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

ORIGINAL ARTICLE

COST OF TOPICAL THERAPY IN PATIENTS WITH PRESSURE ULCERS

CUSTO DA TERAPIA TÓPICA EM PACIENTES COM LESÃO POR PRESSÃO

COSTO DE LA TERAPIA TÓPICA EN PACIENTES CON LESIÓN POR PRESIÓN

Daniel de Macêdo Rocha[1], Sandra Marina Gonçalves Bezerra[2], Aline Costa de Oliveira[3], Josiane Santos Silva[4], Ítalo Arão Pereira Ribeiro[5], Lídya Tolstenko Nogueira[6]

ABSTRACT

Objective: to evaluate the cost of topical therapy in patients with pressure ulcers. ***Method:*** quantitative, cross-sectional and analytical study carried out at a reference outpatient clinic for the treatment of complex wounds. The sample consisted of 20 participants who sought the service for evaluation and the treatment of the ulcer. A form for sociodemographic, clinical, therapeutic and cost analysis was used for data collection. The analysis was carried out through descriptive and inferential statistics. ***Results:*** there was a predominance of males, with a mean age of 56.6 years and of patients coming from Teresina. Chronic wounds prevailed, located in the sacral region and in stage 4. The cost analysis showed that lesions in the lower limbs, with fetid odor, devitalized tissue, intense exudate and that were treated with activated charcoal, silver foam and hydrofiber presented higher cost. ***Conclusion:*** it was shown that the pressure ulcer presented a high cost determined by the clinical characteristics and therapeutic methods adopted. The need to implement preventive measures and new studies to show the impact of the injury on health services was evidenced. ***Descriptors***: Wounds and Injuries; Pressure Ulcer; Bandages; Costs and Cost Analysis; Nursing; Nursing Care.

RESUMO

Objetivo*: avaliar o custo da terapia tópica em pacientes com lesão por pressão. *Método*:** estudo quantitativo, transversal e analítico realizado em um ambulatório de referência para tratamento de feridas complexas. A amostra constituiu-se de 20 participantes que procuraram o serviço para a avaliação e o tratamento da lesão. Utilizou-se, para a coleta de dados, um formulário para a caracterização sociodemográfica, clínica, terapêutica e de análise de custo. Realizou-se a análise por meio da estatística descritiva e inferencial. ***Resultados*:** houve o predomínio do sexo masculino, com idade média de 56,6 anos e de pacientes procedentes de Teresina. Prevaleceram feridas crônicas, localizadas na região sacral e em estágio 4. A análise do custo mostrou que as lesões em membros inferiores com odor fétido, tecido desvitalizado, exsudato intenso e que foram tratadas com o carvão ativado, espuma com prata e hidrofibra apresentaram maior custo. ***Conclusão: mostrou-se que a lesão por pressão apresentou alto custo determinado pelas características clínicas e métodos terapêuticos adotados. Evidenciou-se a necessidade da implementação de medidas preventivas e de novos estudos para mostrar o impacto da lesão nos serviços de saúde. ***Descritores*:** Ferimentos e Lesões; Lesão por Pressão; Bandagem; Custo e Análise de Custos; Enfermagem; Cuidados de Enfermagem.

RESUMEN

Objetivo: evaluar el costo de la terapia tópica en pacientes con lesión por presión. ***Método:*** estudio cuantitativo, transversal y analítico realizado en un ambulatorio de referencia para el tratamiento de heridas complejas. La muestra se constituyó de 20 participantes que buscaban el servicio para la evaluación y el tratamiento de la lesión. Se utilizó, para recolección de datos, un formulario para caracterización sociodemográfica, clínica, terapéutica y análisis de costo. Se realizó el análisis por medio de la estadística descriptiva e inferencial. ***Resultados:*** hubo el predominio del sexo masculino, con una edad media de 56,6 años y de pacientes procedentes de Teresina. Prevalecían heridas crónicas, localizadas en la región sacra y en etapa 4. El análisis del costo mostró que las lesiones en miembros inferiores, con olor fétido, tejido desvitalizado, exudado intenso y que fueron tratadas con el carbón activado, espuma con plata e hidrofibra presentaron mayor costo. ***Conclusión:*** se mostró que la lesión por presión presentó alto costo, siendo determinada por las características clínicas y métodos terapéuticos adoptados. Se evidenció la necesidad de la aplicación de medidas preventivas y de nuevos estudios para mostrar el impacto de la lesión en los servicios de salud. ***Descriptores***: Heridas y Lesiones; Úlcera por Presión; Vendajes; Costos y Análisis de Costo; Enfermería; Atención de Enfermería.

