

## ORIGINAL ARTICLE

## DIRECT COSTS CORRESPONDING TO VASCULOGENIC ULCER DRESSINGS PERFORMED IN A COMPREHENSIVE WOUND CARE UNIT

Paula Buck de Oliveira Ruiz<sup>1</sup>   
Gabriella Pinheiro<sup>2</sup>   
Antônio Fernandes Costa Lima<sup>3</sup> 

### ABSTRACT

**Objective:** to assess the mean direct costs corresponding to vasculogenic ulcer dressings performed by Nursing professionals on patients treated at a Comprehensive Wound Care Unit. **Method:** A quantitative and exploratory-descriptive research study, conducted in March, August and September 2020 at a Comprehensive Wound Care Unit located in Vitória da Conquista, Bahia, Brazil. The costs were calculated multiplying the time spent (timed) by the professionals by the cost of direct labor, adding the costs of the inputs. Data analysis was performed by means of descriptive statistics. **Results:** The total mean direct costs were as follows: US\$ 11.90 (SD±10.79) for outpatient dressings (n=42), US\$ 7.22 (SD±8.69) for home dressings (n=22) and US\$ 3.10 (SD±2.57) for hospital dressings (n=11), with a significant contribution from the costs of topical therapies: US\$ 9.82 (SD±10.55), US\$ 5.60 (SD±8.43) and US\$ 1.30 (SD±0.22), respectively. **Conclusion:** the results may support a review of the inputs required for vasculogenic ulcer dressings, notably, regarding topical therapies and materials/solutions.

**DESCRIPTORS:** Wounds and Injuries; Wound Closure Techniques; Nursing Care; Direct Costs of Services; Costs and Cost Analysis.

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## INTRODUCTION

Population aging and the worsening in the obesity, arterial hypertension (AH) and diabetes mellitus (DM) epidemic lead to an increase in the occurrence of venous diseases in the lower limbs. In this direction, vasculogenic ulcers (VUs) are one of the main causes of morbidity and decreased quality of life<sup>1</sup>, with risk factors tending to be related to conditions that lead to venous dilation or other disturbances of the veins' basic structure<sup>2</sup>.

The following stand out among the risk factors for the occurrence of VUs: advanced age, family history, female gender, pregnancy, obesity, occupations that require to be in a standing position, high-impact physical activity and comorbidities such as Deep Vein Thrombosis (DVT), superficial thrombophlebitis and obstructive sleep apnea. The patients can experience pain, cramps, burning sensation, itching, ankle skin discoloration, edema, phlebitis or bleeding, as well spidery, reticular or varicose vein patterns<sup>2</sup>.

VUs are lesions accompanied by loss of integuments, and may even affect underlying tissues, resulting from malfunction of the vascular system<sup>3</sup>, venous valve anomalies and thrombosis, especially affecting the population over 60 years of age, due to the Non-Communicable Chronic Diseases (NCDs) associated with aging<sup>5</sup>, mainly Chronic Venous Disease (CVD) and AH<sup>6</sup>. They are generally located in the distal third of the leg and represent between 80% and 90% of the cases of leg ulcers<sup>3-4</sup>.

Individuals with VUs experience chronic pain and discomfort, changes in body image and in life habits, impaired mobility and self-care deficit<sup>7</sup>; losses related to social life, causing isolation and low self-esteem; and an increase in absences from work (resulting in early retirement) and in the number of hospitalizations or visits to outpatient clinics, generating significant economic and social impacts both for the population and for the health services<sup>8</sup>.

An American study evidenced that most of the hospitalizations related to VUs have mainly occurred in advanced cases, when the lesions present infections (approximately 20,550 patients/year)<sup>9</sup>; VUs represent the largest percentage of chronic wounds in the lower limbs and affect approximately 1% of the total population<sup>10</sup>.

It is noted that specialized out-of-hospital care for patients with skin lesions can contribute greater benefits associated with the care-related costs and improved quality of life in the patients<sup>11</sup>. In this perspective, this study was carried out with the objective of measuring the Mean Direct Costs (MDCs) of dressings for vasculogenic ulcers (VUs) performed by Nursing professionals in patients treated at a Comprehensive Wound Care Unit (CWCU).

## METHOD

A quantitative and exploratory-descriptive research study, carried out in a CWCU that provides multidisciplinary assistance to patients with acute and chronic wounds, in the outpatient (at its own headquarters), hospital (at three partner hospitals designated as A - philanthropic, and as B and C - private) or home modality; funded by five health plan operators (Operadoras de Planos de Saúde, OPS), by private patients and by the Unified Health System (Sistema Único de Saúde, SUS).

