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Indicators of Nursing Outcomes Classification for evaluation of patients with pressure injury: expert consensus[a]

Indicadores da Nursing Outcomes Classification para avaliação de pacientes com lesão por pressão: consenso de especialistas

Indicadores de la Nursing Outcomes Classification para la evaluación de pacientes con lesión por presión: consenso de expertos

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Abstract

Objectives: to select the nursing outcome indicators Tissue integrity: skin and mucous membranes (1101) and Wound healing: second intention (1103) of the Nursing Outcomes Classification, and to construct their conceptual and operational definitions for the evaluation of patients with pressure injuries. Methods: expert consensus study conducted at a university hospital in September 2018. Ten nurses with experience in using the Nursing Outcomes Classification and in caring for patients with pressure injuries participated in the study. Data collection took place through face-to-face meetings with the specialists. Results: Seventeen indicators from the Nursing Outcomes Classification were selected for the evaluation of patients with pressure injuries, with 100% agreement among the specialists. That's them: Blanching, Erythema, Sensation, Tissue perfusion, Hydration, Thickness, Necrosis, Foul wound odor, Blistered skin, Macerated skin, Undermining, Wound inflammation, Exudate/drainage, Granulation, Tunneling, Scar formation, Decreased wound size. Conclusion and implications for practice: the selected indicators allowed the elaboration of an instrument that will assist in the evaluation of patients with pressure injuries in an accurate way. This instrument will assist the nurses in the diagnostic and therapeutic decision making of the pressure injuries.

Keywords: Pressure Injury; Nursing Process; Standardized Nursing Terminology; Outcome Assessment; Health Care, Wound Healing.

Resumo

Objetivos: selecionar os indicadores dos resultados de enfermagem Integridade tissular: pele e mucosas (1101) e Cicatrização de feridas: segunda intenção (1103) da Nursing Outcomes Classification e construir suas definições conceituais e operacionais para a avaliação de pacientes com lesão por pressão. Métodos: estudo de consenso de especialistas realizado em hospital universitário em setembro/2018. Participaram no estudo 10 enfermeiros com experiência na utilização da Nursing Outcomes Classification e no cuidado ao paciente com lesão por pressão. A coleta de dados ocorreu por meio de encontro presencial com os especialistas. Resultados: Foram selecionados 17 indicadores da Nursing Outcomes Classification para a avaliação do paciente com lesão por pressão, com uma concordância de 100% entre os especialistas. São eles: Branqueamento, Eritema, Sensibilidade, Perfusão tissular, Hidratação/ Descamação, Espessura, Necrose, Odor desagradável na ferida, Pele com bolhas, Pele macerada, Descolamento Sob as bordas da Ferida, Inflamação da Ferida, Exsudato/Drenagem, Granulação, Tunelamento, Formação de cicatriz e Tamanho da ferida. Conclusão e implicações para a prática: os indicadores selecionados permitiram a elaboração de um instrumento que auxiliará na avaliação de pacientes com lesão por pressão de forma acurada. Esse instrumento subsidiará o enfermeiro na tomada de decisão diagnóstica e terapêutica da lesão por pressão.

Palavras-chave: Lesão por Pressão; Processo de Enfermagem; Terminologia Padronizada em Enfermagem; Avaliação de Resultados em Cuidados de Saúde, Cicatrização.

RESUMEN

Objetivos: seleccionar los indicadores de resultados de enfermería Integridad tisular: piel y membranas mucosas (1101) y Cicatrización de heridas: segunda intención (1103) de la Nursing Outcomes Classification, y construir sus definiciones conceptuales y operativas para la evaluación de los pacientes con lesiones por presión. Métodos: estudio de consenso de expertos realizado en un hospital universitario en septiembre/2018. Participaron en el estudio diez enfermeras. La recolección de datos se realizó a través de reuniones cara a cara con los especialistas. Resultados: Se seleccionaron 17 indicadores de la Nursing Outcomes Classification para la evaluación del paciente con una lesión por presión, con el 100% de acuerdo entre los especialistas. Son ellos: Blanqueamiento, Eritema, Sensibilidad, Perfusión tisular, Hidratación / Descamación, Espesor, Necrosis, Olor desagradable en la herida, Piel con burbujas, Piel macerada, Descamación debajo de los bordes de la herida, Inflamación de la herida, Exudado/Drenaje, Granulación, Túneles, Formación de cicatrices y Tamaño de la herida. Conclusión e implicaciones para la práctica: los indicadores seleccionados permitieron la elaboración de un instrumento que ayudará en la evaluación de los pacientes con lesiones por presión. Este instrumento subvencionará a las enfermeras en la toma de decisiones diagnósticas y terapéuticas de la lesión por presión.

Palabras claves: Lesión por Presión; Proceso de Enfermería; Terminología Normalizada de Enfermería; Evaluación de Resultado en la Atención de Salud, Cicatrización de Heridas.

