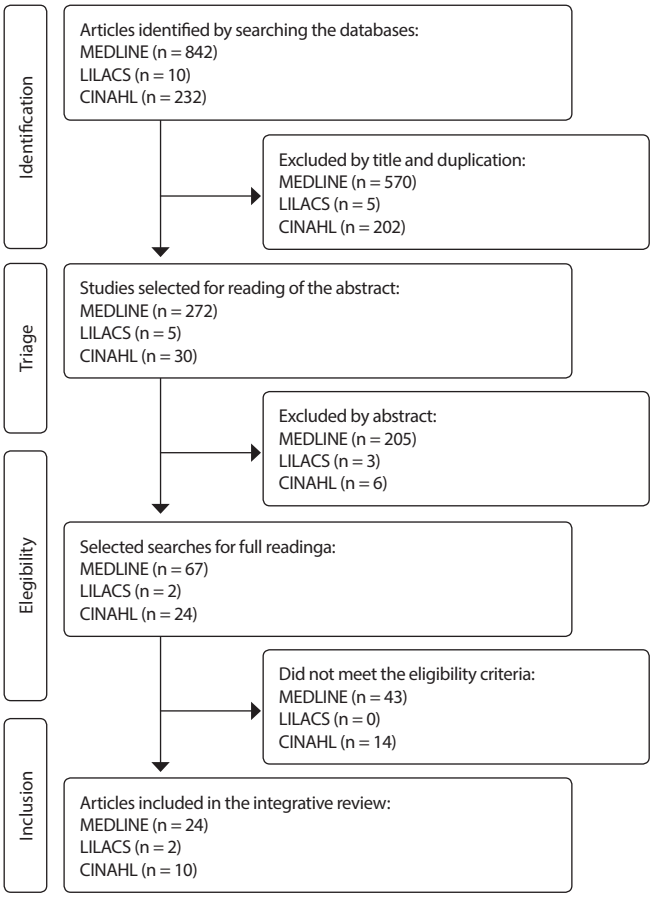

Figure 1 – Flowchart of the search and selection process for the articles included in the integrative review, 2019

Chart 1 – Clinical indicators for ICU care, 2019

Clinical Indicators for ICU Assistance	n
Mechanical ventilatory assistance[2,14–29].	17
Pain[4,14,17,24,30–35].	10
Sedation[14,17-18,24,26,29,32,36-37].	9
Psychomotor agitation[14,18,30,33-34,36,38-39], delirium[17–19,23,26,33,36,38].	8
Anxiety[4,14-15,19,29,31,33], altered heart rate[2,4,21,31,33,38-39].	7
Naso/oroenteral tube diet[20,22,25,27,35,40], diarrhea[22,25,35,37-38,41].	6
Change in level of consciousness[2,16,38,40,42], care with central venous catheter[24,26,43–45].	5
Infusion of vasoactive drug[2,25,27,43], altered blood pressure[2,21,32-33], increased gastric residual volume[20,27,35,40].	4
Endotracheal suction[24,28,32], mental confusion[29,36,38], incontinence dermatitis[25,37,41], dyspnoea[4,18,30], hypertension[4,31,39], hyperthermia[17,25,38], hypotension[2,31,39], hypothermia[17,25,38], hemodynamic instability[4,26,43], skin injury[4,41,44], obesity[38,41,46], nasal probe / oroenteral[24,26,44], bladder catheter[24,26,41], vomiting[27,35,38].	3
Change in sleep pattern[14,30], analgesia[18,24], arrhythmia[26,39], bed bath[25,32], calm[30,33], constipation[20,35], convulsion[16,38], malnutrition[37-38], desaturation[38-39], dysphagia[28,40], edema[4,35], altered respiratory rate[2,38], body hygiene[30,32], hyperglycemia[38,47], hypoalbuminemia[25-26], hypoglycemia[27,47], hypoxia[2,26], insomnia[4,33], respiratory failure[16-17], pressure injury[44,46], fear[30,33], restricted mobilization[17,26], change of position[2,32], nausea[4,38], parenteral nutrition[26-27], high risk of pressure injury[41,46], adventitious noises[4,38], altered oxygen saturation[2,33], tracheal secretion[24,38], overweight[28,30].	2

To be continued

Chart 1 (concluded)

