

Body mobilization for prevention of pressure ulcers: direct labor costs

Mobilização corporal para prevenção de úlceras por pressão: custo direto com pessoal

Movilización para la prevención de úlceras de presión: costo con

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ABSTRACT

Objective: to calculate the average total cost (ATC) on the direct labor costs (DLC) of nursing professionals in body mobilization of patients for the prevention of pressure ulcers. **Method:** this is a quantitative, exploratory and, descriptive research. We observed 656 preventive mobilizations and we calculated the cost by multiplying the time spent by professionals at a unitary DLC. **Results:** ATC with DLC for each Unit corresponded to: Medical Clinic R\$ 5.38 for bed turning, R\$ 5.26 for seating positions, R\$ 5.55 for walking aid; Surgical Clinic R\$ 2.42 for bed turning, R\$ 2.30 for seating positions, R\$ 2.96 for walking aid and Intensive Care Unit R\$ 8.15 for bed turning, R\$ 7.57 for seating positions, R\$ 15.32 for walking aid. **Conclusion:** the knowledge generated can support management related to costs of human resources needed to efficiently and effectively nursing care.

Key words: Nursing Care; Pressure Ulcer; Costs and Cost Analysis.

RESUMO

Objetivo: calcular o custo total médio (CTM) relativo à mão de obra direta (MOD) de profissionais de enfermagem para a mobilização corporal de pacientes visando à prevenção de úlceras por pressão. **Método:** estudo de caso quantitativo, exploratório-descritivo. Observou-se a realização de 656 mobilizações preventivas e calculou-se o custo multiplicando-se o tempo despendido pelos profissionais pelo custo unitário da MOD. **Resultados:** o CTM com MOD por Unidade correspondeu a: Clínica Médica R\$ 5,38 por mudança de decúbito, R\$ 5,26 por posicionamento em poltrona, R\$ 5,55 por auxílio deambulação; Clínica Cirúrgica R\$ 2,42 por mudança de decúbito, R\$ 2,30 por posicionamento em poltrona, R\$ 2,96 por auxílio deambulação e Unidade de Terapia Intensiva R\$ 8,15 por mudança de decúbito, R\$ 7,57 por posicionamentos em poltrona, R\$ 15,32 por auxílio deambulação. **Conclusão:** o conhecimento gerado poderá subsidiar o gerenciamento de custos relacionados aos recursos humanos necessários ao cuidado de enfermagem eficiente e eficaz.

Descritores: Cuidados de Enfermagem; Úlcera por Pressão; Custos e Análise de Custo.

RESUMEN

Objetivo: calcular el costo total medio (CTM) en la mano de obra directa (MOD) de los profesionales de enfermería para la movilización de los pacientes para la prevención de úlceras por presión. **Método:** estudio cuantitativo, exploratorio-descritivo. Se observó 656 movilizaciones y se calculó el costo multiplicando el tiempo dedicado por los profesionales por el costo unitario de la MOD. **Resultados:** el CTM con la MOD fue: Clínica Médica R\$ 5,38 por cambio de posición, R\$ 5,26 por colocación el sillón, R\$ 5,55 para la ayuda deambulación; Clínica Quirúrgica R\$ 2,42 por cambio de posición, R\$ 2,30 para la silla de posicionamiento, R\$ 2,96 para la ayuda deambulación y la Unidad de Cuidados Intensivos R\$ 8,15 por cambio de posición, R\$ 7,57 por colocación el sillón, R\$ 15,32 para la ayuda deambulación. **Conclusión:** el conocimiento generado puede apoyar la gestión de los costos con los recursos humanos necesarios para atender los cuidados de enfermería.

Palabras clave: Atención de Enfermería; Úlcera por Presión; Costos y Análisis de Costo.

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INTRODUCTION

In hospitalized patients, pressure ulcers (PUs) development is a major health problem because it can lead to physical discomfort, increased risk of additional complications, prolonged hospitalization and increased costs related to treatment⁽¹⁾.