INTRODUCTION

Pressure injury (PI) is a localized damage to the skin and underlying tissues, in general, over a bone prominence combined with shear and friction.[1] International studies indicate that incidence rates are approximately 3.51% to 25.9%[2,3] and prevalence of 16.9% to 23.8%[3] in intensive care patients. In clinical units, the incidence of PI is 1.8% and the prevalence is 3.3%.[4] In Brazil, the incidence of PI in patients hospitalized in intensive care units is 13.95% and the prevalence is 17.79%.[5] In clinical and surgical units, the prevalence is 10% and the incidence is 6%.[6]

These data demonstrate that pressure injuries (PIs) are still more prevalent in bed or wheelchair confined patients in individuals with extreme age, incontinence and/or neurological dysfunction.[1,2,4,7,8] The treatment of PI and its complications implies high financial costs,[9] however more important than the financial burden is the high social and emotional impact that PI causes to patients.[9,10]

It is known that nursing has a fundamental role in the care of the patient with PI, being indispensable that the nurse makes a careful evaluation of the patient who presents this type of injury, to have the possibility to define the best interventions and to obtain the solution and/or improvement of this health problem. All treatment begins with an accurate evaluation of the lesion, hence the need to use evaluation tools, which allows greater reliability.[11,12]

One of the examples of instruments is the Pressure Ulcer Scale for Healing (PUSH) adapted and validated in Brazil[13] and used for evaluation of PI healing. Besides this scale, the Nursing Outcomes Classification (NOC),[14] standardized nursing language system, has been used in clinical studies, both to evaluate nursing interventions and to expand their use and qualify their content, in order to provide excellence in the evaluation of health care outcomes. Examples are studies that bring conceptual and operational definitions for NOC indicators,[11,12,15] as well as research that has sought evidence of nursing care to patients with skin and tissue damage,[10,11,16] but are still incipient those that address its use in a specific way for evaluating the PI.

Thus, considering the negative impact of the PI on patients' health and the possibility of using the NOC, with more than 500 nursing outcomes containing thousands of clinical indicators that, although still lacking conceptual and operational definitions, present themselves as an alternative in the evaluation of the PI, it was possible to define the problem that justified the performance of this study. The same search deepens the knowledge about the most appropriate indicators for a reliable nursing evaluation to the patient with PI, having as purpose to provide a set of clinical indicators applicable to this evaluation in an accurate way.

For this purpose, this study had as objectives to select the indicators of the nursing outcomes Tissue integrity: skin and mucous membranes (1101) and Wound healing: second intention (1103) of the Nursing Outcomes Classification/NOC, and to construct its conceptual and operational definitions for the evaluation of patients with PI.

METHOD

This is a consensus study of specialists, conducted at a university hospital in the south of the country, from July to September 2018, where the clinical indicators of the results of NOC Tissue integrity: skin and mucous membranes (1101) and Wound healing: second intention (1103) for the evaluation of patients with PI were selected.

The sample of specialists was for convenience, composed of 10 nurses who are part of a Committee for Prevention and Treatment of Wounds of the institution, with experience in clinical practice for evaluation and treatment of patients with PI, and knowledge about the NOC. These nurses were ranked based on the criteria of Guimarães et al.,[17] as well as: junior expert, with a minimum score of five points; master expert, for those who scored between six and 20 points; and senior expert, those who scored more than 20 points.[17]

Experts were invited to participate in the study voluntarily. For the data collection, a face-to-face meeting was held lasting about three hours in which the researchers presented the study proposal and an instrument to be filled out.

The instrument contained questions regarding the professional characterization of the specialist, followed by the list of indicators of the outcomes Tissue integrity: skin and mucous membranes (1101) and Wound healing: second intention (1103), both previously selected by researchers based on the literature[10,11,16] on evaluation of the PI with the NOC. In the part of the instrument that contemplated the questions regarding the indicators of the NOC, the specialists were able to select, among the 40 clinical indicators, 22 belonging to the outcome Tissue integrity: skin and mucous membranes (1101), and 18 to the outcome Wound healing: second intention (1103). For the selection of indicators, specialists considered their relevance and applicability in clinical practice in the evaluation of patients with PI.

The indicators submitted to the selection of specialists regarding the outcome Tissue integrity: skin and mucous membranes (1101) were: Skin temperature, Sensation, Elasticity, Hydration, Perspiration, Texture, Thickness, Tissue perfusion, Hair growth on skin, Skin integrity, Abnormal pigmentation, Skin lesions, Mucous membrane lesions, Scar tissue, Skin cancers, Skin flaking, Skin scaling, Erythema, Blanching, Necrosis, Induration and Corneal abrasion. On the other hand, those referring to the outcome Wound healing: second intention (1103) were: Foul wound odor, Blistered skin, Macerated skin, Undermining, Wound inflammation, Purulent drainage, Serous drainage, Sanguineous drainage, Serosanguinous drainage, Granulation, Tunneling, Scar formation, Decreased wound size, Sinus tract formation, Necrosis, Sloughing, Periwound edema and Surrounding skin erythema.