Located in Vitória da Conquista, Bahia - Brazil, the CWCU serves the population of a region with almost two million inhabitants, covering the entire Southwest of Bahia, as well as part of the West, South and North of Minas Gerais. It has a coordinating nurse (reference

in home care) and three assistant nurses (one for outpatient care at the headquarters and at hospital B and two for appointments at hospitals A and C); a nursing technician (exclusively for home care); four physicians (dermatologist; intensivist specialized in hyperbaric oxygen therapy; orthopedist and psychiatrist); a nutritionist; an administrative professional; and a receptionist.

Both at the partner hospitals (A, B and C) and at the CWCU own outpatient clinic, the interdisciplinary appointments take place from Monday to Friday (from 8 am to 6 pm); hospital Nursing care during the weekends (from 7 am to 12 pm); and home care from Monday to Friday (from 7 am to 7 pm) and during the weekends (from 7 am to 1 pm). From January to December 2019, the CWCU performed 13,247 procedures, resulting from 5,241 appointments. The patients included in the study were those with VUs, aged  $\geq 18$  years old, treated at the CWCU in the outpatient, hospital and/or home modalities, whereas those with acute injuries were excluded.

Data collection, which was initiated in March 2020, was suspended due to the COVID-19 pandemic, which resulted in several changes in the CWCU, such as the following: referral of patients from outpatient care to home care; suspension of hospital admissions and transfer to home or outpatient care; and interruption of the outpatient care provided to patients from other cities due to the absence of public transportation.

In order to conduct this study, convenience sampling (not probabilistic) was adopted, according to statistical guidance. Thus, the sample corresponded to the opportunities for non-participant direct observation of the VU dressings performed in the morning and afternoon shifts, considering the resources required (personnel, materials/solutions and topical therapy). Data collection, interrupted in March, was resumed in August and September 2020 and was conducted exclusively by one of the researchers of this study, who strictly complied with all the precautionary and protective measures in force adopted for management of the COVID-19 pandemic.

Non-participant observations were carried out during performance of VU dressings in March, August and September 2020, in order to document the number and category of Nursing professionals, time spent (timed) from preparation of the supplies to their disposal, as well as the type of materials/solutions and topical therapies and quantities consumed. The professionals' travel time for home care was not timed. Identification of the MDCs [ $C(P_i)$ ] was supported by means of a study called micro-costing, whose framework consisted in measuring the direct costs.

Direct costs are those that can be clearly quantified and identified; and they refer to a monetary expenditure consumed in the production of a product/service in which it is possible to identify the product or department<sup>12</sup>.

In hospital organizations, direct costs consist in the Direct Labor (DL), inputs and diverse equipment used in the care process<sup>13</sup>. DL is related to the personnel that works directly on a product/service provided, as long as it is possible to measure the time spent and identify who performed each task. It is comprised by the wages, social charges, provisions for holidays and thirteenth salary<sup>12</sup>. The DL unit cost was calculated based on the Nursing professionals' mean wages provided by the CWCU Human Resources Department.

The prices corresponding to the materials and topical therapies consumed in VU dressings were obtained through the Accounting Department. For determination of the MDCs corresponding to the dressings [ $C(P_i)$ ] the mean quantities of materials and topical therapies were identified [ $\overline{qm_k}$ ]; as well as the mean unit price of each material/topical therapy [ $\overline{pmu_k}$ ]; the mean number of solutions [ $\overline{qs_k}$ ]; the mean unit price of each solution [ $\overline{psu_k}$ ]; the mean dedication time corresponding to each professional category [ $\overline{tc}$ ]; and the mean unit salary mass of the DL corresponding to the professional categories (Nurse and Nursing Technician) [ $\overline{su_c}$ ], arriving at the following equation: 
$$C(P_i) = \sum_{k=1}^n (\overline{q_k} \cdot \overline{pmu_k}) + \sum_{k=1}^n (\overline{qs_k} \cdot \overline{psu_k}) + \sum_{c=1}^m (\overline{tc} \cdot \overline{su_c})^{14}.$$

To calculate  $\overline{C(P_i)}$  for the VU dressings, US dollars (US\$) were used considering a conversion rate of US\$ 1.00/R\$5.28 and based on the quotation on 09/18/2020, provided by the Central Bank of Brazil. Treatment of the data related to  $\overline{C(P_i)}$  of the VU dressings was performed by means of descriptive statistics, presenting Mean; Standard Deviation (SD); Median; Maximum Value (Max) and Minimum Value (Min).

