Journal of Nursing
Revista de Enfermagem
UFPE On Line
ISSN: 1981-8963

ORIGINAL ARTICLE

OCCURRENCE AND RISK FACTORS FOR PRESSURE INJURIES IN INTENSIVE CARE CENTERS

OCORRÊNCIA E FATORES DE RISCO PARA LESÕES POR PRESSÃO EM CENTROS DE TERAPIA INTENSIVA

OCURRENCIA Y FACTORES DE RIESGO PARA LESIONES POR PRESIÓN EM CENTROS DE TERAPIA INTENSIVA

Paula Knoch Mendonça[1], Marisa Dias Rolan Loureiro[2], Marcos Antonio Ferreira Júnior[3], Albert Schiaveto de Souza[4]

ABSTRACT

Objective: to describe the frequency and risk factors for development of pressure injuries (PIs) in clients of Intensive Care Centers. ***Method:*** quantitative, cross-sectional study of a sample of 104 clients from a population of 936 subjects from two public teaching hospitals assisted between March and June 2016. Data were collected using an observation form based on national and international guidelines, and descriptive statistical analysis was performed with a significance level of 5%. The results are presented as absolute and relative values, in tables, and the association between variables was calculated. ***Results:*** among the studied variables, age equal to or greater than 60 years, presence of hyperthermia and presence of swollen skin were the ones that had statistically significant effect on the occurrence of PIs. ***Conclusion:*** the risk factors identified as significant for the occurrence of PI can be prevented and, thus, the involvement of the nursing team is fundamental to prevent these lesions. ***Descriptors:*** Pressure Injury; Patient safety; Intensive Care Units; Nursing; Health Care; Critical Care.

RESUMO

Objetivo: descrever a frequência e os fatores de risco para o desenvolvimento de lesões por pressão em clientes de Centros de Terapia Intensiva. ***Método:*** estudo quantitativo, transversal, realizado em uma amostra de 104 clientes de uma população de 936 sujeitos de dois hospitais públicos de ensino, atendidos entre os meses de março a junho de 2016. Os dados foram coletados com uso de um formulário de observação baseado em diretrizes nacionais e internacionais, e a análise estatística descritiva foi realizada com adoção de um nível de significância de 5%. Os resultados são apresentados em tabelas em valores absolutos e relativos, e cálculos para verificação de associação entre as variáveis. ***Resultados:*** dentre as variáveis estudadas, a idade foi igual ou maior a 60 anos, a presença de hipertermia e de pele edemaciada foram as que apresentaram significância estatística com a ocorrência de LP. ***Conclusão:*** os fatores de risco identificados como significativos para a ocorrência de LP podem ser prevenidos, portanto, o envolvimento da equipe de enfermagem é fundamental na prevenção dessas lesões. ***Descritores:*** Lesão por Pressão; Segurança do Paciente; Unidades de Terapia Intensiva; Enfermagem; Assistência à Saúde; Cuidados Críticos.

RESUMEN

Objetivo: describir la frecuencia y los factores de riesgo para el desarrollo de lesiones por presión en clientes de Centros de Terapia Intensiva. ***Método:*** estudio cuantitativo, transversal, realizado en una muestra de 104 clientes de una población de 936 sujetos de dos hospitales públicos de enseñanza, atendidos entre los meses de marzo a junio de 2016. Los datos fueron recogidos con el uso de un formulario de observación basado en directrices nacionales e internacionales, y el análisis estadística descriptiva fue realizada con adopción de un nivel de significancia de 5%. Los resultados son presentados en planillas en valores absolutos y relativos, y cálculos para verificación de asociación entre las variables. ***Resultados:*** entre las variables estudiadas, la edad fue igual o mayor a 60 años, la presencia de hipertermia y de piel con edema fueron las que presentaron significancia estadística con la ocurrencia de LP. ***Conclusión:*** los factores de riesgo identificados como significativos para la ocurrencia de LP pueden ser prevenidos, por lo tanto, el envolvimiento del equipo de enfermería es fundamental en la prevención de esas lesiones. ***Descriptores:*** Úlcera por Presión; Seguridad del Paciente; Unidades de Cuidados Intensivos; Enfermería; Atención de Salud; Cuidados Críticos.