For the final consensus among experts, 100% agreement was considered. After selecting the indicators, the researchers elaborated their conceptual and operational definitions, considering the magnitude on the Likert scale of five points for each selected indicator.[14] The elaboration of these definitions was based on previous studies,[10,11,16] in addition to consulting the literature in the SciELO, CINAHL Database and PubMed databases using the

descriptors: Pressure injury; Standardized Nursing Terminology, Outcome Assessment, Health Care. RIL was conducted in July 2019 and were considered full articles published from 2013 to 2018 in Portuguese, Spanish and English. From this review a synthesis was made, linked to previous studies and which underpinned the construction of definitions that were reviewed and approved by the specials in a presence meeting.

The study complied with Resolution 466 of 2012 of the National Health Council. All participants signed the Free and Informed Consent Term and the project was approved by the Ethics and Research Committee of the institution protocol 2018-0390.

RESULTS

Ten specialist nurses participated in the study, 8 (80%) of them classified as Master Expert and 2 (20%) as Junior Expert, with an average time of 18 years of work in the institution and 8 years of participation in the Committee for Prevention and Treatment of Wounds. In addition, they had an average of 23 (+/-10.8) years of professional experience, 80% with experience in research on PI and/or Nursing Process and 70% with scientific production related to the subject under study.

Seventeen indicators were selected from a total of 40 submitted to the specialists' consensus. Seven of these indicators were selected from the outcome Tissue integrity: skin and mucous membranes, which has a total of 22 indicators in the NOC (Chart 1).

Fifteen indicators of the NOC result were not selected by the specialists Tissue integrity: skin and mucous membranes, such as: Skin temperature, Elasticity, Perspiration, Texture, Hair growth on skin, Skin integrity, Abnormal pigmentation, Skin lesions, Mucous membrane lesions, Scar tissue, Skin cancers, Skin scaling, Skin flaking, Induration and Corneal abrasion.

Among the 18 indicators of the result Wound healing: second intention, the consensus of experts selected 10 for evaluation of the PI (Chart 2).

Five indicators of the result were excluded by the selection process of the specialists Wound healing: second intention, as: Sinus tract formation, Necrosis, Sloughing, Periwound edema and Surrounding skin erythema.

Chart 1. Indicators, conceptual and operational definition, according to the magnitude for their application on the Likert scale (score 1 to 5) of the NOC Nursing Outcomes Tissue integrity: skin and mucous membranes (1101). Porto Alegre, 2020.

Tissue integrity: skin and mucous membranes (1101)		
Definition: Structural intactness and normal physiological function of skin and mucous membranes[14]		
Indicator/ code numeric	**Conceptual definition**	**Operational definition according to its magnitude**
Blanching (110122)	Skin with partial or total whitish pigmentation in the area of the lesion.	Serious (1): Whitish Pigmentation (WP) in 100% of the PI area
		Substantial (2): WP in 75%-50% of the PI area
		Moderate (3): WP in 25%-50% of PI area
		Light (4): WP in 1%-25% of PI area
		None (5): No bleaching on the skin
Erythema (110121)	State in which the skin is reddened due to vascular dilation.	Serious (1): Erythema in 75-100% of PI area
		Substantial (2): Erythema in 50%-75% of PI
		Moderate (3): Erythema in 25%-50% of PI
		Light (4): Erythema from 0-25% PI
		None (5): Absence of erythema
Sensation (110102)	The body's ability to react to external or internal stimuli.	Severely compromised (a) (1): Does not react to pain, even with deep stimulus
		Very compromised (a) (2): Limited ability to react to pain, sensitivity to deep stimulus
		Moderately compromised (a) (3): Limited ability to react to pain, with sensitivity to surface stimulus
		Slightly compromised (a) (4): Ability to react to pain, with sensitivity in the extremities
		Not compromised (5): Ability to react to pain, no change in sensitivity

Source: research data.
Legend: Whitish Pigmentation (WP); Pallor on skin and mucous membranes (PSM); Pressure Injury (PI)

Chart 1. Continued...

Tissue integrity: skin and mucous membranes (1101)		
Definition: Structural intactness and normal physiological function of skin and mucous membranes[14]		
Indicator/ code numeric	**Conceptual definition**	**Operational definition according to its magnitude**
Tissue perfusion (1101111)	It is the level of capillary oxygenation, that is, the time of vascular filling.	Severely compromised (a) (1): Pallor in the skin and mucous membranes (PSM) with capillary filling time >10 seconds (s).
		Very compromised (a) (2): PSM with capillary filling time >3 and <10 s
		Moderately compromised (a) (3): PSM with 3 s capillary filling time
		Lightly compromised (a) (4): Light PSM with capillary filling time < 3 s
		None (5): There´s no bleaching on the skin
Hydration (110104)	Property of the natural skin barrier, moisture. In the expected state, the skin is with the water content normally humid, suitable to keep it looking healthy (with vigor and integrity).	Severely compromised (a) (1): Xerosis with burning, itching and cracks or with white spots, loose tissues and scaly skin
		Very compromised (a) (2): Rough/dry skin with cracks; or with white spots and loose tissues
		Moderately compromised (a) (3): Dry skin with furfur peeling (appearance of flour) or with white spots
		Gently compromised (a) (4): Skin dry or without flaking or swollen (swollen)
		Uncompromised (5): Full skin with healthy skin
Thickness (110109)	Depth affected by the lesion, with layers and structures of the skin altered by the loss of tissue integrity.	Severely compromised (a) (1):
		Commitment from dermis to bones
		Very compromised (a) (2):
		Commitment of dermis, subcutaneous tissue and muscles
		Moderately compromised (a) (3):
		Dermis and subcutaneous tissue commitment
		Slightly compromised (a) (4):
		Dermis only commitment
		Uncompromised (a) (5): Epidermis Integral
Necrosis (110123)	Destruction of a cell or tissue, due to lack of nutrients, with black, brown or brown coloration.	Serious (1): Necrosis in 75%- 100% of PI
		Substantial (2): Necrosis in 50%-75% of PI
		Moderate (3): Necrosis in 25%-50% of PI
		Light (4): Necrosis at 0-25% of PI
		None (5): Absence of necrosis