[1]Masters student, Federal University of Piauí / UFPI. Teresina (PI), Brazil. E-mail: daniel_m.rocha@outlook.com.br ORCID iD: https://orcid.org/0000-0003-1709-2143; [2]PhD, State University of Piauí / UESPI. Teresina (PI), Brazil. E-mail: sandramarina20@hotmail.com ORCID; iD: https://orcid.org/0000-0003-3890-5887; [3]Master, Federal University of Piauí / UFPI. Teresina (PI), Brazil. E-mail: alinecosta.1@hotmail.com ORCID; iD: https://orcid.org/0000-0003-1738-4808; [4]Nurse, State University of Piauí / UESPI. Teresina (PI), Brazil. E-mail: josianesantos28@hotmail.com ORCID; iD: https://orcid.org/0000-0003-4535-0736; [5]Masters student, Federal University of Piauí / UFPI. Teresina (PI), Brazil. E-mail: italoaarao@hotmail.com ORCID; iD: https://orcid.org/0000-0003-0778-1447; [6]PhD, Federal University of Piauí / UFPI. Teresina (PI), Brazil. E-mail: lidyatn@gmail.com ORCID; iD: https://orcid.org/0000-0003-4918-6531

INTRODUCTION

It is known that, despite the evolution of health care, one of the major concerns for the nursing team is the safety with the hospitalized patient and, consequently, the prevention and treatment of Pressure Ulcer (PU).1 Defined as the destruction of the layers of the skin and underlying tissues resulting from prolonged pressure or its combination with friction and shear forces, this lesion is a major cause of morbidity and mortality, disability, dependence on care and hospitalization.[2]

In this context, PU is an avoidable multi-causal phenomenon, being directly influenced by intrinsic and extrinsic factors and its classification indicates the degree of tissue involvement, varying in stages 1, 2, 3, 4 and two additional conditions: the non-classifiable ulcer and the deep tissue.[2-3]

Within this segment, it can be seen that, in Brazil and in different countries, this ulcer is recognized as a public health problem and an indicator of the quality of care, because it is recurrent, incapacitating and has a severe repercussion, on the quality of life, generating physical, emotional overload and social impact on the patient, as well as negative impacts on health services due to the high costs related to treatment involving human, material and financial resources.[4-5]

In this perspective, it is understood that, the application of economic fundamentals, in order to design the rational use of hospital resources, is fundamental and that the management of PU cost is a growing challenge for health institutions, being associated with an increase in the workload for nursing because it involves prolonged hospitalizations, using topical technologies and products for cleaning, debridement and humidity control, surgical procedures and adjacent therapies.[6-7]

In this sense, the need to evaluate the effectiveness, efficiency and costs involved in the treatment of the lesion is demonstrated, since it allows to subsidize the clinical decision making and the management of the care. In this scenario, the nurse stands out as the leader and intermediary of the health team, who must improve their managerial skills and competencies, so as to provide the necessary resources for safety, effectiveness and quality of care.[8-9]

It is considered that the economic impact and the carrying out of research with adequate methodological structuring, lacking today, apart from studies that evaluate PU-related costs are relevant to subsidize the practice of care and to minimize the impacts on patients' lives and health services. In view of the above, this study was based on the question: What is the cost of topical therapy in patients with pressure ulcer?