After obtaining consent from the CWCU Board and Nursing Management area, the study was approved by the Research Ethics Committee (Comitê de Ética em Pesquisa, CEP) of the proposing institution, by means of consubstantiated opinion No. 4,040,447.

## RESULTS

A total of 25 (100%) patients with VUs were treated; the majority (13-52%) were male, aged between 37 and 93 years old and with a mean of 76.32 (SD±11.26); 12 (48%) patients were treated at the outpatient clinic (CWCU headquarters); ten (40%) in their respective homes, and three (12%) at the hospitals, one in hospital A and two in hospital C; 19 (76%) patients had their care paid for by private insurance plans. A total of 20 (80%) patients had AH, 18 (72%) presented Vascular Failure (VF) and seven (28%) had DM; 23 (92%) had two or more comorbidities, of which 15 (60%) had AH and VF, and five (20%) had AH and DM.

Of the 34 (100%) VUs presented by the aforementioned patients, 28 (82.35%) were located in the legs and six (17.64%) in the feet; 27 (79.41%) VUs were of the Venous Ulcer (VenU) type. Nine patients had more than one wound, two with Arterial Ulcer and VenU; six with two VenUs in different lower limbs; and one with two Mixed Ulcers, also in different lower limbs.

To support measurement of the MDCs corresponding to the personnel, the weighted means of the Nursing professionals' salary masses were surveyed, which supported calculation of the respective mean, monthly, per-hour and per-minute costs (Chart 1):

Chart 1 - Mean monthly costs, in relation to the hours and minutes worked by the Nursing professionals who performed dressings on patients with VUs in all three care modalities at the CWCU. Vitória da Conquista, BA, Brazil, 2020

Professional Category	Monthly mean cost, US\$	Mean cost per hour, US\$	Mean cost per minute, US\$
Nurse	357.90/176 monthly hours	2.03	0.03
Nursing Technician	249.42/136 monthly hours	1.83	0.03

Source: CWCU Human Resources Department.

\*Conversion rate: R\$ 5.28/US\$ 1.00, based on the quotation on 09/18/2020, according to the Central Bank.

The materials/solutions used in the VU dressings were classified according to the protocol in force at the CWCU and to the wound size x width ratio, being S Kit (5x5 cm), M Kit (from 5.1x5.1 cm to 10x10 cm), and L Kit (more than 10.1x10.1 cm), as detailed in Chart 2:

Chart 2 - Distribution of the materials/solutions to perform VU dressings, according to kit size, quantity and costs. Vitória da Conquista, BA, Brazil, 2020

S Kit - Materials/Solutions	Quantity	Total cost
40x12 needle	01 unit	US\$ 0.01
Gauze	03 packs	US\$ 0.28
0.9% Physiological Serum	100 ml	US\$ 0.36
Procedure gloves	02 pairs	US\$ 0.22
Sterile gloves	01 pair	US\$ 0.20
Micropore (10x10 cm) or	10 cm	US\$ 0.03
Bandage	01 roll	US\$ 0.10
Total cost with micropore		US\$ 1.10
Total cost with bandage		US\$ 1.17
M Kit - Materials/Solutions	Quantity	Total cost
40x12 needle	01 unit	US\$ 0.01
Gauze	06 packs	US\$ 0.56
0.9% Physiological Serum	250 ml	US\$ 0.37
Procedure gloves	02 pairs	US\$ 0.22
Sterile gloves	01 pair	US\$ 0.20
Micropore (10x15 cm) or	15 cm	US\$ 0.05
Bandage	02 rolls	US\$ 0.20
Total cost with micropore		US\$ 1.41
Total cost with bandage		US\$ 1.56
L Kit - Materials/Solutions	Quantity	Total cost
40x12 needle	01 unit	US\$ 0.01
Gauze	10 packs	US\$ 0.95
0.9% Physiological Serum	500 ml	US\$ 0.74
Procedure gloves	04 pairs	US\$ 0.44
Sterile gloves	01 pair	US\$ 0.20
Micropore (10x15 cm) or	30 cm	US\$ 0.01
Bandage	03 rolls	US\$ 0.30
Total cost with micropore		US\$ 2.35
Total cost with bandage		US\$ 2.64

Source: CWCU Accounting Department.