Source: research data.
Legend: Whitish Pigmentation (WP); Pallor on skin and mucous membranes (PSM); Pressure Injury (PI)

DISCUSSION

The results of this research contribute to the evaluation of the PI patient according to the selection of the main NOC indicators, which can lead the nurse to the most accurate evaluation of PI in his course during treatment. These indicators will also guide the planning of nursing interventions for the PI, which includes the choice of types of dressings, periodicity of changes and use of complementary therapies, in addition to adequacy in feeding, activity and elimination control, which can contribute to the improvement of the PI.

The Erythema (110121) indicator refers to the state of skin coloration due to vascular dilation, caused by inflammation of the lesion. When the erythema area is pressed, it whitens and disappears; when the pressure ceases, it returns to the reddish coloration. In this study, it was proposed the evaluation of this indicator through its measurement from 0 to 100%.

Chart 2. Indicators, conceptual and operational definition, according to the magnitude for their application on the Likert scale (score 1 to 5) of the NOC Nursing Outcome Wound healing: secondary intention (1103). Porto Alegre, 2020.

Wound healing: secondary intention (1103)		
Definition: Extent of regeneration of cells and tissues in an open wound[14]		
Indicator / numerical code	**Conceptual definition**	**Operational definition according to its magnitude**
Foul wound odor (110317)	Presence of unpleasant odor that exhales from the injury.	Extensive (1): Extremely stinking wound, with perceptible smell when entering the room
		Substantial (2): Very stinking wound with perceptible odor on removal of secondary cover
		Moderate (3): Foul-smelling wound, perceptible odor at removal of primary cover
		Limited (4): Slightly stinking wound, odor only perceptible when cleaning
		None (5): Odorless wound
Blistered skin (110310)	Superficial elevations, over 1 cm, formed by liquids in a cavity inside the skin.	Extensive (1): Skin with several blisters covering the entire length of the bed and the edges of the lesion
		Substantial (2): Skin with several blisters covering part of the bed and the edges of the lesion
		Moderate (3): Skin with one or more blisters covering only the edges of the lesion
		Limited (4): Skin with a blister on the injury bed
		None (5): Blister-free skin
Macerated skin (110311)	Whitish tissue, softened or ruptured skin due to excessive hydration.	Extensive (1): Extensive tissue maceration around the lesion 100% -75%
		Substantial (2): Great maceration 75-50%.
		Moderate (3): Average maceration 50%-25%
		Limited (4): Small maceration 25%- 0%
		None (5): Unstained Skin
Undermining (110315)	Condition of separation or distance of the tissue (s) from the bed under the edges of the lesion.	Extensive (1): Extensive detachment area under the edges of the lesion 100% -75%
		Substantial (2): Large area of detachment under the edges of the lesion 75%-50%.
		Moderate (3): Average detachment area under the edges of the lesion 50%-25%
		Limited (4): Small detachment area under the edges of the lesion 25% -0%
		None (5): Tissue without detachment
Wound inflammation (110322)	Healing phase with infiltration of neutrophils, macrophages and lymphocytes.	Extensive (1): Extensive area of inflammation (redness, heat, pain) in the lesion 100% -75%
		Substantial (2): Large area of inflammation 75%-50%.
		Moderate (3): Average area of inflammation 50%-25%
		Limited (4): Small area of ignition 25% - 0%
		None (5): Injury without inflammation

Source: research data.

* According to NOC the indicators of Purulent, Sanguineous, Serosanguineous and Serous drainage are independent. In this study, they were grouped into a single indicator called Exsudate/Drainage, in order to facilitate its clinical application, according to the consensus of experts.

Chart 2. Continued...