Clinical Indicators for ICU Assistance	n
Respiratory acidosis[21], administration of laxative drugs[37], administration of insulin[27], distress[30], alertness[29], altered breathing pattern[38], hallucinations[36], antibiotic therapy[26], anuria[2], apathy[30], apnea[39], apprehension[19], asynchrony with ventilator[33], aid in feeding[30], aid in walking[30], underweight[46], tiredness[33] , coma[38], mechanical restraint[26], compressive dressing in arterial puncture[4], depression[4], discomfort[30], disorientation[14], communication difficulties[41], dysphonia[28], dysrhythmia[18], abdominal distension[35], abdominal pain[35], health education[45], spirituality[45], erythema[41], exhaustion[14], extubation[44], fatigue[33], liquid stools[37], hemodialysis[27], oral hygiene[32], hyperalbuminemia[25], hypercapnia[21], hypercreatinemia[38], hypernatremia[17], hyperuremia[38], hypocapnia[38], hyponatremia[17], hypoperfusion[2], hypoxemia[18], depressed mood[4], immobility[34], fecal incontinence[41], urinary incontinence[41], antiarrhythmic drug infusion[26], hypertonic glucose infusion[27], tube intolerance[33], orotracheal intubation[40], isolation[30], contact isolation[37], fasting[27], lethargy[38] , leukocytosis[38], leukopenia[38], abdominal massage[20], cardiac monitoring[43], altered motor skills[42], odynophagia[28], oliguria[38], oxygen therapy[2], skin pallor[30], panic[19], cardiorespiratory arrest[26], polyneuromyopathy[33], polyuria[38], drug preparation and administration[43], altered cerebral perfusion pressure[32], altered intracranial pressure[32], altered horny reflex[33], altered cough reflex[33], altered sensitivity[42], sweating[30], inotropic support[16], altered temperature[21], altered muscle tone[33], numbness[38], glycemic variability[47].	1

Note: Abbreviation: N - absolute frequency of clinical indicators for ICU assistance found in the literature review.

DISCUSSION

This research promoted the identification of 285 clinical indicators for ICU care, with mechanical ventilatory assistance, pain, sedation, psychomotor agitation, delirium, anxiety, altered heart rate, diet by naso/oroenteral tube and diarrhea the most prevalent, which were mapped with similarities in 12 NIC interventions and 130 nursing activities.

Nursing interventions for critical patients in the ICU described in the literature predominantly involve actions aimed at physical and homeostatic functioning[5,10,48-49], with few, if any, approaches to psychosocial needs, lifestyle and protection from harm. Thus, nursing interventions in the ICU were found in greater numbers in the "Physiological: Complex" domain, highlighting the "Class K – Respiratory Management" with two interventions and 37 mapped nursing activities, data corroborated by NIC studies[48-49].

Forty-eight clinical indicators for ICU care, identified in the review, were linked to Respiratory Management, in relation to which nursing interventions aim to promote airway permeability and gas exchange. Of these, 24 were specific for mechanical ventilatory assistance, and the main interventions mapped in the NIC for this indicator were: Artificial Airway Management, Mechanical Ventilation Management: Invasive[5].

Chart 2 - Mapping of the main clinical indicators for ICU care with Nursing Interventions Classification interventions and activities**,** 2019

Domain 1 – Physiological: Basic		
Class B: Elimination Management		
Clinical Indicators	**Nursing Interventions**	**Activities**
Diarrhea	Bowel Incontinence Care – 0410	- Determine physical or psychological cause of fecal incontinence. - Determine onset and type of incontinence, frequency of episodes, and any related change in bowel function or stool consistency. - Eliminate the cause of incontinence if possible. - Wash perianal area with soap and water and dry it thoroughly after each stool. - Protect the skin from excess moisture of urine, stool or perspiration with a moisture barrier cream, as needed. - Monitor perianal skin for the development of pressure ulcers and for infection. - Monitor for adequate bowel evacuation. - Avoid foods that cause diarrhea. - Administer prescribed medication for diarrhea.
	Diarrhea Management – 0460	- Determine history of diarrhea. - Identify factors that may cause or contribute to diarrhea. - Monitor for signs and symptoms of diarrhea. - Monitor skin in perianal area for irritation and ulceration. - Measure diarrhea/bowel output.
	Bowel Management – 0430	- Note date of last bowel movement. - Monitor bowel movements including frequency, consistency, shape, volume, and color, as appropriate. - Monitor bowel sounds. - Monitor for signs and symptoms of diarrhea, constipation, and impaction. - Insert rectal suppository, as needed.
Class D: Nutrition Support		
Clinical Indicators	**Nursing Interventions**	**Activities**
Naso/ oroenteral tube diet	Enteral Tube Feeding – 1056	- Insert nasogastric, nasoduodenal, or nasojejunal tube, according to agency protocol. - Apply anchoring substance to the skin and secure feeding tube with tape. - Monitor for proper placement of the tube by inspecting oral cavity, checking for gastric residual, or listening while air is injected and withdrawn, according to agency protocol. - Elevate head of the bed 30 to 45 degrees during feedings. - Discontinue feeding 30 to 60 minutes before putting in a head down position. - Turn off the tube feeding one hour prior to a procedure or transport if the patient needs to be less than 30 degrees. - Irrigate the tube every 4 to 6 hours as appropriate during continuous feedings and after every intermittent feeding. - Use clean technique in administering tube feeding. - Check gravity drip rate or pump rate every hour. - Slow tube feeding rate and/or decrease strength to control diarrhea.