OBJECTIVE

- To evaluate the cost of topical therapy in patients with pressure ulcer.

METHOD

This is a quantitative, cross-sectional and analytical study carried out in a reference outpatient clinic for the treatment of complex wounds in Teresina-PI, from February to June 2016. The population comprised patients with pressure injury referenced by the Family Health Strategy. Sampling was non-probabilistic, for convenience, being included patients aged 18 years or more, who presented as a consequence of physical immobility the development of single or multiple lesions and who sought the health service for evaluation and adequacy of treatment. Thus, the sample totaled 20 participants, corresponding to 58 lesions.

The data was collected by monitoring the patient's conditions and wound treatment, as well as by analyzing the records in medical records and in patient records. To do so, a semi-structured form was used composed of three blocks: the first one comprised the sociodemographic variables (age, sex, marital status, income and origin); the second corresponded to clinical data (risk factors, number of lesions, anatomical location, stage of the lesion, dimensions, presence and appearance of exudate) and the third, the treatments (frequency of dressing changes, coverages used and cost of treatment).

It should be noted that information was collected from the administration and the financial sector of the hospital on the unit values of each type of material and that all the resources were acquired through a bidding process, considering, for the calculations, the value corresponding to the bidding in effect in all the study period.

Data was processed in the Statistical Package for the Social Sciences (SPSS) software, where the descriptive statistics, such as means, standard deviation, minimum and maximum for quantitative variables, and the frequencies for qualitative variables were calculated. In the inferential analyzes, the Shapiro-Wilk test was performed, to verify the normality of the data, the Mann-Whitney and Kruskal-Wallis tests, for comparison of costs and the tests of Pearson's Correlation and

Sperman Correlation verify the presence and the intensity of correlations, considering the 95% confidence interval and significance level of 5% ($p < 0.05$).

This study was based on the ethical precepts contained in Resolution 466, of 2012, of the National Health Council, and the favorable opinion to the accomplishment of the study was issued by the Research Ethics Committee of the State University of Piauí under process No. 1,341,988.

RESULTS

It is revealed that, among the 20 participants, the majority were elderly, 11 (55%); male, 14 (70%); mean age 56.6 years; family income between one and two minimum wages, 11 (55%); married, ten (50%), and from Teresina, 19 (95%), according to (Table 1).

Table 1. Sociodemographic characterization of patients with pressure lesions. Teresina (PI), Brazil, 2016.

Variables	M (±DP)	Min-Max	n (%)
Age	56.6 (28.9)	19.8-104.4	
Less than 60 years			9 (45.0)
60 years or more			11 (55.0)
Sex			
Male			14 (70.0)
Female			6 (30.0)
Marital Status			
Married/Stable Union			10(50.0)
Single			5 (25.0)
Separated/Divorced			1 (5.0)
Widow			4 (20.0)
Schooling			
Illiterate			3 (15.0)
Elementary school			13 (55.0)
Highschool			6 (30.0)
Individual income (in MW)	1.6 (1.1)	0.79-5.2	
Less than 1 minimum wage			6 (30.0)
1 to 2 minimum wages			11 (55.0)
3 to 5 minimum wages			2 (10.0)
Over 5 minimum wages			1 (5.0)
Origin			
Teresina			19 (95.0)
Interior of Piauí			1 (5.0)
Total			20(100)

Key: M (± SD): mean and standard deviation; Min-Max: minimum value and maximum value; MW: minimum wage in force R$ 880,00 (01/01/2016).

The presence of comorbidities and risk factors was observed in all patients, with prolonged immobility being prevalent, 20 (100%), followed by motor deficit, 18 (90%); of urinary incontinence, ten (50%); of nutritional impairment, nine (45%); of anal incontinence, seven (35%); of the spinal cord trauma, five (25%); of systemic arterial hypertension, five (25%); of diabetes mellittus, four (20%) and cerebrovascular accident, three (15%).