\*Conversion rate: R\$ 5.28/US\$ 1.00, based on the quotation on 09/18/2020, according to the Central Bank.

In relation to the topical therapies, the products predominantly used as established in the CWCU protocol, the Nursing professionals' clinical experience and the characteristics of the VUs are detailed in Chart 3:

Chart 3 - Distribution of the topical therapies used in the VU dressings according to type and cost. Vitória da Conquista - BA, Brazil, 2020

Topical therapies	Total Value - US\$
Aquacel® ag+ extra 10x10 cm	9.470
Aquacel® ag+ extra 15x15 cm	15.152
Biatain® ag adhesive 12.5x12.5 - Foam + silver dressing	8.017
Biatain® non-adhesive ag 10x10 - Foam + silver dressing	8.017
Biatain® non-adhesive ag 15x15 - Foam + silver dressing	13.831
Biatain® alginate 10x10 cm	2.841
Biatain® ag alginate 10x10 cm	4.924
Biatain® ag alginate tape 3x44 cm	8.574
Cutimed® alginate 10x20 cm	5.525
Foam w/phmb 10.2x10.2 cm	7.479
Foam w/phmb 5.1x5.1 cm	2.657
Foam w/phmb w/edge 14x14 cm	12.318
Foam w/phmb w/edge 19x19 cm	28.386
Foam w/phmb w/edge 8.9x8.9 cm	5.106
Foam w/fenestrated phmb 8.9x7.6 cm	5.492
PHMB gel, 100 ml	14.773
Amorphous hydrogel, 85 g	6.975
Amorphous L hydrogel, 20 g	0.000
Amorphous M hydrogel, 15 g	0.000
Amorphous S hydrogel, 5 g	0.000
Kerlix® roll (3.7 m)	4.360
Kerlix® S	0.030
Kerlix® M	0.030
Kerlix® L	0.030
Purilon® gel, 8 g (small dressing)	2.557
Silvercel® 11x11 cm	5.813

Source: CWCUC Accounting Department.

\*Conversion rate: R\$ 5.28/US\$ 1.00, based on the quotation on 09/18/2020, according to the Central Bank.

A total of 42 (56%) dressings were performed at the outpatient clinic (CWCUC headquarters), 22 (29.40%) at the homes and 11 (14.60%) at the hospitals, totaling 75 (100%) dressings for the treatment of patients with VUs. Of these, 32 (42.70%), 27 (28.30%) and 16 (21%) consumed Small (5x5 cm), Medium (from 5.1x5.1 cm to 10x10 cm) and Large (more than 10.1x10.1 cm) dressings, respectively. Medium dressings prevailed in the outpatient appointments (16 dressings) whereas the small ones predominated in home care (14 dressings) and in hospital care (seven dressings). The topical therapies used in VU dressings were antimicrobial foams (13 units) and dressings (11 units); foams with silver (five units) were used for Arterial Ulcers; and antimicrobial dressings (two units) were employed in Mixed Ulcers.

The mean time to perform VU dressings was 14.31 minutes (SD±5.92) in the outpatient modality, varying from five to 31 minutes; 6.82 (SD±1.82) in the hospital modality, ranging from five to 11 minutes; and 11.11 (SD±5.69) in the home modality, varying from five to 28 minutes.

As indicated in Table 1, the total MDC corresponding to the dressings performed in the outpatient modality was US\$ 11.90 (SD±10.79), US\$ 7.22 (SD±8.69) in the home modality, and US\$ 3.10 (SD±2.57) in the hospital modality, with an expressive contribution of the MDC for topical therapies in these three modalities: US\$ 9.82 (SD±10.55), US\$ 5.60 (SD±8.43) and US\$ 1.30 (SD±0.22), respectively. Considering the assistance provided by the CWCU Nursing professionals in all three modalities, the total MDC corresponded to US\$ 9.24 (SD±9.89), with US\$ 7.35 (SD±9.60) for topical therapies, US\$ 1.51 (SD±0.38) for materials/solutions and US\$ 0.37 (SD±0.19) for the personnel.