[1]Master, University Hospital of the Federal University of Grande Dourados/UFGD. Dourados (MS), Brazil. Email: paulaknoch@hotmail.com ORCID iD: http://orcid.org/0000-0002-5010-9579; [2]PhD, Master's Program in Nursing, Federal University of Mato Grosso do Sul/UFMS. Campo Grande (MS), Brazil. Email: marisarolan@gmail.com ORCID iD: http://orcid.org/0000-0001-8795-5966; [3]PhD, Master's and Doctoral Program in Nursing, Federal University of Rio Grande do Norte/UFRN. Campo Grande (MS), Brazil. Email: marcos_junior@ufms.br ORCID iD: https://orcid.org/0000-0002-9123-232X; [4]PhD, Master's and Doctoral Programs in Health and Development in the Center-West Region, Federal University of Mato Grosso do Sul/UFMS. Campo Grande (MS), Brazil. Email: albertss@hotmail.com ORCID iD: http://orcid.org/0000-0003-0017-672X

INTRODUCTION

Pressure injuries (PIs) represent a serious public health problem, mainly because of the impact they cause to the sick persons, their families and society. They are considered quality indicators of health care and require interventions for their prevention and treatment.[1]

Pressure injuries are a frequent problem in Intensive Care Centers (ICCs). In the daily practice, the evolution of PIs is rapid and can bring complications to the hospitalized patient, in addition to prolonging the time needed for treatment and rehabilitation.[2]

A Brazilian study performed in two ICCs of a private hospital in the state of Rio Grande do Norte showed an incidence of PIs of 50.0% in hospitalized clients.[3]

It should be emphasized that the development of PIs can also lead to lawsuits against both institutions and health professionals. PI prevention is a challenge for the multiprofessional team. It requires a qualified nursing team to identify the risk factors in order to plan and implement timely and effective prevention and treatment measures.[4]

Risk factors for PI development can be divided into extrinsic and intrinsic. Extrinsic factors are those derived from the environment, external to the patient. The most important are contact pressure on bony prominences, duration of this pressure, tissue tolerance, and microclimate.[5]

Efforts to develop and implement PI prevention protocols resulting from the National Patient Safety Program have notably increased in Brazilian hospitals. The incidence of pressure injuries is a quality indicator of nursing care. However, hospitals do not yet have a client safety culture and present difficulties to implement a prevention work as a priority practice. This is due to lack of human and material resources, the quality of nursing management, and lack of professional training.[6]

Nurses are responsible for the elaboration and implementation of preventive protocols, including periodic evaluation of adherence to the proposed measures, application of clinical indicators, continuing education, commitment to quality and/or improvement of structural, organizational and human resources and materials.[7]

In this context, this study adopted the following guiding question << What is the incidence of PIs and the associated risk factors in ICC-assisted clients? >>. The magnitude of epidemiological data on the occurrence of PIs and the risk factors determining its appearance in ICC clients is an important indicator of nursing care quality, and justify the relevance of the present study.

OBJECTIVE

- To describe the frequency and risk factors for development of pressure injuries in clients of Intensive Care Centers.

MÉTHOD

Paper based on the Master's thesis entitled << Pressure injuries: occurrence, risk factors and preventive clinical practice of nurses in Intensive Care Centers >>, presented at the Graduate Academic Master's Nursing program, Federal University of Mato Grosso do Sul. Campo Grande (MS), Brazil, 2017.

Quantitative, descriptive, analytical, cross-sectional study with clients assisted at two general adult ICCs from two public teaching hospitals in Campo Grande, Mato Grosso do Sul.

The study population consisted of all the clients assisted in the studied services, consisting of a total of 936 subjects. The sample was selected for convenience and included adults aged 18 years or over and with at least 24 hours of hospitalization. This criterion of minimum hospitalization time in the sector was adopted due to evidence that the risk of PI occurrence starts over that time. Pregnant women were excluded due to physiological aspects related to bed positioning, as well as the clients coming from long-term care institutions due to the difficulty of obtaining the data, besides the polytraumatized patients as a way to maintain homogeneity among participants of the two institutions eligible for the study. The final sample consisted of 104 participants and data collection was performed between March and June 2016.