The clinical characterization of the lesions according to the number of wounds, time of existence, anatomical location, the stage, presence of odor, type of tissue, amount and aspect of exudate are presented in table 2.

Table 2. Clinical characterization of pressure lesions. Teresina (PI), Brazil, 2016.

Variables	M (±DP)	Min-Max	n (%)
Number of ulcers	2.9 (2.1)	1-8	
Only one			7 (35.0)
Two or three			7 (35.0)
Over three			6 (30.0)
Time of existence	4.4 (5.8)	0.5-36	
Up to three months			43 (74.1)
Over three months			15 (25.9)
Anatomic location			
Sacral			13 (22.4)
Trochanter			9 (15.5)
Isquio			7 (12.1)
Calcaneus			5 (8.6)
Lower limbs			11 (19.0)
Buttock			7 (12.1)
Others			7 (12.1)
Stage			
Stage 2			2 (3.4)
Stage 3			11 (19.0)
Stage 4			39 (67.2)
No classification			6 (10.3)
Fetid odor			
Yes			16 (27.6)
No			
Type of tissue			
Granulation			13 (22.4)
Devitalized			26 (44.8)
Necrotic			19 (32.8)
Amount of Exudate			
Intense			11 (19.0)
Moderate			30 (51.7)
Little			15 (25.9)
Absente			2 (3.4)
Aspect of Exudate			
Without exudate			2 (3.4)
Serous			26 (44.8)
Bloody			3 (5.2)
Serossanguinolous			19 (32.8)
Purulent			3 (5.2)
Not registered			5 (8.6)
Total			**58(100)**

Key: M (± SD): mean and standard deviation; Min-Max: minimum value and maximum value.

The use of the hydrogel in 39 (67.2%) wounds followed by the alginate with calcium and sodium in 34 (58.6%) was verified when checking the prevalent coverage in the treatment of the lesion; of the hydrocolloid in 26 (44.8%); of the rayon gauze in 23 (39.7%); of the hydro-fiber in 16 (27.6%); of the activated carbon in 13 (22.4%) and the foam with silver in five (8.6%). Regarding the treatment outcome, 13 (22.4%) lesions healed; 34 (58.6%) remained in outpatient follow-up and 11 (19%) were referred for treatment in basic health care.

It was observed, through cost analysis, that the average cost of treatment per patient was R $ 882.90 (± SD = 1149.1), ranging from R$43.78 to 4,303.50. Table 3 shows the distribution of costs according to the clinical characteristics of the lesions.

Table 3. Distribution of treatment costs according to the clinical characteristics of the lesions. Teresina (PI), Brazil, 2016.

Variables	M (±DP)	Min-Max	P value
Anatomic location			**0.025[a]**
Hip region	271.5 (286.6)	15.9-933.7	
Head region	16.3 (0.5)	15.9-16.7	
Lower limbs	387.0 (334.7)	81.1-1.301.7	
Upper limbs	86.0 (72.4)	19.5-163.28	
Stage			**0.097[a]**
Stage 2	28.4 (12.5)	19.5-37.2	
Stage 3	169.8 (158.0)	17.4-504.1	
Stage 4	345.0 (327.1)	15.9-1.301.7	
Unclassifiable	162.2 (202.8)	43.7-255.5	
Fetid odor			**0.003[b]**
Present	530.2 (394.3)	30.9-1.301.7	
Absent	186.2 (179.8)	15.9-613.5	
Type of tissue			**0.013[a]**
Granulation	86.6 (52.3)	17.4-168.8	
Devitalized	426.6 (346.6)	15.9-1.301.7	
Necrotic	234.1 (244.2)	15.9-933.7	
Amount of Exudate			**0.01[a]**
Intense	545.1 (195.6)	172.9-933.7	
Moderate	296.6 (342.0)	15.9-1.301.7	
Little	136.3 (139.5)	15.9-523.4	
Absente	28.3 (12.5)	19.5-37.2	
Aspect of Exudate			**0.049[a]**
Serous	178.5 (194.2)	15.9-866.9	
Bloody	56.7 (8.7)	47.1-64.3	
Serossanguinolous	423.4 (364.3)	30.9-1.301.7	
Purulent	99.0 (104.5)	25.1-172.9	
Anatomic location			**0.025[a]**
Hip region	271.5 (286.6)	15.9-933.7	
Head region	16.3 (0.5)	15.9-16.7	
Lower limbs	387.0 (334.7)	81.1-1.301.7	
Upper limbs	86.0 (72.4)	19.5-163.28	
Stage			**0.097[a]**
Stage 2	28.4 (12.5)	19.5-37.2	
Stage 3	169.8 (158.0)	17.4-504.1	
Stage 4	345.0 (327.1)	15.9-1.301.7	
Unclassifiable	162.2 (202.8)	43.7-255.5	
Fetid odor			**0.003[b]**
Present	530.2 (394.3)	30.9-1.301.7	