To be continued

Chart 2

Class D: Nutrition Support		
Clinical Indicators	**Nursing Interventions**	**Activities**
Naso/ oroenteral tube diet	Enteral Tube Feeding – 1056	- Monitor for sensation of fullness, nausea, and vomiting. - Check residual every 4 to 6 hours for the first 24 hours, then every 8 hours during continuous feedings. - Check residual before each intermittent feeding. - Hold tube feedings if residual is greater than 150 cc or more than 110% to 120% of the hourly rate in adults. - Keep cuff of endotracheal or tracheostomy tube inflated during feeding, as appropriate.
Class E: Physical Comfort Promotion		
Clinical indicators	**Nursing Interventions**	**Activities**
Pain	Pain Management – 1400	- Perform a comprehensive assessment of pain to include location, characteristics, onset/duration, frequency, quality, intensity or severity of pain, and precipitating factors. - Observe the nonverbal cues of discomfort, especially in those unable to communicate effectively. - Assure patient attentive analgesic care. - Use therapeutic communication strategies to acknowledge the pain experience and convey acceptance of the patient's response to pain. - Provide information about the pain, such as causes of the pain, how long it will last, and anticipated discomforts from procedures. - Control environmental factors that may influence the patient's response to discomfort. - Select and implement a variety of measures (e.g., pharmacological, nonpharmacological, interpersonal) to facilitate pain relief, as appropriate. - Provide the person optimal pain with prescribed analgesics. - Assure pretreatment analgesia and/or nonpharmacologic strategies prior to painful procedures
Domain 2 – Physiological: Complex		
Class H: Drug Management		
Clinical indicators	**Nursing Interventions**	**Activities**
Pain	Analgesic Administration – 2210	- Determine pain location, characteristics, quality, and severity before medicating patient. - Check medical order for drug, dose and frequency of analgesic prescribed. - Choose the appropriate analgesic or combination of analgesic when more than one is prescribed. - Determine analgesic selection, based on the type and severity of pain. - Determine the preferred analgesic, route of administration, and dosage to achieve optimal analgesia. - Choose the IV route, rather than IM, for frequent pain medication injections, when possible. - Monitor vital signs before and after administering narcotic analgesic with first-time dose or if unusual signs are noted. - Attend to comfort needs and other activities that assist relaxation to facilitate response to analgesia. - Administer analgesics around the clock to prevent peaks and troughs of analgesia, especially with severe pain. - Administer adjuvant analgesics and/or medications when needed to potentiate analgesia. - Consider use of continuous infusion, either alone or in conjunction with bolus opioids, to maintain serum levels. - Institute safety precautions for those receiving narcotic analgesic, as appropriate. - Instruct to request PRN pain medication before the pain is severe. - Evaluate the effectiveness of analgesics at regular frequent intervals after each administration, but, especially after the initial doses, also observing for any signs and symptoms of untoward effects. - Document response to analgesic and any untoward effects. - Evaluate and document level of sedation for patients receiving opioids. - Implement actions to decrease untoward effects of analgesics.
Sedation	Sedation Management – 2260	- Check for drug allergies. - Instruct the patient and/or family about effects of sedation. - Evaluate the patient's level of consciousness and protective reflexes before administering sedation. - Administer medication as per physician's order or protocol, titrating carefully, according to patient's response. - Monitor the patient's levels of consciousness and vital signs, oxygen saturation, and EKG, as per agency protocol. - Monitor the patient for adverse effects of medication, including agitation, respiratory depression, hypotension, undue somnolence, hypoxemia, arrhythmias, apnea, or exacerbation of a preexisting condition.
Class K: Respiratory Management		
Clinical indicators	**Nursing Interventions**	**Activities**
Mechanical ventilatory assistance	Mechanical Ventilation Management: Invasive – 3300	- Monitor for conditions indicating a need for ventilation support. - Monitor for impending respiratory failure. - Initiate setup and application of the ventilator. - Ensure that ventilator alarms are on. - Routinely monitor ventilator settings, including temperature and humidification of inspired air. - Check all ventilation connections regularly. - Monitor for factors that increase the patient/ventilator work of breathing (e.g., morbid obesity, pregnancy, biting ET). - Monitor for symptoms that indicate increased work of breathing. - Monitor the effectiveness of mechanical ventilation on patient's physiological and psychological state. - Provide care to alleviate patient distress (e.g., positioning, sedation and/or analgesia, tracheobronchial toileting). - Provide patient with a means for communication (e.g., paper nad pencil, alphabet board).