For data collection, a one-time observation form was applied after 24 hours of hospitalization at the ICC, for evaluation of clients and collection of information from medical records. The observation script was adapted from relevant topics related to PI prevention and client safety cited in national and international guidelines.

The form was submitted to evaluation and approved by three PI experts regarding the following criteria: clarity, pertinence, content and suggestions. A pre-test was applied to three clients of the Coronary Unit of one of the institutions studied. The participants of

this pre-test also signed an Informed Consent Form (ICF).

The eligible variables were categorized into two groups: *1) Identification:* sex, color, age, and Body Mass Index (BMI); and *2) evaluation of risk factors:* temperature, laboratory test result (hemoglobin and leukocytes), nutritional status, skin conditions, capillary refill, mechanical ventilation, general health, physiological eliminations, use of vasoactive drugs, type of mattress used, and conditions of the sheets.

The collected data were stored in spreadsheets in the *Microsoft Office Excel® software*, version 2010. The analysis was performed using the *Statistical Package for the Social Sciences* (SPSS), version 23.0, through descriptive statistics and chi-square or Fisher's exact tests, according to the analyzed variables, in addition to the statistical test of *Odds Ratio*. The level of significance adopted was 5%. The results were presented in tables, listing absolute and relative frequencies, besides the calculations for verification of association between variables.

The protocol of this research was approved in its ethical and methodological aspects by the Ethics Committee for Research with Human Beings of the UFMS, under the Consubstantiated Opinion nº 1,300,163/2015 and the Certificate of Presentation for Ethical Appreciation (CAAE) nº 50011615.6.0000.0021. All clients invited to participate in the study were informed about the purpose of the work and had the confidentiality of the provided information guaranteed. The ICF was signed by participants or their legal guardians in cases of clients in situation of substantial decreased cognitive discernment and capacity of the motor speech apparatus. The Term of Commitment for the Use of Information from Medical Records was signed by the main researcher, in accordance with Resolution nº 466/2012of the National Health Council.

RESULTS

The sample consisted of 104 clients from the two institutions studied, with 45 from the public Institution 1 and 59 from the philanthropic Institution 2 which serves the Unified Health System. During the period, a total of 192 hospitalizations were recorded in the Institution 1 and 744 in the Institution 2, amounting to a total of 936 subjects.

Despite the greater flow of clients in the institution 2, several aspects limited their inclusion in the study, such as the high frequency of hospitalizations for polytrauma and clients referred from cities of the countryside of the state of Mato Grosso do Sul (MS). This aspect led to the reduction of the number of visits and consequent difficulty to obtain the consent for inclusion in the research. Another aspect was the hospitalization of clients coming from long-term care institutions.

Table 1 shows the association between the characteristics of the sample and the occurrence of PIs.

Table 1. Occurrences of pressure injuries in clients hospitalized in Intensive Care Centers of two teaching hospitals. Campo Grande/MS, 2017 (n=104).

Variables	Pressure injury				*p*+	*Odds Ratio* (95% CI)
	Yes		No			
	n	%	n	%		
Sex						
Female	24	47.1	24	47.1	1.000	0.93 (0.43-2.01)
Male	27	52.9	29	54.7		
Skin color						
White	15	29.4	21	39.6	0.308	1.58 (0.70-3.57)
Non-white	36	70.6	32	60.4		
Age group						
Up to 59 years	17	33.3b	29	54.7a*	0.032	0.41 (0.19-0.92)
Over 59 years	34	66.7a	24	45.3b*		
BMI classification**						
Eutrophic	18	69.2	12	63.2	0.754	0.76 (0.22-2.66)
Dystrophic	08	30.8	07	36.8		
No information	59					

*Fisher's exact test Different letters indicate a statistically significant difference in the occurrence of Pressure Injury ($p < 0.05$).** Body Mass Index (kg/m^2).

