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Care Bundle for Medical Device-Related Pressure Injuries in Covid-19 times

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Abstract

Objective: *To validate the content of the Nursing Care Bundle for the prevention, diagnosis and treatment of Medical device-related Pressure Injuries.*

Method: *Methodological study, with a quantitative approach, conducted in May and June 2019, with a sample of 20 nurses specialized in stomatherapy, using an electronic form, consisting of prevention actions, nursing diagnoses and treatments for Medical device-related Pressure Injuries. For data analysis, the content validity index (≥0.8) was used.*

Results: *The Bundle was validated in its final version with care aimed at prevention, nursing diagnosis and treatment of Medical device-related Pressure Injuries, with CVI of 0.93.*

Conclusions: *The validated Bundle contributes to reducing the occurrence of Medical device-related Pressure Injuries by qualifying the nursing care provided, envisioning patient safety in Covid-19 times.*

Keywords: *Nursing; Pressure injury; Equipment and supplies; Coronavirus; Nursing care.*

Introduction

The World Health Organization (WHO), in mid-March 2020, declared a worldwide pandemic alert and mobilization, due to the high number of infection cases caused by the coronavirus COVID-19 (1).

In Brazil, the pandemic began in late February, and the number of infected individuals has been increasing daily, as it is a virus with a high potential for transmission (2).

The patients affected by COVID-19 have variable clinical symptoms, with some individuals with asymptomatic infection, going from mild illness with signs and nonspecific symptoms of acute respiratory illness to severe or fatal illness characterized by pneumonia, with severe respiratory impairment, which may result in hospitalization in intensive care units, orotracheal intubation, use of vasoactive drugs and septic shock (3).

The elderly population and individuals with some chronic disease are vulnerable to presenting symptoms more severely, as aging and illness tend to decrease immunity against infections in general (4).

In view of the severity of the symptoms triggered by COVID-19, many patients require intensive care, where the use of medical devices is essential for maintaining life. However, some critical patients have significant pressure and respiratory lability, where minimal movements can result in clinical decompensation (3).

One of the approaches adopted for the treatment of acute respiratory distress syndrome is the prone position, which must be applied early (first 48 hours), once pronated, the patient must be kept for at least 16 hours in this position, triggering the risk of develop Pressure Injuries (PI), especially those related to medical devices (5).

In the face of the pandemic, the risk of developing Medical device-related Pressure Injuries (MDRPI) is

a growing problem, also associated with the fact that the populationmost affected by the virus are elderly and with associated comorbidities, increasing the risk of developing skin lesions (3-4).

The National Pressure Injury Advisory Panel (NPIAP) describes that the damage to the underlying skin occurs over bony prominence or is related to a medical device or other type of device. MDRPI results from the use of medical devices, designed and applied for diagnostic or therapeutic purposes, where PI generally maintains the pattern or shape of the device. Therefore, these injuries must be classified using the staging system (6).

The nurse has a fundamental role with regard to holistic care, however many MDRPI are iatrogenic, due to the fixation of the device making it difficult to inspect the skin or mucosa. Thus, evaluation is essential to implement effective preventive measures and for this to happen, it is essential that this professional has technical-scientific knowledge based on evidence about this disease (7).

As a prevention and care strategy, Bundles are instruments that, through care management, enable safety and quality of care based on current scientific knowledge, especially when anchored in levels of evidence. In addition, it recommends that all actions should be observed, otherwise the same results are not obtained (7).

Objective

Validate a Nursing Care Bundle for prevention, diagnosis and treatment of MDRPI during hospitalization.

Methods

Ethical Aspects

The study was approved by the Human Research Ethics Committee at the Federal University of Santa Catarina (UFSC).

Design, Sample and Inclusion and Exclusion Criteria

This is a methodological study with the purpose of validating a bundle of nursing care for the prevention, diagnosis and treatment of MDRPI.

The methodological trajectory of the study followed the validation of the instrument by a panel of experts and agreement between the expert judges in the area of stomatherapy to define the representativeness of the measured construct.

To build the initial sample of experts, the Snowball technique was used, where the seeds help the researcher to establish contacts. Thus, it is requested that the professionals indicated by the seeds indicate new contacts with the desired characteristics, from their personal network and so on (8).