The occurrence of PUs, during hospitalization, is considered a negative indicator of care quality, so it is expected that health professionals adopt a systematic approach to prevention as a strategy to alleviate the problem. The success of PUs prevention depends on the knowledge and skills of these professionals, especially members of the nursing staff who provide direct and continuous care to patients⁽²⁾.

The nurse, leader of the nursing team is responsible for managing the care and providing decision-making with regard to best practices for the hospitalized patient. So it is necessary that such practices are scientifically supported with the best clinical evidence with a view to increasing the available human resources and reduce costs to the institution⁽³⁾.

Nowadays, it is evident that the occurrence of PUs, due to its multifactorial etiology, goes beyond the care of nursing staff. However, they have been responsible for the implementation of preventive measures, adopting systematized protocols based on international guidelines⁽⁴⁾.

Nationally, authors state that public hospitals are struggling to manage their scarce resources as a result of the reduction of federal, state and local budgets on health, compared to the increased demands of the population for health services⁽⁵⁾.

We highlight that many health providers are unable to link costs to improvements in processes and results, which prevents them from promoting systemic and sustainable cost reductions. To contain costs they take measures such as general cuts in expensive services, in employees and staff salaries, which can lead to contradictory results, that is, higher total costs for the system and worse outcomes. A correct funding allows the impact of improvements in processes to be easily calculated, validated and compared generating better results that contribute to lower costs in the full cycle of care⁽⁶⁾.

Given the indispensability of nurses to understand that the adoption of PU preventive measures in their clinical practice has costs and these, when known, will support the management of available resources, but in limited quantities, this study was developed focusing on the body mobilization activity. We justify the choice of these preventive actions as an object of study by the fact that most protocols highlight them as one of the important items⁽⁷⁻⁸⁾.

OBJECTIVE

Calculating the average total cost (ATC) on the direct labor cost (DLC) of nursing staff involved in the body mobilization activities of patients admitted to a teaching hospital for the prevention of pressure ulcers.

METHOD

This is a quantitative, exploratory and descriptive research, classified as case study.

Exploratory-descriptive research is characterized by systematic collection of numerical data in control conditions, using statistical procedures to analyze the results. It aims to observe, describe and document aspects of a situation or reality, as well as research factors related to the phenomenon in question⁽⁹⁾.

Through the case study method, very useful in exploratory research⁽¹⁰⁾, we seek to understand the totality of a situation, describing, understanding and interpreting the complexity of a case, through deep and comprehensive immersion in a delimited object. It has a planning logic that incorporates specific approaches regarding the collection and analysis of data⁽¹¹⁾.

After approval by the Research and Education Commission and the Research Ethics Committee of the Teaching Hospital of the *Universidade de São Paulo* (HU-USP) (Protocol 881/09 - SISNEP; Certificate of Ethics Assessment: 0002.198.196-09) we began collecting data in a Medical Clinic Unit (MC), a Surgery Clinic Unit (SC) and an Adult Intensive Care unit (ICU-A). These units were chosen for the study because they have a PUs prevention protocol which has been implemented since July 2005⁽⁴⁾.

The MC has 41 beds for the care of patients from the Emergency Room of Adult Units (ER), Clinics (Cli), ICU-A and other HU-USP Units being mostly composed of elderly patients and those with chronic diseases. This unit has implemented the Patient Classification System (PCS) according to nursing care complexity, classifying patients into the following types of Nursing care⁽¹²⁾:

High Dependence Care (14 beds): chronic patients requiring medical and nursing assessments, stable from a clinical point of view, however, with total dependence of nursing actions regarding the fulfilment of basic human needs;

Intermediate Care (27 beds): stable patients from a clinical and nursing point of view requiring medical and nursing assessments, partially dependent on nursing care to meet their basic human needs;

The SC is intended for comprehensive, continuous and individualized care of surgical patients, pre- and postoperatively. To this end, it has 44 beds (36 beds for general surgery and 8 beds for orthopedic surgery) to care for patients of both sexes, aged from 15 years old on who require general or orthopedic surgery.