A proportion of 53.8% (56) of the sample corresponded to male subjects and no statistically significant association was found regarding skin color and PI outcome. As for age group, 55.8% (58) was aged over 59 years, with a statistically significant influence of this variable over the occurrence of PI ($p = 0.032$).

Regarding BMI, the majority (66.7%) of participants were classified as eutrophic (30), excluding those whose information was missing in the medical record (59). The description of the sample and analysis of the

data regarding BMI was not possible due to missing data in the medical records and the difficulty to perform these measurements in ICC settings. BMI was calculated from weight and height records of only 45 clients. Table 2 presents the occurrence of PIs and the risk factors.

Table 2. Relationship between risk factors and occurrence of pressure injuries in clients hospitalized in Intensive Care Centers of two public teaching hospitals. Campo Grande/MS, 2017 (n=104).

Risk factors	Pressure injury				*p*+	*Odds Ratio* (95% CI)
	Yes		No			
	n	%	n	%		
Temperature						
Normothermia	23	45.1b	36	67.9a*	0.029	2.58 (1.17-5.72)
Hyperthermia	28	4.9a	17	32.1b*		
Hemoglobin						
Normal	03	5.9	08	15.1	0.202	0.35 (0.09-1.41)
Altered	48	94.1	45	84.9		
Leukocytes						
Normal	20	39.2	13	24.5	0.141	1.99 (0.86-4.60)
Altered	31	60.8	40	75.5		
Nutrition						
Fasting	12	23.5	14	26.4	0.822	1.17 (0.48-2.84)
Caloric intake	39	76.5	39	73.6		
Skin conditions						
No edema	18	35.3b	32	60.4a*	0.012	0.36 (0.16-0.79)
Swollen	33	64.7a	21	39.6b*		
Capillary refill						
Preserved (≤ 2 seconds)	32	62.7	25	47.2	0.120	1.89 (0.86-4.13)
Decreased (> 2 seconds)	19	37.3	28	52.8		
Mechanical ventilation						
Yes	41	80.4	45	84.9	0.610	1.37 (0.49-3.81)
No	10	19.6	08	15.1		
General condition						
Good	01	2.0	01	1.9	1.000	0.96 (0.06-15.79)
Regular/Bad	50	98.0	52	98.1		
Diureses						
Continent/SVD	47	92.2	47	88.7	0.742	0.67 (0.18-2.52)
Incontinent	04	7.8	06	11.3		
Elimination						
Diaper	48	94.1	52	98.1	0.358	3.25 (0.33-32.32)
Others	03	5.9	01	1.9		
Use of vasoactive drugs						
Yes	30	58.8	25	47.2	0.246	1.60 (0.74-3.48)
No	21	41.2	28	52.8		

*Fisher' exact test or Chi square. Different letters indicate a statistically significant difference in the occurrence of Pressure Injury (p <0.05).

The risk factors for PI that presented a statistically significant difference were hyperthermia (p = 0.029) and edema (p = 0.012). Temperature values and laboratory tests were collected from the medical record and the others were collected during the clinical evaluation.

Table 3 shows the relationship between the support surfaces and the occurrence of PIs, which affected 49.0% of the clients using pneumatic mattresses and 51.0% of those using a viscoelastic foam mattresses (p = 0.234). Regarding the bedsheet conditions, 82.4% of the clients who used non-compliant sheets and 17.6% of those who used compliant sheets presented PIs.

Table 3. Relation between the support surfaces and the occurrence of pressure injuries in clients hospitalized in Intensive Care Centers of two public teaching hospitals. Campo Grande/MS, 2016 (n=104).

Support surfaces	Pressure injury				*p*+	*Odds Ratio* (95% CI)
	Yes		No			
	n	%	n	%		
Type of mattress						
Pneumatic	25	49.0	19	35.8	0.234	0.58 (0.27-1.27)
Viscoelastic foam	26	51.0	34	64.2		
Sheet conditions						
Compliant **	09	17.6	17	32.1	0.114	2.20 (0.88-5.54)
Non-compliant	42	82.4	36	67.9		

*Fisher's exact test. ** Dry, without wrinkles, or without food waste.