For validation of the instrument, experts on the theme were invited to participate, according to the inclusion criteria: nurses who develop assistance, teaching and / or research activities with the title of Stomatherapist certified by the Brazilian Association of Stomatherapy (SOBEST). As for the exclusion criterion, it consisted of not respecting the 10-day deadline for returning the completed data collection instrument.

134 nurses were contacted by e-mail, through an invitation letter in which the guidelines and justifications for this study and the importance of participation as a specialist were elucidated. After acceptance, the link was sent to access the Consent Form, being essential the signature to access the validation instrument. Twenty nurses participated in the validation of the instrument.

Study Protocol

The validation stage took place in the period from April to May 2019. The validation instrument was prepared via an online form, on Google Docs®, a multifunctional tool shared via real-time email through the generated link, allowing the use of electronic spreadsheets. To assess the agreement of the opinions, the Likert scale was used to record the evaluation containing the scores 1 (disagree), 2 (partially disagree), 3 (partially agree) and 4 (agree). Were assessed for agreement, relevance and accuracy of the wording, in addition to a field of open responses to suggestions, observations, opinions and comments from experts (9).

The form was made available to the evaluating judges through two rounds of validation, developed according to the recommendation of the Delphi technique. These steps are in line with the literature, which points out that for the application of the referred technique, the researcher must prepare an objective form, structured or not, exploring the points that he wants to know the consensus of the specialists and send to them. The

form circulates through the group of experts to reach consensus.

For the statistical treatment in this phase, the categories were considered: completely adequate and adequate for those who reached a consensus ≥ 80% (0.8), with this agreement index based on other validation studies. The consensus of 80% (0.8) or more was considered valid between the evaluations of the judges, the values below 80% were adjusted, based on the experts' suggestions, being forwarded for a new evaluation (10,11).

The analysis of the second round generated reformulation and refinement of the content of the initial instrument. The experts' agreement regarding the representativeness of the items in relation to the content covered was measured using the content validity index (CVI), calculated by the number of evaluators in agreement with the item by the total number of evaluators (10).

Results

The sample consisted of 20 evaluators, predominantly female (85%), mostly qualified as masters (50%), followed by doctors (25%), specialists (20%) and post-doctorate (5%). Regarding the length of experience in the profession, most have worked for more than 20 years (35%) with 30% working for 11 to 15 years and 20% between five to ten years. As for the area, the highest concentration is in the hospital environment (45%), followed by activities related specifically to stomatherapy (45%) and the minority (10%) in hospital level concurrent with Primary Health Care. Finally, 40% of participants exercise teaching activity at a higher level, 35% in post-graduation and 20% do not exercise professors.

Table1. *Trial of experts for Bundle in the first and second round of the validation process. Florianópolis, SC - Brazil, 2020 (n = 20)*

	CVI *%	A*%	P*%	AW*%
Nursing Diagnosis: Pain[25]				
Pain under medical device is a predictive sign of Medical device-related Pressure Injuries	95	95	90	100
Sudden or slow onset pain under and around the medical device	95	95	100	100
Mild to severe pain under and around the medical device	95	95	100	100
Regular skin assessment after complaints of pain and discomfort reported by the patient and / or companion, especially in patients at higher risk (advanced age, malnutrition, edema)	95	95	90	100
Nursing Diagnosis: Pressure Injury (25)				
Injury located on the skin and / or underlying tissue usually on a bony prominence, resulting from pressure and shear or related to a medical device, categorized in stages	100	100	100	100
Pressure Injury stage 1: Skin intact with erythema that does not whiten	95	95	100	100
Stage 2 Pressure Injury: Partial thickness loss of skin with exposure of the dermis	94	94	100	100
Stage 3 Pressure Injury: Loss of full thickness skin	100	100	100	100
Stage 4 Pressure Injury: Loss of full thickness skin and non-visible tissue loss	0,94	94	100	100
Deep Tissue Injury: dark red, brown or purple discolouration, persistent and non-whitening	100	100	100	100
Nursing Diagnosis: Impaired skin integrity (25)				
Defined as dermis and altered epidermis, such as: alteration in the integrity of the skin, localized area hot to the touch, acute pain, foreign matter perforating the skin, redness	100	100	100	100