Table 1 - Distribution of the MDC corresponding to personnel, materials/solutions, topical therapies and total dressings for the treatment of VUs performed in March, August and September 2020, according to the care locus. Vitória da Conquista, BA, Brazil, 2020 (n=75)

Variable		Outpatient n=42 (56%)	Hospital n=11 (14.70%)	Home n=22 (29.30%)	Total n=75 (100%)
Nurse	Mean±SD	0.33±0.18	0.31±0.18	0.26±0.09	0.60±0.28
	Median	0.30	0.27	0.24	0.59
	Min-Max	0.12-0.93	0.09-0.99	0.18-0.48	0.21-1.38
Nursing Technician	Mean±SD	-----	-----	0.33±0.27	0.33±0.27
	Median	-----	-----	0.18	0.18
	Min-Max	-----	-----	0.15-0.84	0.15-0.84
MDC for personnel, US\$	Mean±SD	0.33±0.18	0.31±0.18	0.29±0.18	0.37±0.19
	Median	0.30	0.27	0.21	0.30
	Min-Max	0.12-0.93	0.09-0.99	0.15-0.84	0.15-0.93
MDC for materials/solutions, US\$	Mean±SD	1.66±0.41	0.31±0.18	1.38±0.25	1.51±0.38
	Median	1.58	0.27	1.18	1.43
	Min-Max	1.12-2.16	0.09-0.99	1.12-2.16	1.12-2.16
MDC for topical therapies, US\$	Mean±SD	9.82±10.55	1.30±0.22	5.60±8.43	7.35±9.60
	Median	2.20	1.18	2.24	2.00
	Min-Max	0.42-25.51	1.12-1.58	0.03-25.51	0.03-25.51
Total MDC, US\$	Mean±SD	11.90±10.79	3.10±2.57	7.22±8.69	9.24±9.89
	Median	4.54	2.11	3.95	4.02
	Min-Max	1.80-28.59	1.45-10.46	1.39-28.38	1.39-28.59

Source: Personal file of the researchers authors of this study.

Key: DL - Direct Labor; MDC - Mean Direct Cost; SD - Standard Deviation

## DISCUSSION

The mean age of the patients included in this study indicates an older age group, in line to what is shown in the literature<sup>6</sup>. In 2014-2015, the National Health Service (NHS), one of the largest and oldest public health systems in the world, estimated that VUs affected nearly one out of 500 people in the United Kingdom, although they became much more common with age, increasing to one out of 50 individuals over the age of 80<sup>6</sup>. A study carried out in the United Kingdom based on records from The Health Improvement Network (THIN) database, estimated occurrence of 170,000 new VUs between 2017 and 2018, which would cost the NHS approximately £1.3 billion in the first 12 months after treatment initiation<sup>15</sup>.

More than 30 million people in the United States of America (USA) have some form of CVD, and its prevalence is 10 times higher than that of peripheral arterial disease, indicating an increasing trend for the emergence of VU cases, as this skin lesion is directly related to CVD<sup>16</sup>.

VUs are frequently associated with high care-related costs, productivity losses and reductions in quality of life. A systematic review has evidenced that at least 1% of the people living in high-income countries will develop a wound that is difficult to heal during their lifetime; in the USA, more than 6.5 million individuals have some type of this lesion, with 15% prevalence of in the aged population. Hard-to-heal wounds represent a substantial economic burden for the health systems, costing billions of dollars a year to the United States of America. Therefore, the prevalence of VU is a significant problem for the health of patients and society, and wound care economic management is still not clear enough for managers and professionals in the assistance area<sup>3</sup>.

In managing the care provided to nearly 278,000 patients with VUs from 2012 to 2013, the NHS indicated an annual cost variation from £596.6 to £921.9 million<sup>1,16</sup>. A study conducted with 505 VU patients from 2015 to 2016 reported that the annual cost of using health care resources (analgesics, nurse and medical team visits, dressings and compressions, among others) was approximately £7,600 per VU. This same study showed that the cost of managing an unhealed VU (£13,455) was four to five times higher than that of managing a healed VU (£2,981). When analyzing the cost drivers, nurses' visits were the main expense, representing 78% of the cost of patient management<sup>1</sup>.

In the current study, it was verified that the total MDC corresponding to the dressings for the management of VUs was significantly composed of the MDC for topical therapies and for materials/solutions, highlighting the higher number of dressings classified as Medium size, which require more execution time and higher consumption of inputs. In micro-costing studies developed by nurses, the costs corresponding to materials/solutions, required to enable provision of health services, have exerted a greater impact on the calculation of the total MDC for procedures and processes. In this perspective, the participation of Nursing professionals in the management of material resources/solutions is indicated as an aspect relevant to the financial balance of the health organization, contributing to the rational allocation of limited resources, with a view to maintaining sustainability and quality of care<sup>14,17-23</sup>.