Key: M (± SD): mean and standard deviation; Min-Max: minimum value and maximum value.

It was evidenced that the treatment in localized lesions in the lower limbs, stage 4, with fetid odor, devitalized tissue and intense exsudate of serosanguinolent aspect presented higher cost. It was also observed significant correlations between the use of activated carbon (p <0.001), foam with silver (p = 0.007) and hydrofibra (p <0.001) and increased costs.

DISCUSSION

It was verified that there was a higher incidence of pressure lesion in elderly men, with associated comorbidities or sequelae of circulatory and neurological diseases. This result may be justified by the physical limitations and greater predisposition to chronic diseases associated with the aging process that increase the risk of complications such as prolonged immobility, loss or decrease in sensitivity.[10]

It is noteworthy that, although the percentage of youngsters and adults is small, it becomes a relevant and worrying quantitative, considering that patients of productive age are far from work, thus interfering, with the economic situation, family organization and system social security.[11]

It is justified in a study carried out in the metropolitan region of Goiânia that the predominance of the lesion in the male sex may be related to the greater difficulty in performing the repositioning maneuvers in men with motor deficit, the intense exposure to risk factors and the smaller willingness to resort to health services for the treatment of grievances.[12]

The low socioeconomic and educational levels were observed in the majority of patients. Studies associate the low schooling conditions with the difficulty of locomotion in patients with motor deficit, as well as the

restriction in the access to the education due to the deficiency of public policies that do not stimulate the education to people of low income, reflecting directly in the self-care.[13]

The comorbidities revealed that the lesion had a multifactorial etiology, including intrinsic and extrinsic conditions, such as prolonged immobility and aging, related to aging or external causes such as spinal cord trauma, diabetes mellitus, arterial hypertension, vascular accident encephalic and nutritional impairment. This result was found in another study that showed the prevalence of pressure injury in hypertensive patients (74.3%), diabetics (25.6%) and neuro-motor impairment (60%).[14-15]

It is believed that prolonged immobility can lead to tissue death due to deficiency in body weight distribution, generating high pressure in areas of bone prominence and that advanced age is conditioned by neuro-motor impairment and changes in skin characteristics such as reduction thickness and elasticity.[15]

In the clinical analysis of the lesions, the predominance of chronic wounds, in stage 4 and located in the sacral, trochanteric and calcaneal regions, was presented. These data are similar to other studies which, when investigating the incidence of LP, found a higher frequency of stage 4 (72.2%) and of the sacral (48.6%), trochanter (19.2%) and calcaneus regions (19.2%).[16-17]

It is noteworthy that chronic wounds are characterized by imbalance of proteases, which promote degradation of the extracellular matrix and inactivation of growth factors, stagnating the lesion in the inflammatory phase and hampering the healing process.[18]