Hyperemia under and around the medical device	95	95	100	100
Skin macerated at the insertion site of the medical device	95	95	100	100
Altered microclimate under and around the medical device	95	95	100	100
Medical device inserted improperly, damaging tissue	95	95	90	100
Localized edema	95	95	100	100
Prevention and treatment				
Inspect the skin under and around the medical device more than 2x a day in people with specific conditions (risk of edema / generalized edema)	80	80	100	100
Choose the right sized device for each patient	100	100	100	100
Choose medical device with flexible and soft material	100	100	100	100
Develop an individualized skin assessment plan under and around the medical device in cases of edema or risk of edema	95	95	100	100
Loosen the fixings of the medical device whenever necessary	80	80	90	100
Keep skin clean and dry under and around the medical device	100	100	100	100
Avoid insertion of medical device in areas with pre-existing skin lesions	95	95	100	100
Apply monolayer occlusive dressing depending on the situation	84	84	90	100
Apply occlusive dressings with multiple layers depending on location and area	89	89	95	100
Apply fixations that allow visualization of the skin	90	90	100	100
Apply transparent films that allow visualization of the insertion site of the medical device as far as possible	100	100	100	100
Perform dressing changes when moisture is present	100	100	100	100
Apply thin hydrocolloid to avoid pressure and shear	80	80	100	100
Apply specific devices as a preventive support for Medical device-related Pressure Injuries	85	85	90	90
Avoid overlapping dressings	95	95	100	100
Choose dressings according to anatomical location	100	100	100	100
Choose dressings that allow ease of application and removal	100	100	100	100
Apply foam dressings to prevent pressure and shear and moisture absorption	90	90	100	100
Apply foams to absorb peristomal moisture (tracheostomy and gastrostomy) and under non-invasive ventilation masks	90	90	100	100
Apply foam dressings to maintain the microclimate	95	95	100	100
Apply foam dressings as they distribute pressure better	95	95	100	100
Apply foam dressing under tracheostomy cannula	95	95	100	100
Apply skin protector to each dressing change	80	80	100	100
Apply barrier-forming tissue to peristomal area of tracheostomy	89	89	100	100

Note: * CVI: content validity index, * A: agreement, * P: pertinence, * AW: accuracy of writing

Table2. *Bundle for the prevention of Medical device-related Pressure Injuries. Florianópolis, SC, Brazil, 2019.*

Preventive Care	Detailing of Care
Daily skin inspection	Inspect the skin under and around the medical device more than once a day; establish an individualized skin assessment plan under and around the medical device in cases of edema or risk of edema.
Choice and fixation of the medical device	Choose a medical device made of flexible and soft material with the appropriate size for each patient, refixing the device whenever necessary.
Repositioning the medical device	Reposition the medical device at least twice a day; Establish an individualized skin assessment plan under and around the medical device in cases of edema or risk of edema.
Skin care	Keep the skin under and around the medical device always clean and dry; Avoid inserting medical devices in areas with pre-existing skin lesions.
Protective dressing under the medical device	Apply skin protector to each dressing change and in the peristomal area of the tracheostomy (in spray, cream or tissue); Choice of prophylactic coverage according to the device, insertion site and clinical aspects of the patient; Consider: - Use fine hydrocolloid to protect the friction and shear: pay attention to areas of excess moisture, due to the risk of maceration and detachment of the cover; - Use foam dressings as they distribute pressure better, for protection from friction and shear and moisture absorption.

Table3. *Bundle for Nursing Diagnosis of Medical device-related Pressure Injuries. Florianópolis, SC, Brazil, 2019.*

Nursing Diagnoses	Detailing of care	Defining characteristics
Pain	● Identify pain located in the region of a medical device. ● Assess pain intensity using predictive scales: Visual analog or Behavior Pain Scale in sedated patients using mechanical ventilation. ● Pay attention to patients with a potential risk of Medical device-related Pressure Injuries for complaints of pain and discomfort. ● Promote pain control.	-Pain located in the region of the medical device is a predictive sign of Medical device-related Pressure Injuries. - Sudden or slow onset pain under and around the medical device. - Mild to severe pain under and around the medical device. - Regular skin assessment after complaints of pain and discomfort referred by the patient and / or companion, especially in patients at higher risk (advanced age, malnutrition, edema).
Impaired skin integrity	● Assess hyperemia around the medical device. ● Identify skin maceration at the insertion site of the medical device. ● Assess for moisture and heat under and around the medical device. ● Certify as to the insertion mode and correct positioning of the medical device to avoid injury to the skin. ● Assess for the presence of edema under and around the medical device.	-Dermis and epidermis altered, as: alteration in the integrity of the skin, localized area hot to the touch, acute pain, foreign matter perforating the skin, redness. - Hyperemia under around the medical device. - Skin macerated at the insertion point of the medical device. - Microclimate changed under and around the medical device. - Medical device inserted improperly, damaging the tissue. - Localized edema.