Wound healing: secondary intention (1103)		
Definition: Extent of regeneration of cells and tissues in an open wound[14]		
Indicator / numerical code	**Conceptual definition**	**Operational definition according to its magnitude**
***Exudate/drainage (110303-304-305-306)**	Aqueous content from the lesion composed of cells, protein content and dead microorganisms.	Extensive (1): Purulent exudate (green or brown aqueous)
		Substantial (2): Bloody exudate (aqueous)
		Moderate (3): Serum exudate (aqueous or yellowish-pink colored liquid)
		Limited (4): Serous exudate (yellowish aspect) None (5): Absence of exudate
Granulation (110301)	Vivid red tissue with shiny appearance due to the circulation of red blood cells.	None (1): No granulation tissue
		Limited (2): 0-25% PI granulation area
		Moderate (3): Granulation area of 25-50% PI
		Substantial (4): Granulation area of 50-75% of PI
		Extensive (5): 75-100% PI granulation area
Tunneling (110314)	Creation of an artificial conduit within the lesion.	Extensive (1): tunnel >10cm in lesion
		Substantial (2): tunnel between 9 > 7cm in the lesion
		Moderate (3): tunnel between 6 > 4cm in lesion
		Limited (4): tunnel between 3 > 1cm in lesion
		None (5): No tunnel
Scar formation (110320)	Wound covered with epithelial tissue in a pinkish color that develops from the edge.	None (1): Absence of epithelial tissue
		Limited (2): Area of epithelial tissue of 0-25%.
		Moderate (3): Area of epithelial tissue 25-50%.
		Substantial (4): Area of epithelial tissue 50-75%.
		Extensive (5): Area of epithelial tissue from 75-100%.
Decreased wound size (110321)	Wound area: greatest length versus greatest width (cm2)	None (1): No reduction in the size of the injury
		Limited (2): Small 0%-25% reduction
		Moderate (3): Average reduction of 25%-50%
		Substantial (4): Large reduction of 50%-75%
		Extensive (5): Virtually closed lesion 75%-100%

Source: research data.

* According to NOC the indicators of Purulent, Sanguineous, Serosanguineous and Serous drainage are independent. In this study, they were grouped into a single indicator called Exsudate/Drainage, in order to facilitate its clinical application, according to the consensus of experts.

In the PI, erythema is the result of prolonged external skin pressure, often present in patients with little mobility, confined to bed or wheelchair, with compromised sensory perception and/or mechanical restriction.[18] When in the presence of stage I PI, the skin presents with a localized area of erythema or redness, however, it does not whiten after pressure relief, pointing to tissue damage, being therefore an important indicator to be evaluated.[18,19]

It is easier to observe the occurrence of erythema in light skin than to identify it in dark pigmented skin. It is also important to verify the presence of other factors such as local heat, edema and alteration in the consistency of the tissue in relation to the surrounding tissue as stiffness, which are also indicative of early damage caused by pressure on dark pigmented skin.[1]

The Sensation (110102) indicator allows the evaluation of the organism's reaction capacity to external or internal stimuli. The total or partial loss of reaction to an internal or external stimulus demonstrates a change in the patient's sensory perception and, when associated with an increase in the force

of tissue compression, decreases the perception of pain, and consequently, the mobilization of the patient, which can result in the PI.[8-20] Thus, the recommendation with a strong level of evidence for the prevention and treatment of PI is the change in the patient's decubitus every 2 hours, especially in those with decreased sensitivity and those who are bedridden.[1,20]

The Tissue perfusion (1101111) indicator allows the evaluation of the level of vascular oxygenation in relation to the speed with which the circulation of the skin returns to the basal conditions after the local pressure of the skin is applied. Tissue oxygenation and perfusion are essential conditions for the maintenance of tissue integrity, thus, the decrease in blood supply favors the decrease in transport of defense cells and nutrients, contributing to ischemia and aggravation of tissue necrosis, which, related to pressure, favor the development of PI.[21]

The Hydration (110104) indicator refers to the evaluation of skin moisture, where one expects to find a skin with the water content normally wet, to keep it looking healthy, vigorous and full. In the case of PI, it is important to evaluate this condition, which is part of the skin microclimate risk factor, which allows the evaluation of temperature, moisture and air flow under the skin in relation to a support surface.1

Corroborating the importance of this indicator, study has developed an instrument of skin hydration evaluation in elderly, called Skin Turgor Evaluation Scale (EATP), which helps the nurse in the prevention of PI.[22] The importance of evaluating the hydration levels of the patient's skin is important both for the prevention of the lesion and during its treatment. This measure, attached to a humid/hydrated environment, when the lesion is already installed, accelerates the healing process, assists in the removal of exudate and performs mechanical debridement of non-viable tissues, evidencing to be an important indicator to be evaluated for the choice of the most appropriate dressing for the healing phase of the lesion.[16]

The Blanching (110122) indicator allows the evaluation of the skin pigmentation conditions in the PI area. This indicator is present, most of the times, in elderly people, in which the aging process leads to alterations in the melanocytes with reduction of the epidermis-dermis thickness, reduction of the elasticity and sebum secretion by the sebaceous glands, reduction of the vascular bed and paleness in the skin coloration. These changes in the tegumentary system of the elderly highlight the need for the nurse to prevent and evaluate the PI and treat it safely with appropriate technologies.[22]

Linked to this indicator, it is possible to observe in the skin the presence of the Macerated skin (110311) indicator which, besides the whitish tissue, presents itself as softened or ruptured skin due to excessive hydration and/or exposed, for a prolonged time, to the moisture around and in the area of the lesion. The excess moisture coming from urine, feces, sweat, food remains and wound exudations, weakens the layers of the skin and raises its Ph, causing changes in the epidermal barrier. This enhances the friction and shear forces which, associated with tissue pressure, may contribute to trigger an inflammatory process and, consequently, an PI.[23]