Regarding the support surfaces used in the ICCs studied, it was possible to evaluate the sample individually. The institution 1 presented 91.1% (41) of the beds with pneumatic mattresses, and 8.9% (04) with viscoelastic foam mattresses. Institution 2 presented pneumatic mattresses in 5.1% (03) of the beds, and viscoelastic foam mattresses in 94.4% (56). There was a significant difference between the institutions ($p < 0.001$).

Regarding the bedsheet conditions of the clients studied in Institution 1, only 8.9% (04) were in accordance with the recommendations, while 91.1% (41) were not. In Institution 2, 37.3% (22) were compliant, and 62.7% (37) were non-compliant. There was a significant difference between the two institutions ($p = 0.001$).

DISCUSSION

Clients of both sexes presented PIs, with males representing 52.9% of the sample and females, 47.1%. The finding is in line with a prospective cohort study performed at a ICC in the city of Vitória, capital of the state of Espírito Santo, where 59% of the male population presented PIs.[8] A cross-sectional study carried out in a large university hospital in the South of Brazil in 2008, the female sex presented a higher occurrence of PIs.[9] This difference between studies may be related to the comorbidities of each client. In addition, there was a slight difference in the number of men in that sample.

Regarding the sociodemographic characteristics, there was a statistical difference between age groups, which showed more PIs in clients aged over 59 years ($p = 0.032$). In a study performed in a Brazilian hospital, PIs were found to be prevalent among elderly patients with a mean age of 67 years.[10] Older age predisposes the skin to greater risk of injury.[5,11-12] Despite this, it is noted that ICC patients often present other therapeutic priorities due to their critical clinical conditions that make it difficult to perform preventive care for PI.

Regarding skin color and the occurrence of PI, there was no statistical association between these variables ($p = 0.308$). The non-bleachable erythema known as Stage 1 PI can be difficult to identify in people with dark skin tones because the different color of the surrounding area may become unapparent, or pass undetected in the skin evaluation performed by an untrained professional. Such a condition may be indicative of risk.[13] However, there are still controversies regarding these variables in the literature.[8]

Although the BMI values of all the clients studied were not available, there was no statistically significant association of this variable with the occurrence of PI ($p = 0.754$). This finding is similar to the cross-sectional, analytical study carried out in 2007 in a ICC in the state of Minas Gerais in which 50% of the PIs occurred in eutrophic patients, without statistical differences in the frequency of PI according to nutritional status ($p = 0.179$).[14] A study conducted in the United States of America in the period from 2007 to 2010 with clients hospitalized in the ICC revealed that the BMI classifications stratified as low weight and important obesity represent a high risk for the occurrence of PI and deserved more attention than those patients with normal weight.[15] These findings highlight the importance of this data in medical records, for it represents a predictor of risk for PI.

The presence of hyperthermia had a statistically significant association with the occurrence of PIs ($p = 0.029$). This differs from what was found ($p = 0.137$) in the study developed in an adult ICC at a public hospital of João Pessoa/PB in 2012.[5] Microclimatic control is fundamental, since the increase in body temperature causes a potential impact on the risk of a individual developing PI.[13] Rigorous temperature control of ICC clients leads to important clinical reasoning related to the treatment and evolution of the disease.

Clients whose clinical manifestations presented edema and the occurrence of PI also had a significant association ($p = 0.012$).

In the study carried out in João Pessoa, swollen skin showed no statistical association with PI (p = 0.896).[5] However, the presence of edema compromises the diffusion of oxygen in the tissues, a factor that predisposes to the occurrence of PI.[16] Such an event is common in clients hospitalized in ICCs mainly due to impaired mobility, infusion of large volumes of fluids, and multiple organ dysfunctions.

Variables related to laboratory tests, specifically hemoglobin and leukocyte values, besides clinical findings such as capillary refill, mechanical ventilation, general condition, physiological eliminations, and the use of vasoactive drugs did not present a statistically significant correlation with the occurrence of PI in this study, similar to findings from another study.[5,8] Despite the absence of statistical association, anemia affects the transport of oxygen and its effect on the immune system leads to a decrease in resistance and consequent infections, which may favor the development of PI.[16] The daily control of laboratory test values in critical clients aids the treatment and expresses clinical evolution.