The prevalence of PU in the sacral region is explained by the difficulty in relieving pressure on bone prominences and the greater susceptibility of unequal weight distribution, which is associated with late assessment, the presence of risk factors, deficiencies in care and the availability of resources materials for performing dressings can influence to a greater degree of tissue destruction.[7,12]

It is thus believed that evaluation of the lesion is essential to determine the clinical conditions of the patient, which assures to develop an adequate therapeutic plan, adopt adjuvant therapies, supervise the healing process and implement preventive measures.[19]

The prevalence of hydrogel, calcium and sodium alginate, hydrocolloid, rayon gauze and silver topcoats such as hydro-fiber, activated carbon and polyurethane foam were assessed when evaluating the products used for the treatment of PU. These data differ from the results found in another research that pointed out the predominance of Essential Fatty Acid in the treatment of pressure injury.[20]

The use of the hydrogel is related to the presence of devitalized tissue, due to its high capacity of autolytic debridement, hydrocolloid as a barrier against microorganisms and a therapeutic alternative to prevent complications such as the evolution of stages.[21-2]

It should be emphasized that in the literature it is highly justified the investment in coatings such as hydrocolloid and polyurethane film, since the identification of the patient at risk and the early treatment contain the progression of the lesion at an early stage, contributing to eradicate pain and suffering that may be present at advanced stages and to improve the quality of life and reducing costs.[14]

It was also identified that, the covers with silver ions were used in potentially infected lesions and with high exudation to control infectious processes and humidity, being indicated in the treatment of fetid, exudative, infected, colonized, deep and cavity wounds.[23]

It was found, as in other studies, that, for most dressings, the cost increased proportionally in relation to the progression of the lesions where stage 4, the presence of devitalized tissue, intense exudate and fetid odor were more impacting requiring constant evaluations, interactive coverage to promote debridement, control of exudate and infection, greater number of dressings and need for more material resources.

It was found, as in other studies, that for most dressings cost increased proportionally to the progression of the lesions, in which stage 4, the presence of devitalized tissue, intense exudate and foul-smelling were more striking, requiring constant evaluations, interactive coverage to promote debridement, control of exudate and infection, greater number of dressings and need for more material resources.[8,14,24]

It should be pointed out, therefore, that the indication of the topical product or coverage should be associated to several factors, such as the treatment objective, the availability of resources, the cost-benefit and the clinical characteristics of the PU. Given this, the knowledge and the ability of the nursing team about the indication and frequency between the changes in the coverage are fundamental to guarantee the

effectiveness of the treatment and the reduction of costs.[25]

In this way, it is recommended that with technological advances in the treatment of wounds large investments are necessary both in the availability of the inputs and in the training of the professionals to handle them. Faced with this and in relation to managerial activities, nurses assume a relevant role in the allocation of material, human and technological resources, with the prospects of reducing costs and increasing the quality and effectiveness of care.[6,14]

It is emphasized that in addition to the direct expenses that correspond to the resources used to perform the dressings, the presence of the injury involves indirect costs, being related to the loss of productivity and impact on the family income, the quality of life impairments and the overload of caregivers and of the health team.[7]

It is necessary, in the face of high assistance costs, the organization of health services, aiming at preventing the development or progression of the injury, rational use of hospital materials and financial balance, without, therefore, safety and effectiveness of care.

CONCLUSION

Important aspects related to the cost of treatment of patients with pressure injury were addressed through this study. Factors associated with the clinical characteristics of the lesions and the therapeutic methods such as the extent, the type of tissue, the amount and appearance of the exudate, the presence of infection and the use of silver toppings were determinant for the cost increase, generating greater economic impact for the health service.

It is hoped, in this sense, to awaken the need for investments in preventive measures, given its avoidable nature, as well as to form subsidies for the development of future research, for clinical decision making and for the planning of assistance with a focus on rational use of the materials, cost-effectiveness, effectiveness and safety of treatment. It is concluded, therefore, that cost evaluation has been achieved and that further studies involving the direct and indirect costs resulting from the prevention and treatment of the injury and that favor the financial sustainability of health organizations.