To be continued

Chart 2

Class K: Respiratory Management		
Clinical indicators	**Nursing Interventions**	**Activities**
Mechanical ventilatory assistance	Mechanical Ventilation Management: Invasive – 3300	- Monitor ventilator pressure readings, patient/ventilator synchronicity, and patient breath sounds. - Perform suctioning based on presence of adventitious breath sounds and/or increased inspiratory pressure. - Monitor pulmonary secretions for amount, color and consistency and regularly document findings. - Monitor for adverse effects of mechanical ventilation (e.g., tracheal deviation, infection, barotrauma, gastric distention, subcutaneous emphysema). - Monitor for mucosal damage to oral, nasal, tracheal or laryngeal tissue from pressure from artificial airway, high cuff pressure, or unplanned extubations. - Use commercially tube holders rather than tape or strings to fixate artificial airways to prevent unplanned extubations. - Position to facilitate ventilation/perfusion matching, as appropriate.
	Artificial Airway Management – 3180	- Provide an oropharyngeal airway or bite block to prevent biting on the endotracheal tube, as appropriate. - Inflate endotracheal/tracheostomy cuff using minimum occlusive volume technique or minimal leak technique. - Maintain inflation of the endotracheal/tracheostomy cuff at 15 to 25 mm Hg during mechanical ventilation and during and after feeding. - Monitor cuff pressure every 4 to 8 hours during expiration using a three-way stopcock, calibrated syringe, and manometer. - Check cuff pressure immediately after delivery of any general anesthesia or manipulation of endotracheal tube. - Change the endotracheal tapes/ties every 24 hours, inspect the skin and oral mucosa, and reposition the endotracheal tube to the other side of the mouth. - Loosen commercial endotracheal tube holders at least once a day, and provide skin care. - Auscultate for presence of lung sounds bilaterally after insertion and after changing endotracheal/tracheostomy ties. - Note the centimeter reference marking on endotracheal tube to monitor for possible displacement. - Assist with chest x-ray examination, as needed, to monitor the position of tube. - Minimize leverage and traction on the artificial airway by suspending ventilator tubing from overhead supports, using flexible catheter mounts and swivels, and supporting tubes during turning, suctioning, and ventilator disconnection and reconnection. - Monitor for presence of crackles and rhonchi over large airways. - Monitor secretions color, amount and consistency. - Perform oral care, as needed. - Monitor for decrease in exhale volume and increase in inspiratory pressure in patients receiving mechanical ventilation. - Institute measures to prevent spontaneous decannulation (i.e., secure artificial airway with tapes or ties, administer sedation and muscle paralyzing agent, use arm restraints), as appropriate. - Provide trachea care every 4 or 8 hours as appropriate: Clean inner cannula, clean and dry the area around the stoma, and change the tracheostomy tie. - Inspect skin around the tracheal stoma for drainage, redness, irritation, and bleeding. - Shield the tracheostomy from water.
Class N: Tissue Perfusion Management		
Clinical indicators	**Nursing Interventions**	**Activities**
Altered heart rate	Hemodynamic Regulation – 4150	- Perform a comprehensive appraisal of hemodynamic status (i.e., check blood pressure, heart rate, pulse, jugular venous pressure, central venous pressure, right and left atrial and ventricular pressures, and pulmonary artery pressure), as appropriate. - Monitor and document blood pressure, heart rate, rhythm, and pulse. - Monitor pacemaker function, if appropriate. - Administer antiarrhythmic medications, as appropriate. - Monitor the effects of medications.
Domain 3 – Behavioral		
Class T: Psychological Comfort Promotion		
Clinical indicators	**Nursing Interventions**	**Activities**
Anxiety	Anxiety Reduction – 5820	- Use a calm, reassuring approach. - Explain all procedures, including sensations likely to be experienced during the procedure. - Stay with patient to promote safety and reduce fear. - Encourage verbalization of feelings, perceptions, and fears. - Identify when level of anxiety change. - Help patient identify situations that precipitate anxiety. - Administer medication to reduce anxiety, as appropriate. - Assess for verbal and nonverbal signs of anxiety.
Domain 4 - Safety		
Class V: Risk Management		
Clinical indicators	**Nursing Interventions**	**Activities**
Psychomotor agitation, delirium	Delirium Management – 6440	- Identify etiological factors causing delirium. - Initiate therapies to reduce or eliminate factors causing delirium. - Recognize and document the motor subtype of delirium. - Monitor neurological status on an ongoing basis.