Mechanical ventilation did not represent a higher risk for PIs compared with spontaneous ventilation (p = 0.610). A study conducted in a ICC and Semi-Intensive unit in Rio Grande do Sul pointed to an association between the use of mechanical ventilation and the development of PIs.[17] However, it is known that the use of these aid may predispose to this sort of lesions due to factors such as immobility, pressure on bony prominences, and difficulty in maintaining adequate ventilation-perfusion, which impairs tissue oxygenation.[5] It is important to note that poor tissue perfusion can also affect PI healing.[13] Although the use of mechanical ventilation in this study did not demonstrate a significant association with the occurrence of PI, frequent mobilization, adequate client positioning, and daily skin inspection are indispensable precautions to prevent these lesions.

The use of vasoactive drugs did not present a significant association with the presence of PI (p = 0.246), likewise a study carried out between 2013 and 2014 in a ICC of a public hospital in the state of São Paulo (p = 0.842).[18] In general, the severity of the clinical state of ICC clients may require the use of vasoactive drugs due to hemodynamic instability, as well as other priority measures to maintain life. These measures interfere in a way to delay the evaluation of the risk for PI by health professionals that take care of the priorities of the cases, postponing the implementation of interventions to maintain skin integrity, such as decubitus change.[19] Clinical evaluation and the association of technologies in PI prevention should be adopted mainly for the most serious clients.

The regular/poor general condition and the occurrence of PIs also did not present a statistically significant association (p = 1.000) for the outcome occurrence of PI in the clients studied. In a study conducted in 2009 in a CCI of a school hospital in the city of São Paulo, patients with high risk in the Braden Scale evaluation were 25.5 times more likely to develop PI compared to those with low risk, mainly due to their general state.[20] Although the assessment of the general health status may present some subjectivity, such assessment in ICC clients is usuall regular or poor and demonstrates the importance of care, including the prevention of PIs.

No statistical association was found in relation to physiological eliminations and the occurrence of PIs when comparing continent patients using Long-term Indwelling Catheter (LIC) and/or incontinent patients (p = 0.742). However, it is known that skin damage resulting from moisture is a risk for PIs.[13] Although the use of LIC decreases the probability of humidity, the higher observed occurrence of PI can be due to the fact that the clients are in more severe clinical conditions and are consequently more likely to develop PIs.

Regarding the type of mattress used by the ICC clients studied, the occurrence of PIs was detected in 51% of those who used a viscoelastic foam mattresses compared to 49% of those who used a pneumatic mattresses (p = 0.234). The use of highly specific reactive foam mattresses is recommended instead of reactive foam mattresses of low specificity. Pneumatic mattresses with a diameter of less than 10 centimeters do not inflate enough air to ensure the relief of pressure on cells that are deflated. The choice of a type of support surface does not dispense frequent manual repositioning, especially in individuals at high risk for PI, which is the case of intensive care clients.[13]

Pneumatic mattresses are not always available in sufficient quantity in hospitals to meet the demand. So, nurses indicate them only to some priority clients, according to the risk for PI identified in their evaluations. In the case of clients with indication for use of such mattresses, it is usual to suggest the family to purchase the mattress, what will depend on financial availability.

Regarding the conditions of the sheets, 82.4% of clients with PI had the same

nonconformities, but without presenting statistical significance (p = 0.114) in the results of this study. Moisture, dirt and wrinkles in the sheets should be avoided in the provision of nursing care, for the presence of these factors increases the risk for PIs.[6] The findings of this study demonstrate the importance of inspecting sheets at each mobilization in the bedside, and exchanging sheets is recommended whenever necessary.[6]

Effective nursing interventions for PI prevention in ICC clients involve careful and individualized assessment that addresses the real needs of clients and the decision-making of nurses on skin care of critical clients.[21]

CONCLUSION

The occurrence of PI was more frequent in patients aged over 59 years who presented hyperthermia and swollen skin as the main risk factors. It was observed that skin care is insufficient in ICC settings for clients with compromised clinical conditions and when therapeutic priorities overlap the actions of prevention of such injuries. It is essential that the institutions prioritize the elaboration and implementation of prevention protocols to improve the quality of care.