REFERENCES

1. Inoue KC, Matsuda LM. Cost-effectiveness of two types of dressing for prevention of pressure ulcer. Acta Paul Enferm. 2015 Sept/Oct; 28(5):415-9. Doi: http://dx.doi.org/10.1590/1982019420150007 0

2. Moraes JT, Borges EL, Lisboa CR, Cordeiro DC, Rosa EG, Rocha NA. Conceito e classificação de lesão por pressão: atualização do National Pressure Ulcer Advisory Panel. Rev Enferm Cent O Min. 2016 May/Aug; 6(2):2292-306. Doi: http://dx.doi.org/10.19175/recom.v6i2.1423

3. Caliri MHL, Santos VLCG, Mandelbaum MHS, Costa IG. Classificação das lesões por pressão - consenso NPUAP 2016: adaptada culturalmente para o Brasil [Internet]. São Paulo: SOBEST; 2016 [cited 2018 July 15]. Available from: http://www.sobest.org.br/textod/35

4. Mallah Z, Nassar N, Kurdahi BL. The effectiveness of a pressure ulcer intervention program on the prevalence of hospital acquired pressure ulcers: controlled before and after study. Appl Nurs Res. 2015 May; 28(2):106-13. Doi: http://dx.doi.org/10.1016/j.apnr.2014.07.001

5. Rogenski NMB, Kurcgant P. The incidence of pressure ulcers after the implementation of a prevention protocol. Rev Latino-Am Enfermagem. 2012 Apr/May; 20(2):333-9. Doi: http://dx.doi.org/10.1590/S010411692012000 200016.

6. 6. Lima ACB, Guerra DM. Evaluation of the cost of treating pressure ulcers in hospitalized patients using industrialized dressings. Ciênc Saúde Coletiva. 2011 Jan; 16(1):267-77. Available from: http://dx.doi.org/10.1590/S141381232011000 100029.

7. .Silva DRA, Bezerra SMG, Costa JP, Luz MHBA, Lopes VCA, Nogueira LT. Pressure ulcer dressings in critical patients: a cost analysis. Rev esc enferm USP. 2017 June; 51:e03231. Doi: http://dx.doi.org/10.1590/S1980-220X2016014803231.

8. Andrade CCD, Almeida CFSC, Pereira WE, Alemão MM, Brandão CMR, Borges EL. Costs of topical treatment of pressure ulcer patients. Rev esc enferm USP. 2016 Mar/Apr; 50(2):292-8. Doi: http://dx.doi.org/10.1590/S0080-623420160000200016.

9. Sade PMC, Peres AM. Development of nursing management competencies: guidelines for continuous education services. Rev esc enferm USP. 2015 Dec; 49(6):991-8. Doi:

http://dx.doi.org/0.1590/S0080-623420150000600016

10. Clares JWB, Freitas MC, Borges CL. Social and clinical factors causing mobility limitations in the elderly. Acta Paul Enferm. 2014; 27(3):237-42. Doi: http://dx.doi.org/10.1590/1982-0194201400040

11. Freitas NAA, Silva AVS, Brasil ACO, Bastos VPD, Fernandes LCBC. Clinical and epidemiological profile of adolescent and young victims of firearm wounds. Cad Saúde Coletiva. 2017 Dec; 25(4):429-35. Doi: http://dx.doi.org/10.1590/1414-462x201700040213

12. Queiroz ACCM, Mota DDCF, Bachion MM, Ferreira ACM. Pressure ulcers in palliative home care patients: prevalence and characteristics. Rev esc enferm USP. 2014 Apr; 48(2):264-71. Doi: http://dx.doi.org/10.1590/S0080-6234201400002000010

13. Bezerra SMG, Barros KM, Brito JA, Santana WS, Moura ECC, Luz MHBA. Characterization of sores in bedridden patients assisted by the Family Health Strategy. Rev Interd [Internet]. 2013 July/Sept [cited 2018 Jan 18]; 6(3):105-14. Available from: https://revistainterdisciplinar.uninovafapi.edu.br/index.php/revinter/article/view/95/pdf_38