This clinical indicator is also present in PI risk predictor scales such as Braden[24] and Integrare[25], however, with moisture nomenclature. In addition, updated guideline on PI points out that soft tissue tolerance from support surfaces causes cellular and vascular deformations and skin rupture, and these increase with the microclimate (moisture), age, perfusion, health status (chronic or acute) and patient comorbidities.[1]

The Thickness (110109) indicator implies assessing the layers and structures of the skin altered by the loss of tissue integrity in the PI area. Therefore, the evaluation of this indicator is related to the classification of the PI stage, since the PI classification system, besides determining the severity of the lesion according to the tissue damage, described in stages or numbered degrees, allows the evaluator to identify the type of tissue exposed at the lesion site. Thus, the deeper the PI, the greater the stage it is at. The knowledge of this also favors the evaluation of the healing process.[1]

The Foul wound odor (110317) indicator evaluates the bad smell coming from the injury, which originates from colonization and infection in the wound. Its presence may be indicative of delayed tissue healing and, therefore, a greater negative impact on the patient's health and a greater cost in their treatment. Patients with stinking wounds usually experience social isolation, shame, loss of appetite and even depression.[26]

The Blistered skin (110310) indicator makes it possible to evaluate collections of liquids larger than 1cm located in the layers of the skin, that is, in the presence of blisters. This indicator is characteristic of stage II PI, although it can also present itself in other stages of the lesion, often indicating excess moisture.[1]

The Undermining (110315) indicator has the function of evaluating the condition of separation or detachment of the tissue(s) from the bed under the wound edge. For patients with infected wound and difficult to manage, this indicator has a high incidence. In these cases, the nurse can make use of the Negative Pressure Therapy (NPT) dressing technology, which promotes healing in a humid environment, by means of a sub atmospheric pressure controlled and applied locally.[27]

The Wound inflammation (110322) indicator allows the nurse to evaluate the first phase of the healing process, characterized by the infiltration of neutrophils, macrophages and lymphocytes, with the presence of pain, redness and heat. This process is part of the beginning of a cascade of events that culminates in the re-establishment of epithelial tissue. However, the nurse needs to be aware of this process that may evolve into an infection.[28]

The Necrosis (110123) indicator describes the destruction of a cell or a certain tissue, usually due to lack of nutrients carried by the blood. Clinically it has a black, brown or brown coloration that adheres firmly to the bed or the edges of the wound and may be harder or more softened compared to peri-lesion skin. The Granulation (110301) indicator in turn is the opposite, it refers to the presence fibroblast matrix with a shiny and granular aspect. Collagen and neovascularization produce fragile capillaries that

cause granulation tissue, which must be maintained in a wet environment for epithelial formation.[16] These two indicators are essential in the evaluation of the PI, considering that from them the types of exudates will appear and will indicate worsening or improvement of healing.

Linked to this, the Exudate/Drainage (110303-304-305-306) indicator also indicates the improvement or worsening of the lesion, depending on its characteristic. The same can come from the inflammatory process (serous, sanguineous and serosanguineous) or infectious (purulent) of the lesion. Its evaluation helps the nurse to verify the degree of healing of the lesion, the need to clean it with debridement technique or not, and maintenance of the wet environment to stimulate angiogenesis and the formation of fibrin and collagen in the attempt to epithelialize and close the PI.[28] The importance of this indicator is corroborated in PUSH, which helps to monitor the change in the PI status over time.[13]

The Scar formation (110320) indicator allows the evaluation and measurement of the epithelial tissue that covers the lesion at its closure, with pink or shiny coloration and develops from the edges of the lesion. To reach this stage, the lesion will need care that takes into account the intrinsic and extrinsic factors, to which the patient is being submitted in order to establish the best treatment for each stage of wound healing.[29] It is inferred that this is perhaps the most important indicator of the evaluation of the lesion, because in its evaluation the other indicators may be implicit, since a wound does not heal if all its conditions are not considered, that is, type of tissue present, type of exudate, tissue perfusion, besides skin conditions, among others.[28]

The Decreased wound size (110321) and Tunneling (110314) indicators allows the measurement of the area and depth of the PI. A recent study evaluated PI healing in patients coming from a Home Care Service and pointed to a significant difference ($p<0.001$) between the variation in planimetry and the depth of PIs over time.[30] Thus, the evaluation of these indicators allows the nurse to verify whether or not there is a delay in healing and also to classify the PI in stages, since this classification is based on the inspection of the type of tissue exposed and the extent of tissue damage.[1]

CONCLUSION AND IMPLICATIONS FOR CLINICAL PRACTICE

The selection of 17 indicators of the NOC outcomes Tissue integrity: skin and mucous membranes (1101) and Wound healing: second intention (1103) produced a set of indicators capable of facilitating the evaluation of patients affected by PI, according to the consensus among specialists. Its application in clinical practice may produce evidence of the quality of care, as well as favor the teaching and diagnostic and therapeutic decision making of the PI. In addition, the contribution with conceptual and operational definitions of the selected indicators may facilitate the use of the NOC in a real scenario of care, in addition to collaborating in the refinement of this classification in the follow-up of the PI healing process. The limitation of the study is related to the fact that the specialists come from the same health institution. However, they fulfilled the criteria adopted for their participation, which denotes scientific rigor to the study.