In the units, patients are admitted from the ER, usually to carry out emergency surgery and ER elective surgeries. They are admitted including patients transferred from other units of the hospital, when they, in addition to clinical care, require surgical procedures.

While the SC nurses also classify the surgical patient in accordance with the PCS⁽¹²⁾, in practice, it is not possible to group them into distinct physical areas as recommended by the classification due to the high turnover of patients. However, PCS is used for staff in the planning and distribution of activities to prevent nursing team work overload.

The ICU-A consists of 20 beds, 12 for the ICU and eight beds to the Semi Intensive Care. It serves patients older than 15 years, mostly elderly, those with acute chronic diseases, coming from various HU-USP units as well as other hospitals.

Nurses of these units perform the Nursing Process, a method that provides, through the evaluation of the patient, data to support appropriate decision-making concerning the care needs (diagnostics), the goals they want to achieve (results) and what are

the best alternatives to meet those needs forward to these desirable outcomes (interventions)⁽¹³⁾.

In order to identify the ATC of body mobilization preventive activities aimed at patients admitted to the MC, SC and ICU-A of the HU-USP, the analysis of the material was constituted by observations of bed turning/repositioning; Patient seating positions and walking Aids done by nursing team professionals, as well as materials and solutions needed to achieve them. Thus, the convenience, non-probabilistic sample occurred due to the availability of field observers to conduct the data collection.

For measuring the ATC, we used direct costs, defined as a monetary expenditure that applies in the production of a product or service where there is possibility of identification with the product or department. Direct cost is everything which can be measured, that is, it can be identified and clearly quantified⁽¹⁴⁾. In hospital units these costs primarily consist of labor, materials and equipment used directly in the care process⁽¹⁵⁾.

The direct labor cost (DLC) refers to staff working directly on a product or service provided, since it is possible to measure the time spent and the identification of who performed the work. It is composed of salaries, social taxes, holidays payment and 13th salary⁽¹⁴⁾.

The calculation of unit cost to the DLC was based on the average salaries by professional category, provided by the Financial Director of the HU-USP from the nursing staff working in the MC, SC and ICU-A. As there is no difference in the performance of body mobilization preventive activities by nursing technicians and assistants according to salaries from these categories through weighted average. So, we obtained R\$ 11,318.40/144hours, R\$ 78.60/hour and R\$ 1.31/minute for nurses and R\$ 7,430.40/144hours, R\$ 51.60/hour and R\$ 0.86/minute for nursing technicians/assistants.

We calculated the ATC multiplying the time spent by nursing staff at a unit cost of DLC. For the purposes of the calculation we used the Brazilian currency¹ (R\$).

RESULTS

During the 30 days of data collection were performed 656 (100%) PUs prevention activities and 386 (58.84%) bed turning/repositioning, 148 (22.56%) patient seating positions and 122 (18.60%) walking aid. At least two nursing staff members

Table 1 - Distribution of the average total cost (ATC) staff involved in average total cost bed turning/repositioning observed in the Medical Clinic, Surgery Clinic and Adult Intensive Care Unit, São Paulo, Brazil, 2013