14. Lima AFC, Castilho V, Baptista CMC, Rogenski NMB, Rogenski KE. Direct cost of dressings for pressure ulcers in hospitalized patients. Rev Bras Enferm. 2016 Mar/Apr; 69(2):269-75. Doi: http://dx.doi.org/10.1590/0034-7167.2016690212i

15. Coleman S, Gorecki C, Nelson A, Closs JS, Defloor T, Halfens R, et al. Patient risk factors for pressure ulcer development: systematic review. Int J Nurs Stud. 2013 July; 50(7):974-1003. Doi: https://doi.org/10.1016/j.ijnurstu.2012.11.019

16. Rabid MH, Vincent AS. Do vascular risk factors contribute to the prevalence of pressure ulcer in veterans with spinal cord injury? J Spinal Cord Med. 2011 Jan; 34(1):46-51. Doi: http://dx.doi.org/10.1179/107902610X12923394765652

17. Freitas JPC, Alberti LR. Application of the Braden Scale in the home setting: incidence and factors associated with pressure ulcers. Acta Paul Enferm. 2013 Nov/Dec; 26(6):515-21. Doi: http://dx.doi.org/10.1590/S0103-21002013000600002

18. Serena TE. Development of a Novel Technique to Collect Proteases from Chronic Wounds. Adv Wound Care. 2014 Dec; 3(12):729-32. Doi: http://dx.doi.org/10.1089/wound.2013.0463

19. Silveira SLP, Silva GRF, Moura ECC, Rangel EML, Sousa JERB. Pressure Ulcers Assessment Through the Pressure Ulcer Scale for Healing Application (PUSH). Rev Pesq Cuid Fundam Online. 2013 Apr/June;5(2):3847-55. Doi: http://dx.doi.org/10.9789/2175-5361.2013.v5i2.3847-3855

20. Santos ICRV, Souza MAO, Andrade LNV, Lopes MP, Silva MFAB, Santiago RT. Characterization of care for patients with wounds in Primary Care. Rev Rene. 2014 jul-ago; 15(4):613-20. Doi: http://dx.doi.org/10.15253/2175-6783.2014000400008

21. Franco D, Gonçalves LF. Skin wounds: adequate dressing choice. Rev Col Bras Cir. 2008 May/June; 35(3):203-6. Doi: http://dx.doi.org/10.1590/S0100-69912008000300013

22. Pott FS, Meier MJ, Stocco JGD, Crozeta K, Ribas JD. The effectiveness of hydrocolloid dressings versus other dressings in the healing of pressure ulcers in adults and older adults: a systematic review and meta-analysis. Rev Latino-Am Enfermagem. 2014 May/June; 22(3):511-20. Doi: http://dx.doi.org/10.1590/0104-1169.3480.2445

23. Smaniotto PHS, Ferreira MCl, Isaac C, Galli R. Systematization of dressings for clinical treatment of wounds. Rev Bras Cir Plást. 2012 Oct/Dec; 27(4):623-6. Doi: http://dx.doi.org/10.1590/S1983-51752012000400026

24. Dealey C, Posnett J, Walker A. The cost of pressure ulcers in the United Kingdom. J Wound Care. 2012 Jun; 21(6):261-6. Doi: http://dx.doi.org/10.12968/jowc.2012.21.6.261

25. Silva AJ, 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. 2013 Aug; 47(4):971-76. Doi: http://dx.doi.org/10.1590/S0080-623420130000400028

Submission: 2018/07/27
Accepted: 2018/08/12
Publishing: 2018/10/01

Corresponding Address

Daniel de Macêdo Rocha
Rua Firmino de Sousa Martins, 2364
Bairro Parque Ideal
CEP: 64078-690 – Teresina (PI), Brazil