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AUTHORS' CONTRIBUTIONS

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REFERENCES

1. European Pressure Ulcer Advisory Panel – EPUAP, National Pressure Injury Advisory Panel – NPIAP, Pan Pacific Pressure Injury Alliance – PPPIA. Prevention and treatment of pressure ulcers/injuries: guideline. Prague: EPUAP/NPIAP/PPPIA; 2019.
2. Li D. The relationship among pressure ulcer risk factors, incidence and nursing documentation in hospital-acquired pressure ulcer patients in intensive care units. J Clin Nurs. 2016 ago;25(15-16):2336-47. http://dx.doi.org/10.1111/jocn.13363. PMid:27302084.
3. Chaboyer WP, Thalib L, Harbeck EL, Coyer FM, Blot S, Bull CF et al. Incidence and prevalence of pressure injuries in adult intensive care patients: a systematic review and meta-analysis. Crit Care Med. 2018 nov;46(11):e1074-81. http://dx.doi.org/10.1097/CCM.0000000000003366. PMid:30095501.
4. Biçer EK, Güçlüel Y, Türker M, Kepiçoglu NA, Sekerci YG, Say A. Pressure ulcer prevalence, incidence, risk, clinical features, and outcomes among patients in a Turkish Hospital: a cross-sectional, retrospective study. Wound Manag Prev. 2019 fev;65(2):20-8. PMID: 30730302.
5. Palhares VC, Palhares No AA. Prevalência e incidência de úlcera por pressão em uma unidade de terapia intensiva. Rev enferm UFPE on line. [Internet] 2014 out; [citado 2020 abr 25];8(Supl 2):[aprox. 7 telas]. Disponível em: http://hdl.handle.net/11449/140740.
6. Melleiro MM, Tronchin DMR, Baptista CMC, Braga AT, Paulino A, Kurcgant P. Indicadores de prevalência de úlcera por pressão e incidência de queda de paciente em hospitais de ensino do município de São Paulo. Rev Esc Enferm USP. 2015; 49(n. esp2):55-9. http://dx.doi.org/10.1590/S0080-623420150000800008.