Observações	n	Mean R\$	SD R\$	Median R\$	Minimum R\$	Maximum R\$	Mode R\$
MC Nursing staff ¹²⁵							
Nursing assistant	5	3.33	1.98	2.78	1.20	5.43	.
Nursing technician	116	4.64	4.38	3.40	0.37	20.55	2.09
Nurse	16	7.33	12.64	2.96	0.90	52.53	.
ATC - MC Total Cost	125	5.38	6.57	3.81	0.37	52.53	2.09
SC Nursing staff ¹⁰⁵							
Nursing assistant	24	1.65	0.98	1.07	0.66	3.78	.
Nursing technician	87	1.93	1.47	1.38	0.39	7.57	.
Nurse	21	2.22	1.42	1.90	0.90	6.07	.
ATC - SC Total Cost	105	2.42	2.06	1.66	0.39	11.35	.
ICU-A Nursing staff ¹⁵⁶							
Nursing assistant	2	7.43	3.35	7.42	5.06	9.79	...
Nursing technician	145	6.65	4.16	5.73	0.72	19.95	...
Nurse	48	6.08	3.34	5.33	1.42	17.34	...
ATC - ICU-A Total Cost	156	8.15	5.80	6.88	0.72	34.41	...

Note:

MC: Medical Clinic; SC: Surgery Clinic; ICU-A: Adult intensive care unit.

participated in the implementation of most of these activities in their unit.

In the MC, 125 bed turning/repositioning were observed, the duration of which ranged from 0.43 to 13.37 minutes with an average 3.02 (SD= 2.73) and mode 1.22 minutes. There was variation in the duration of 105 bed turning/repositioning, with SC 0.45 to 5.00 minutes with an average 1.78 (SD= 1.05) minutes. In ICU-A the duration of 156 bed turning/repositioning in the bed ranged from 0.83 to 11.38 minutes, with an average 4.35 (SD= 2.22) and mode 3.43 minutes.

Regarding the 47 seating positions accompanied in the MC, there was variation from 0.37 to 11.47 minutes with a mean of 2.89 (SD= 3.14) and mode 0.70 minutes. In the SC the duration of the 50 seating positions ranged from 0.40 to 4.13 minutes with an average of 1.57 (SD= 0.86) minutes. The duration of the 51 seating positions in ICU-A ranged from 0.47 to 14.08 minutes with an average 3.47 (SD= 2.29) minutes.

The duration of the 46 walking aid observed in the MC ranged from 0.88 to 18.23 minutes with an average 4.38 (SD= 4.26) minutes. The SC varied in the duration of 51 walking aid from 0.38 to 13.05 minutes, with an average 2.61 (SD= 2.71) and mode 1.08 minutes. The duration of the 25 walking Aids in ICU-A ranged from 1.08 to 19.13 minutes with an average 8.54 (SD = 5.04) minutes.

1 In Brazil, R\$ 1,00 real corresponds to US\$ 0,29 American dollars according to the Central Bank of Brazil on August 1st, 2015.

Table 2 - Distribution of the average total cost (ATC) staff average total cost involved in seating positions observed in Medical Clinic, Surgery Clinic and Adult Intensive Care Unit, São Paulo, Brazil, 2013

Observations	n	Mean R\$	SD R\$	Median R\$	Minimum R\$	Maximum R\$	Mode R\$
MC Nursing staff ⁴⁷							
Nursing assistant	1	0.54	.	0.54	0.54	0.54	.
Nursing technician	36	2.80	3.25	1.59	0.40	14.28	.
Nurse	22	6.63	5.63	3.62	0.48	18.86	.
ATC - MC Total Cost	47	5.26	7.03	1.94	0.40	25.15	.
SC Nursing staff ⁵⁰							
Nursing assistant	20	1.21	0.74	1.01	0.34	3.17	0.43
Nursing technician	31	2.41	2.74	1.39	0.43	10.66	.
Nurse	9	1.77	0.95	1.44	0.92	3.97	.
ATC - SC Total Cost	50	2.30	2.44	1.38	0.34	10.66	.
ICU-A Nursing staff ⁵¹							
Nursing assistant	1	1.75	...	1.75	1.75	1.75	...
Nursing technician	37	4.18	3.08	3.40	0.40	13.36	2.61
Nurse	31	7.41	6.00	5.18	0.94	20.17	3.97
ATC - ICU-A Total Cost	51	7.57	7.50	5.48	0.40	30.56	6.58

Note:

MC: Medical Clinic; SC: Surgery Clinic; ICU-A: Adult intensive care unit.