Permanent education of nursing professionals on the subject would enable an approach to prevention, according to the needs of the services and the management of care based on scientific evidence. Further research is needed on the subject, with larger populations in peculiar situations, besides the detailed analysis of each risk factor for the incidence of PIs.

FINANCIAL SUPPORT

Federal University of Mato Grosso do Sul/UFMS.

REFERENCES

1. Silva AJ Silva, Pereira SM, Rodrigues A, Rocha AP, Varela J, Gomes LM et al. Economic cost of treating pressure ulcers: a theoretical approach. Rev Esc Enferm USP [Internet]. 2013 [cited 2017 Mar 01];47(4):967-72. Available from: http://www.scielo.br/pdf/reeusp/v47n4/en_0080-6234-reeusp-47-4-0971

2. Makai P, Koopmanschap M, Bal R, Nieboer A. Cost effectiveness of a pressure ulcer quality collaborative. Cost Eff Resour Alloc [Internet]. 2014;8(2):11. Available from: https://www.ncbi.nlm.nih.gov/pubmed/20515473

3. Wada A, Teixeira Neto N, Ferreira MC. Úlceras por pressão. Rev Med (São Paulo) [Internet]. 2016 [cited 2017 Mar 23];89(3/4):170-7. Available from: http://www.revistas.usp.br/revistadc/article/view/46293

4. Brandão ES, Mandelbaum MHS, Santos I. A challenge in nursing care: preventing pressure ulcers in the client. Rev enferm UFPE on line [Internet]. 2013 [cited 2017 Mar 23];5(1):3221-28. Available from: http://www.revista.ufpe.br/revistaenfermagem/index.php/revista/article/viewArticle/2862

5. Silva ML, Oliveira SHS, Diniz ERS, Costa MML, Farias MCAD, Soares MJGO. Medical conditions and risks associated with pressure ulcers. Int Arch Med [Internet]. 2016 [cited 2017 Apr 18];9(48):1-6. Available from: http://imed.pub/ojs/index.php/iam/article/view/1514

6. Rolim JA, Vasconcelos JMB, Caliri MHL, Santos IBC. Prevenção e tratamento de úlceras por pressão no cotidiano de enfermeiros intensivistas. Rev RENE [Internet]. 2015 [cited 2017 Apr 02];14(1):148-57. Available from: http://www.periodicos.ufc.br/rene/article/view/3346

7. Silva MLN, Caminha RTO, Oliveira SHS, Diniz ERS, Oliveira JL, Neves VSN. Úlcera por pressão em unidade de terapia intensiva: análise da incidência e lesões instaladas. Rev RENE [Internet]. 2014 [cited 2017 Apr 10];14(5):938-44. Available from: http://www.revistarene.ufc.br/revista/index.php/revista/article/viewFile/1341/pdf_1

8. Borghardt AT, Prado TN, Bicudo, SDS, Castro DS, Bringuente MEO. Pressure ulcers in critically ill patients: incidence and associated factors. Rev Bras Enferm. 2016 [cited 2017 Apr 11];69(3):431-8. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0034-71672016000300460

9. Santos CT, Oliveira MC, Pereira LM, Lucena AF. Pressure ulcer care quality indicator: analysis of medical records and incident report. Rev Gaúch Enferm [Internet]. 2015 [cited 2017 Apr 22];34(1):111-8. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1983-14472013000100014

10. Menegon DB, Bercini RR, Santos CT, Lucena AF, Pereira AGS, Scain SF. Braden subscales analysis as indicative of risk for pressure ulcer. Texto Contexto Enferm [Internet]. 2014 [cited 2017 Mar 27];21(4):854-61. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0104-07072012000400016