To be continued

Chart 2 (concluded)

Domain 4 - Safety		
Class V: Risk Management		
Clinical indicators	**Nursing Interventions**	**Activities**
Psychomotor agitation, delirium	Delirium Management – 6440	- Acknowledge the patient's fears and feelings. - Allow the patient to maintain rituals that limit anxiety. - Administer PRN medications for anxiety or agitation, but limit those with anticholinergic side effects. - Reduce sedation in general, but do control pain with analgesics, as indicated. - Remove stimuli, when possible, that create excessive sensory stimuli. - Maintain a well-lit environment that reduces sharp contrasts and shadows. - Maintain a hazard-free environment. - Use physical restrictions, as needed. - Inform patient of person, place, and time, as needed. - Provide a low-stimulation environment for patient in whom disorientation is increased by overstimulation.

It is known that mechanical ventilation is associated with complications, such as pneumonia, injury to the laryngotracheal mucosa, dysphagia, anxiety, delirium, pain, among others[5,28-29,33,40], making it necessary to institute interventions nursing as Respiratory Monitoring, Airway Insertion and Stabilization, Mechanical Ventilation Management: Pneumonia Prevention, Airway Suctioning, Mechanical Ventilatiry Weaning, Endotracheal Extubation, Anxiety Reduction, Pain Management, and Delirium Management[5].

Despite the higher prevalence of nursing interventions in the NIC Physiological Complex domain, a significant number of interventions located in the Physiological Basic domain were also identified, which aims to support the individual's physical functioning. In this domain, the "Class B - Elimination Management" stood out, which aims to establish and maintain regular patterns of intestinal and urinary elimination and to control complications arising from altered patterns[5].

Diarrhea was the most prevalent clinical indicator mapped in the Elimination Management intervention; is a symptom of severe gastrointestinal dysfunction in critically ill patients, associated with an increase in the malnutrition rate, in addition to predisposing to an increase in nursing workload and health costs[10,22]. In parallel, it is necessary to institute other interventions, such as Pressure Ulcer Prevention and Wound Care, since diarrhea is a risk factor for incontinence dermatitis and pressure injury[5,22,25,37,41].

Regarding the Behavioral domain (which supports psychosocial functioning and facilitates changes in lifestyle) and the Safety domain (which aims to protect against harm), a nursing intervention was evidenced for each domain mapped to the clinical indicators of anxiety, psychomotor agitation and delirium. The intervention of the NIC mapped for anxiety was the Anxiety Reduction, whereas the intervention for psychomotor agitation and for delirium was the Delirium Management[5].

In the ICU, the occurrence of anxiety, psychomotor agitation and delirium are frequent, as patients are constantly exposed to risk factors, such as invasive procedures, restricted mobilization, noisy unit, use of benzodiazepines and narcotics, changes in sleep pattern, changes electrolytic, among others[18-19,26,36]. Therefore, it is essential to outline a care plan that favors the standardization of sleep and wakefulness, early mobilization, a pleasant environment and effective communication with the patient about the time, clinical condition and interventions to be performed by the health team[26,33,36].

Study limitation

As for the limitations of this review, the authors delimited primary studies and restricted languages, that is, gray literature and articles in languages that did not meet the inclusion criteria were not included in the research.

Contributions to the field of nursing, health or public policy

It is necessary to recognize the pertinence in identifying the main clinical indicators for assistance of a certain population and, from these, elaborate care protocols through cross-mapping with the Nursing Classifications, in order to unify and standardize care. Thus, the results of this study serve as a tool for the development of nursing care protocols for critical patients in the ICU.

FINAL CONSIDERATIONS

It is concluded that the clinical indicators for ICU care are concrete data that help in identifying the clientele's care profile and, consequently, in the development of an appropriate intervention plan.

The cross-mapping process between these indicators and the NIC showed which interventions are related to them and pointed out a set of them to support care plans. Thus, it is also concluded that the NIC is a broad taxonomy that can assist intensive care nurses in their clinical practice.

Finally, it can be said that cross-mapping was effective in identifying the main nursing interventions in the ICU. However, new research can be carried out in order to identify and test interventions according to the needs of the assisted clientele, through studies with more robust designs.

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