Table 3 - Distribution of the cost of nursing staff average total cost (ATC) involved in walking aid observed in Medical Clinic, Surgery Clinic and Adult Intensive Care Unit, São Paulo, Brazil, 2013

Observations	n	Mean R\$	SD R\$	Median R\$	Minimum R\$	Maximum R\$	Mode R\$
MC Nursing staff ⁴⁶							
Nursing assistant	6	2.24	1.63	1.90	0.90	5.38	.
Nursing technician	27	1.84	1.18	1.45	0.76	5.38	.
Nurse	19	10.11	6.33	9.00	1.31	23.89	.
ATC - MC Total Cost	46	5.55	5.79	2.56	0.76	23.89	.
SC Nursing staff ⁵¹							
Nursing assistant	26	3.71	5.38	1.63	0.34	26.83	.
Nursing technician	25	1.38	1.81	1.09	0.33	9.75	0.93
Nurse	4	4.98	1.59	4.38	3.82	7.34	.
ATC - SC Total Cost	51	2.96	4.21	1.39	0.33	26.83	0.93
ICU-A Nursing staff ²⁵							
Nursing assistant	8	11.63	6.14	13.21	2.67	19.64	...
Nursing technician	7	4.83	3.90	3.37	1.55	12.61	...
Nurse	20	12.81	5.93	11.62	4.43	25.07	...
ATC - ICU-A Total Cost	25	15.32	10.90	12.18	1.55	35.26	...

Note:

MC: Medical Clinic; SC: Surgery Clinic; ICU-A: Adult intensive care unit.

DISCUSSION

The average time spent by nurses, technicians/assistants to perform body mobilization activities of bed turning/repositioning; seating positions and walking aid - was higher in ICU-A (4.35, 3.47 and 8.54 minutes, respectively) compared to MC (3.02; 2.89 and 4.38 minutes, respectively) and higher in the MC compared to the average time spent in the SC (1.78, 1.57 and 2.61 minutes, respectively).

Among these three units the average cost of ATC nurse staff was higher in ICU-A (bed turning/repositioning - R\$ 8.15, seating positions - R\$ 7.57 and walking aid- R\$ 15.32) and MC (bed turning/repositioning - R\$ 5.38, seating positions - R\$ 5.26 and walking aid - R\$ 5.55). This finding is consistent with the participants' profile which is mostly elderly patients with chronic diseases, requiring a greater number of professionals for the care development.

The average cost with DLC obtained in the ICU is justified by patients who require intensive and semi-intensive care needs demanding a large number of nursing hours, as generally because of their increasing complexity and hospitalization time.

In the ICU context sophisticated technologies are employed for diagnosis and treatment, making the balance between the needs of patients and the infrastructure for their care fundamental. Thus, the high cost of maintaining such a complex unit justifies the strict cost control, especially with staff⁽¹⁶⁾.

We highlight the lowering of the sensorial perception, common situation in ICU, reduces the feeling of pain or discomfort, with consequent lack of stimulus for the patient to move for relief, thus, making them more likely to develop PUs. Therefore, strengthened specific guidelines aimed at preventing PUs are of urgent need, with a view to prioritizing care, and to increase resources⁽⁴⁾, including financial resources.

Due to the presence of devices connected to the patient, especially the elderly and in critical condition, body mobilization becomes more difficult and challenging and they demand the involvement of at least two nurses staff.

Thus, given the high cost of ICUs, authors emphasize the need to assess, objectively, who are severely ill patients requiring intensive care through the use of severity measuring instruments, judging the practice as indispensable⁽¹⁷⁾.