Pressure Injury	● Staging the Medical device-related Pressure Injuries in accordance with the National Pressure Injury Advisory Panel's staging system. ● Evolve the characteristics of the lesion in detail.	-Injury located on the skin and / or underlying tissue usually on a bony prominence, resulting from Medical device-related Pressure Injuries or other, being categorized into stages: - Pressure Injury stage 1: Skin intact with erythema that does not whiten; - Pressure Injury stage 2: Loss of the skin in its partial thickness with exposure of the dermis; - Pressure Injury stage 3: Loss of skin in its full thickness; - Pressure Injury stage 4: Loss of skin in its full thickness and non-visible tissue loss; - Deep Tissue Injury: dark red, brown or purple discolouration, persistent and not whitening. Pressure injury on mucous membrane.

Table4. *Bundle for the Treatment of Medical device-related Pressure Injuries. Florianópolis, SC, Brazil, 2019.*

Treatment	Detailing Care
Microclimate and exudate control	Use polyurethane foam dressings as they distribute pressure better, protection against friction and shear, better absorption of moisture and maintenance of the skin's microclimate. Consider: Apply in peristomal sites (tracheostomy and gastrostomy), under non-invasive ventilation masks and tracheostomy cannulas.
Dressing change	Select coverings that allow easy application and removal, according to the anatomical location and clinical aspects of the patient, replacing when there is excess moisture and avoiding overlapping of dressings.
Daily skin assessment, follow-up and monitoring of the lesion	Individualized plan for daily skin assessment under and around the medical device. Consider in the case of pressure injury related to medical device: Describe in medical records as to: staging, characteristics of the lesion, presence of exudate, edema, maceration and hyperemia of the skin; as well as the applied conduct and implemented treatments.

Discussion

The bundle of care for prevention, diagnoses and nursing treatment was validated in relation to the criteria of agreement, relevance and accuracy of the writing, since the final CVI 0.93, respectively, reaching the values indicated in the literature (10).

Studies reveal that MDRPI are frequent mainly in the elderly, due to capillary fragility, among other changes resulting from aging, causing the development of skin lesions. In addition, the elderly are more vulnerable to infections caused by COVID-19 due to low immunity caused by aging (4,12).

Elderly patients who are in critical condition in Intensive Care Units (ICUs) caused by COVID-19, need medical devices for therapeutic applicability, making them more susceptible to MDRPI, so that the devices with the greatest potential for injury are observed are respiratory, food, nasogastric tubes, oximeters and adhesives. Corroborating that, MDRPI may be related to the fact that professionals direct the focus on pathology and other organs than skin care, therefore

the importance of implementing the Care Bundle for standardization of nursing care is emphasized (12).

In this sense, the nurse must use instruments to guide nursing care regarding the choice and fixation of the medical device, it must be of flexible material and of adequate size for each patient, taking care to loosen its fixations whenever necessary and provided that the patient's clinical condition permits (13,14,15). In addition, it must be repositioned twice a day (15,16,17).

With regard to preventive care regarding MDRPI, daily skin inspection should be performed more than once a day, in addition to carrying out a plan for its evaluation under and around the medical device in patients with specific conditions, exemplifying those with swelling or at risk of edema, anasarca or presence of fluids around the medical device (19,20,22). The skin must always remain clean and dry under and around the device, avoiding its insertion in areas with pre-existing skin lesions (13,15,19,20).

With regard to protective dressings, transparent films or tapes should be used to allow visualization of the insertion site of the medical device as long as it is possible to apply this technology (21,22). Thin hydrocolloid is indicated to avoid skin pressure and shear (25). As for the prevention of pressure, shear and moisture absorption, foam dressings are among the most indicated, as they distribute pressure better avoiding injuries (23).

Still, with regard to prevention, the use of specific materials as a preventive support of gel or cushions relieve the pressure of the device on the skin. The application of barrier cream or spray at each dressing change is essential to protect the perilesional skin or peristoma, as well as the barrier-forming tissue in the peristomal area of the tracheostomy (21).