11. Fernandes MGM, Costa KNFM, Santos SR, Pereira MA, Oliveira DST, BRITO SS. Risco para

úlceras por pressão em idosos hospitalizados: aplicação da escala de Waterlow. Rev Enferm UERJ [Internet]. 2015 [cited 2017 Apr 12];20(1):56-60. Available from: http://www.e-publicacoes.uerj.br/index.php/enfermagemuerj/article/view/3977

12. Rogenski NMB, Kurcgant P. Avaliação da concordância na aplicação da Escala de Braden Interobservadores. Acta Paul Enferm [Internet]. 2014 [cited 2017 Mar 01];25(1):24-8. Available from: http://www.scielo.br/pdf/ape/v25n1/v25n1a05

13. National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel, Pan Pacific Pressure Injure Alliance. Prevention and treatment of pressure ulcers: quick reference guide. Osborne Park (AUS); 2016. [cited 2017 Feb 11]. Available from: http://www.npuap.org/resources/educational-and-clinical-resources/prevention-and-treatment-of-pressure-ulcers-clinical-practice-guideline/

14. Gomes FSL, Bastos MAR, Matozinhos FP, Temponi HR, Velásques-Meléndez G. Risk assessment for pressure ulcer in critical patients. Rev Esc Enferm USP [Internet]. 2016 [cited 2017 Mar 15];45(2):313-8. Available from: http://www.scielo.br/scielo.php?pid=S0080-23420110002000002&script=sci_arttext&tlng=en

15. Hyun S, Li X, Vermillio NB, Newton C, Fall M, Kaewprag P, Susan MB, et al. Body mass index and pressure ulcers: improved predictability of pressure ulcers in intensive care patients. Am J Crit Care [Internet]. 2014 [cited 2017 Mar 02];23(6):494-502. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4385001/

16. Bryant RA, Nix DP. Acute and Chronic Wounds: Current Management Concepts. 5th ed. St Louis: Elsevier; 2012.

17. Rockenbach CWF, Borges AM, Amaral RB, Bordin E. Fatores de risco para desenvolvimento de úlceras de pressão em UTI. Conscientiae Saúde [Internet]. 2012 [cited 2017 Mar 22];11(2):249-55. Available from: https://www.revistaestima.com.br/index.php/estima/article/view/99

18. Campanili, TCGF, Santos VLCG, Strazzieri-Pulido KC, Thomaz PBM, Nogueira PC. Incidence of pressure ulcers in cardiopulmonary intensive care unit patients. Rev Esc Enferm USP [Internet]. 2015 [cited 2017 Apr 13];49(spe):7-14. Available from: http://www.scielo.br/scielo.php?pid=S0080-23420150007000007&script=sci_arttext&tlng=en

19. Silva RB, Loureiro MDR, Frota OP, Ortega FB, Ferraz CCB. Qualidade da assistência de enfermagem em Unidade de Terapia Intensiva de um hospital escola. Rev Gaúch Enferm [Internet]. 2013 [cited 2017 Apr 12];34(4):114-20. Available from: http://seer.ufrgs.br/index.php/RevistaGauchadeEnfermagem/article/view/36792

20. Rogenski NMB, Kurcgant P. The incidence of pressure ulcers after the implementation of a prevention protocol. Rev Lat Am Enferm [Internet]. 2014 [cited 2017 Mar 22];20(2):333-9. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0104-11692012000200016

21. Benevides JL, Coutinho JFV, Tomé MABG, Gubert FA, Silva TBC, Oliveira SKP. Estratégias de enfermagem na prevenção de úlceras por pressão na terapia intensiva: revisão integrativa. J Nurs UFPE on line [Internet]. 2017 [cited 2017 July 12];11(5):1943-52. Available from: http://www.revista.ufpe.br/revistaenfermagem/index.php/revista/article/view/9710

Submission: 2017/07/21
Accepted: 2017/11/18
Publishing: 2018/02/01

Corresponding Address

Paula Knoch Mendonça
Rua Cornélia Cerzósimo de Souza, 1470, Ap. 304
Bairro Vila Matos
CEP: 79823-192 – Dourados (MS), Brazil