Thus, the adoption of measures aimed at preventing PUs, such as equipping hospitals with pressure zones supplies, monitoring the degree of risk, incidence and prevalence, training teams to the issue, should be a top priority in health organizations⁽¹⁸⁾. However, together with these measures, we emphasize the indispensability of quantitative and qualitative adequacy of nursing professionals, being with patients in 24 hours, implementing actions to prevent the occurrence of PUs and evaluate its efficacy and effectiveness.

When addressing the review and implementation of simple procedures, particularly among institutionalized elderly, authors state that professionals should be constantly instructed about the importance of measures to relieve pressure, through bed turning, correct use of mobile linens, adequate chairs and bed positioning, friction prevention in movements, moisture control combined with facilitation and encouragement in nutrition and hydration⁽¹⁹⁾.

Study conducted in the MC HU-USP indicated that the profile of the patients classified in the high dependency nursing beds corresponds mostly to patients with total dependence for feeding, bathing, hygiene, mobilization and/or require constant monitoring, as a result of mental confusion status or other neuro-cognitive changes⁽²⁰⁾. It is believed that such a profile is common in other health institutions due to population aging, increased survival and presence of chronic conditions, consequently, increasing hospitalizations and costs related to them.

Motivating the performance of bed turning/repositioning every two hours, as established in the nursing prescription, in 24 hours the daily cumulative cost of DLC of nurses per patient, would correspond to R\$ 97.80 in the ICU-A; R\$ 64.56 in the MC and R\$ 29.04 in the SC.

In clinical practice, nurses working in the studied units generally prescribe to change seating positions twice daily, so the daily accumulated cost as well nursing DLC per patient corresponded to R\$ 15.14 in ICU-A; R\$ 10.52 in the MC and R\$ 4.60 in the SC. As the frequency with walking aid is variable because it depends on the clinical condition and specificities

of each patient hospitalized in these units, it was decided not to perform an estimate of the daily cumulative cost of the DLC on the nursing staff involved in this activity.

It is essential that healthcare professionals have in mind that prevention is always the best alternative, since it avoids the pain and suffering of the patient by reducing the length of hospital stay as well as the expenses related to treatment⁽²¹⁾.

In this sense, the importance of adopting PUs preventive measures is unquestionable, especially in trying to avoid the intangible costs, when referring to physical and/or psychic suffering, are the most difficult to measure or valued, since they depend on the perception that the patient has about their health problems and their social consequences⁽²²⁾.

Therefore, we agree that the nursing care provided to patients with PUs, besides the psychological and emotional changes, complications of infection and prolonged hospitalization, should also involve knowledge of the political aspects and financial costs of treatment for the injuries⁽²³⁾.

Thus, the nurse who is increasingly responsible, in relation to cost management and participation in the budget planning of health institutions, will have to manage human, material and financial resources, since they are the professionals who are the most in contact with the patient and can analyze the assistance provided⁽²⁴⁾.

CONCLUSION

The study performance made possible to calculate the ATC regarding DLC of nurses and nursing technicians/assistants involved in carrying out 656 body mobilization activities for the prevention of PUs in patients at risk, admitted in three HU-USP units.

In the MC, ATC with DLC corresponded to R\$ 5.38 (SD = 6.57) for bed turning/repositioning, R\$ 5.26 (SD = 7.03) for seating positions, and R\$ 5.55 (SD = 5.79) for walking aid; the SC to R\$ 2.42 (SD = 2.06) for bed turning/repositioning, R\$ 2.30 (SD = 2.44) for seating positions, and R\$ 2.96 (SD = 4.21) for walking aid, and in the ICU-A it corresponded to R\$ 8.15 (SD = 5.80) for bed turning/repositioning, R\$ 7.57 (SD = 7.50) for seating positions, R\$ 15.32 (SD = 10, 90) for walking aid.

It is considered that the results obtained may provide subsidies for the management of relative costs for human resources needed for nursing care, efficiently and effectively, for preventive care of patients with risk of developing PUs.

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