The Nursing Diagnosis (ND) validation studies are fundamental in the search for scientific evidence and in reducing the possibility of errors in the Nursing process and in the decision making process of the nurse, emphasizing that the ND described in this Bundle are correlated with each other in the identification of MDRPI (24). The Bundle comprised three nursing diagnoses of MDRPI, which were related to Acute Pain, Impaired Skin Integrity and Pressure Injury.

Among the ND, "Acute Pain" (25) located in the region of the medical device is a diagnosis which shows the occurrence of MDRPI, since the unpleasant sensory and emotional experience associated with real or potential tissue damage, of sudden or slow onset, from light to intense intensity, with anticipated or predictable termination and lasting less than 3 months. Among the factors related to pain is the harmful physical agent (26).

Among the nursing care related to the ND of "Pain", the identification of pain located in the region of a medical device is a predictive sign of MDRPI (30). Therefore, the nurse must assess the intensity of pain using predictive scales, such as Visual Analog or Behavior Pain Scale in sedated patients using mechanical ventilation. Pain assessment in critically ill, mechanically ventilated, unconscious and sedated patients (with a level of sedation from 4 to 6, according to the Ramsay scale) is assessed using the BPS-IP / PT scale (Behavior Pain Scale / Behavioral Scale of Brazilian version, which proved to be promising in the evaluation of pain, as they are often unable to communicate effectively, under the effect of sedation / analgesia or with a reduced level of consciousness (27,28).

Regarding the ND, entitled "Impaired skin integrity" (30) defined as dermis and altered epidermis, including alteration in skin integrity, localized area hot to the touch, acute pain, foreign matter perforating the skin, redness (25). The evaluation of the skin for hyperemia around the medical device, as well as observing the insertion site to identify the occurrence of macerated tissue, in the same way that moisture, heat and the presence of edema are risk factors for MDRPI. Early detection of skin degradation is relevant to implement preventive measures and prevent the development of injuries (13,20,23,25). Another relevant precaution to avoid injury to the skin is to make sure that the medical device is inserted and positioned correctly (13,16,19).

It should be noted that, recently, a new ND entitled "Pressure Injury" (30) was included, which was defined by a lesion located on the skin and / or underlying tissue, usually on a bony prominence, resulting from pressure and shear or related to a device doctor or other, being categorized into stages (28). MDRPI should be classified according to the NPUAP staging system, and they are common in two stages, however, these injuries can worsen for more advanced stages if not treated (16,29). The treatments of MDRPI

constitute technological elements and systematized nursing interventions.

Among the treatments, the management of the microclimate and exudate is necessary to avoid MDRPI, so that the polyurethane foam is indicated for control and maintenance of the microclimate and moisture absorption, especially in peristomal areas (tracheostomy, colostomy, gastrostomy and other stomas) , under non-invasive ventilation masks and tracheostomy cannula (23).

Regarding the application of occlusive dressings, it is important to select it according to the anatomical location, to assess how much the thickness is monolayer or multiple, avoiding overlapping of dressings (13). In relation to dressing changes, these should be carried out when there is moisture or the presence of exudate, opting for the choice of dressings that allow easy application and removal (21).

Study Limitations

Anyway, it was considered as a limitation of the study the divergence among the experts in some evaluated care and the delay in returning the instrument on the part of them, after signing the IC, was a difficulty faced in the validation steps.

Contributions to the Health Area

With regard to contributions to the area, this Bundle is considered to be extremely important for the standardization of nursing care in times of COVID-19, since, due to the severity of the clinical condition, patients make use of various medical devices predisposing the occurrence of MDRPI.

Conclusions

MDRPIs are frequent in the hospital environment, in most therapeutic treatments, it is necessary to use medical devices, predisposing the occurrence of this disease. This relationship is also present in patients who fall ill due to COVID-19, who lack critical care and are mostly elderly.

The validated items that make up the Bundle are of great relevance for the prevention, diagnosis and treatment of MDRPI and were considered valid because the general agreement of the instrument among the experts was 0.93.

It is believed that it contributes to the systematization of nursing care and the standardization of care care, adding knowledge to nursing professionals, not only in hospitals, but also for primary health care, since we have many elderly people who they use medical devices at home, so that the importance of this care can be explained to the family / patient and caregiver.

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