7. Kaysera SA, Van Gilderb CA, Lachenbrucha C. Predictors of superficial and severe hospital-acquired pressure injuries: a cross-sectional study using the International Pressure Ulcer Prevalence survey. Int J Nurs Stud. 2019 jan;89:46-52. http://dx.doi.org/10.1016/j.ijnurstu.2018.09.003.
8. Santos CT, Almeida MA, Lucena AF. The Nursing Diagnosis of risk for pressure ulcer: content validation. Rev Lat Am Enfermagem. 2016 jun;24:e2693. http://dx.doi.org/10.1590/1518-8345.0782.2693. PMid:27305182.
9. Demarré L, Van Lancker A, Van Hecke A, Verhaeghe S, Grypdonck M, Lemey J et al. The cost of prevention and treatment of pressure ulcers: a systematic review. Int J Nurs Stud. 2015 nov;52(11):1754-74. http://dx.doi.org/10.1016/j.ijnurstu.2015.06.006. PMid:26231383.
10. Palagi S, Severo IM, Menegon DB, Lucena AF. Laser therapy in pressure ulcers: Evaluation by the Pressure Ulcer Scale For Healing and Nursing Outcomes Classification. Rev Esc Enferm USP. 2015 out;49(5):826-33. http://dx.doi.org/10.1590/S0080-623420150000500017. PMid:26516754.
11. Barreto LNM, Swanson EA, Almeida MA. Nursing Outcomes for the Diagnosis Impaired Tissue Integrity (00044) in Adults With Pressure. Int J Nurs Knowl. 2016 fev;27(2):104-10. http://dx.doi.org/10.1111/2047-3095.12081. PMid:25808109.
12. Luzia MF, Argenta C, Almeida MA, Lucena AF. Conceptual definitions of indicators for the nursing outcome "Knowledge: Fall Prevention". Rev Bras Enferm. 2018 mar/abr;71(2):431-9. http://dx.doi.org/10.1590/0034-7167-2016-0686. PMid:29412303.
13. Santos VLCG, Azevedo MAJ, Silva TS, Carvalho VMJ, Carvalho VF. Adaptação transcultural do Pressure Ulcer Scale for Healing (PUSH), para a língua portuguesa. Rev Lat Am Enfermagem. 2005 maio/jun;13(3):305-13. http://dx.doi.org/10.1590/S0104-11692005000300004. PMid:16059535.
14. Moorhead S, Johnson M, Maas ML, Swanson E. Classificação dos Resultados de Enfermagem: mensuração dos resultados em saúde. 6. ed. St. Louis, Missouri: Elsevier; 2018.
15. Pires AUB, Lucena AF, Behenck A, Heldt E. Resultados da Nursing Outcomes Classification/NOC para pacientes com transtorno obsessivo-compulsivo. Rev Bras Enferm. 2020 fev 10;73(1):e20180209. http://dx.doi.org/10.1590/0034-7167-2018-0209. PMid:32049241.
16. Osmarin VM, Boni FG, Bavaresco T, Lucena AF, Echer IC. Uso da Nursing Outcomes Classification - NOC para avaliar o conhecimento de pacientes com úlcera venosa. Rev Gaúcha Enferm. 2020; 41(n. spe), e20190146. http://dx.doi.org/10.1590/1983-1447.2020.20190146.
17. Guimarães HCQCP, Pena SB, Lopes JL, Lopes CT, Barros ALBL. Experts for Validation Studies in Nursing: New Proposal and Selection Criteria. Int J Nurs Knowl. 2016 jul;27(3):130-5. http://dx.doi.org/10.1111/2047-3095.12089. PMid:25782343.
18. Artico M, Dante A, D'Angelo D, Lamarca L, Mastroianni C, Petitti T et al. Prevalence, incidence and associated factors of pressure ulcers in home palliative care patients: a retrospective chart review. Palliat Med. 2018 jan;32(1):299-307. http://dx.doi.org/10.1177/0269216317737671. PMid:29130416.
19. Moraes JT, Borges EL, Lisboa CR, Cordeiro DCO, Rosa EG, Rocha NA. Conceito e classificação de lesão por pressão: atualização do National Pressure Ulcer Advisory Panel. Enferm. Cent. O. Min. 2016 maio/ago;6(2). http://dx.doi.org/10.19175/recom.v6i2.1423.
20. van der Wielen H, Post MWM, Lay V, Glasche K, Scheel-Sailer A. Hospital-acquired pressure ulcers in spinal cord injured patients: time to occur, time until closure and risk factors. Spinal Cord. 2016;54(9):726-31. http://dx.doi.org/10.1038/sc.2015.239. PMid:26782839.
21. Cox J, Roche S, Murphy V. Pressure injury risk factors in critical care patients: a descriptive analysis. Adv Skin Wound Care. 2018;31(7):328-34. http://dx.doi.org/10.1097/01.ASW.0000534699.50162.4e. PMid:29923903.
22. Giaretta VMA, Silva AM, Renó ACM, Aguiar DAF, Arantes CMS, Posso MBS. Proposta de escala para avaliar o turgor da pele de idosos. Rev Ciên Saúde [Internet]. 2016; [citado 2020 mar 25]; 1(1):[aprox. 7 telas]. Disponível em: https://revistaeletronicafunvic.org/index.php/c14ffd10/article/view/7/12
23. Schwartz D, Magen YK, Levy A, Gefen A. Effects of humidity on skin friction against medical textiles as related to prevention of pressure injuries. Int Wound J. 2018;15(6):866-74. http://dx.doi.org/10.1111/iwj.12937. PMid:29797409.
24. Bergstrom N, Braden BJ, Laguzza A, Holman V. The Braden Scale for predicting pressure sore risk. Nurs Res. 1987 jul/ago;36(4):205-10. http://dx.doi.org/10.1097/00006199-198707000-00002. PMid:3299278.
25. Porcel-Gálvez AM, Romero-Castillo R, Fernández-García E, Barrientos-Trigo S. Psychometric testing of INTEGRARE, an instrument for the assesment of pressure ulcer risk in inpatients. Int J Nurs Knowl. 2018 jul;29(3):165-70. http://dx.doi.org/10.1111/2047-3095.12173. PMid:28834407.
26. Sarabahi S. Recent advances in topical wound care. Indian J Plast Surg. 2012;45(2):379-87. http://dx.doi.org/10.4103/0970-0358.101321. PMid:23162238.
27. Lima RVKS, Coltro PS, Farina Jr JA. Terapia por pressão negativa no tratamento de feridas complexas. Rev Col Bras Cir. 2017 jan/fev;44(1):81-93. http://dx.doi.org/10.1590/0100-69912017001001. PMid:28489215.
28. Su L, Zheng J, Wang Y, Zhang W, Hu D. Emerging progress on the mechanism and technology in wound repair. Biomed Pharmacother. 2019 set;117:109191. http://dx.doi.org/10.1016/j.biopha.2019.109191. PMid:31387187.
29. Najafi E, Ahmadi M, Mohammadi M, Beigmohammadi MT, Heidary Z, Vatanara A et al. Topical pentoxifylline for pressure ulcer treatment: a randomised, double-blind, placebo-controlled clinical trial. J Wound Care. 2018 ago;27(8):495-502. http://dx.doi.org/10.12968/jowc.2018.27.8.495. PMid:30086256.
30. Machado DO, Mahmud SJ, Coelho RP, Cecconi CO, Jardim GS, Paskulin LMG. Cicatrização de lesões por pressão em pacientes acompanhados por um serviço de atenção domiciliar. Texto Contexto Enferm. 2018;27(2). http://dx.doi.org/10.1590/0104-07072018005180016.

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