Although the total MDC corresponding to the personnel was not significant in this research, the indispensability of adequate training of Nursing professionals, and nurses in particular, for decision-making regarding the inputs that will assist in the VU management process is unquestionable. In this sense, the fact that nurses work in a CWCU and, therefore, are specialists in the treatment of wounds, gives them the possibility of grounding the provision of care on the best scientific evidence available, considering the ideal treatments and standards.

An Australian study<sup>24</sup> that compared optimal treatment based on guidelines and



conducted in a specialized unit to the standard therapy evidenced that comprehensive and specialized care improved the patients' healing results and quality of life. It also asserted that treatment of VUs generates a substantial cost for Australia, and that the choice of specialized services, with therapies based on the best evidence, reduces healing time, thus allowing for early recovery of the individuals.

Wound dressings can result in direct health care costs, encompassing hospital costs for Nursing professionals' labor, topical therapies, materials/solutions for application of the dressings, or for the treatment of any systemic infection. Direct health care costs include nurses' salaries, various hospital costs, the time needed for the nurses to care for the patients and the time and costs related to the home visits when necessary, as well as the visits to the primary care provider and follow-up of these patients in these appointments<sup>25</sup>.

A study carried out in a Health District from the municipality of Ribeirão Preto with 53 VU patients revealed that different topical therapies were used to maintain the different phases of the healing or infection process. After grouping all the products with such characteristics, it was observed that foam was the third most frequently used option for the treatment of 16 patients (43.2%), the first being calendula for 19 patients (51.4%) and the second, papain gel for 18 patients (48.6%)<sup>8</sup>.

Traditional dressings have limited application due to the difficulty maintaining the wound bed moist and to their propensity to adhere to the granulation tissue, in addition to the need for frequent exchanges, resulting in discomfort for the patient and in the possibility of injuries in healthy tissues<sup>26-27</sup>. By keeping the environment moist, modern dressings change and interact with the surface of the wound, causing less tissue damage due to a reduction in the exchange frequency, favoring healing<sup>26</sup>. In addition to that, modern dressings are characterized by their better biocompatibility, degradability and moisture retention<sup>27</sup>.

Given the above, it is understood that nurses play a fundamental role in the therapeutic process of patients with chronic wounds. Their training to provide treatment continuity, as well as to follow the guidelines in relation to the good practices in the care of chronic wounds, is extremely relevant and can contribute to the reduction of costs<sup>28</sup>. In addition to that, it provides them with better health outcomes, resulting from improved diagnostic support and from the implementation of integrated care paths, articulating and qualifying the therapeutic process<sup>1</sup>, in relation to those currently observed with the standard therapy.

It is worth noting that, in view of the increasing costs related to the management of patients who need complex care for different types of wounds, in addition to finding cost-effective treatments, policymakers are interested in understanding in which health environment these patients will be best treated, and how this may lower the costs for the health services<sup>29</sup>.

Finally, considering the repercussions of the COVID-19 pandemic in the scope of this study, the need to adopt convenience sampling to enable its continuity is indicated as a limitation. For future studies, it is recommended that sample calculation of the number of observations of the dressings for the treatment of VUs be established according to the size (Small, Medium, Large) and to the care modality, considering the historical series of typical months of operation of the study field locus.

## CONCLUSION

There was predominance of the total MDC corresponding to the VU dressings performed in the outpatient modality in relation to the total MDC obtained in the home and hospital modalities; in all three care modalities, the repercussion of the costs for

topical therapies stood out, which corresponded to 82.52%, 77.56% and 41.93% of the composition of the MDCs, respectively.

As a contribution of this study, it is noted that, by evidencing the economic-financial aspects associated with the three different care modalities, it will be possible to guide a review of the inputs required for VU dressings, in particular, topical therapies and materials/solutions, aiming at their efficiency regarding allocation.

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Corresponding author:

Paula Buck de Oliveira Ruiz

Escola de Enfermagem da Universidade de São Paulo

Rua Cardeal Arcoverde, número 201 - Apartamento 104. Pinheiros. CEP: 05407-000.

E-mail: paulabuckruiz@gmail.com

Role of Authors:

Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work - Ruiz PB de O, Pinheiro G, Lima AFC; Drafting the work or revising it critically for important intellectual content - Ruiz PB de O, Pinheiro G, Lima AFC; Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved - Ruiz PB de O, Pinheiro G, Lima AFC. All authors approved the final version of the text.

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