Original Article

Implementation costs of a prevention protocol for pressure ulcers in a university hospital

Custos da implantação de um protocolo de prevenção de úlceras por pressão em um hospital universitário

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ABSTRACT

A quantitative, descriptive, and exploratory case study, aiming to calculate the direct implementation costs of a prevention protocol for pressure ulcers (PUs) in a university hospital. We mapped the activities constituting the creation steps, the implementation, and assessment of the protocol implementation. The hourly salary/professional was multiplied by the time spent in each activity and the costs of each product, accessory and equipment multiplied by the quantity acquired for the protocol feasibility. The Brazilian currency (R$) originally used in the calculations was converted to the North-American currency using the rate US$ 0.49/R$. The costs totalized US$ 60,857.38 (100%), being US$ 38,297.64 (62,93%) referred to the direct labor of nurses, technicians/nursing assistants and secretary, and US$ 22,559.74 (37,07%) referring to the acquisition of products, accessories and equipment. We expect the obtained results to contribute by subsidizing discussions regarding the indispensability of financial investments to implement preventive measures for PUs.

Descriptors: Pressure Ulcer; Nursing; Costs and Cost Analysis; Cost Control.

RESUMO

Pesquisa quantitativa, exploratório-descritiva, do tipo estudo de caso, objetivando calcular os custos diretos da implantação de um protocolo de prevenção de úlceras por pressão (UPs) em um hospital universitário. Foram mapeadas as atividades constituintes das etapas elaboração, implantação e avaliação da implantação do protocolo. O salário hora/profissional foi multiplicado pelo tempo despendido em cada atividade e o custo unitário dos produtos, acessórios e equipamentos multiplicado pela quantidade adquirida para a viabilização do protocolo. A moeda brasileira (R$) utilizada originalmente para os cálculos foi convertida para a moeda norte-americana pela taxa de US$ 0.49/R$. Os custos totalizaram US$ 60,857.38 (100%), sendo US$ 38,297.64 (62,93%) relativos à mão de obra direta de enfermeiros, técnicos/auxiliares de enfermagem e secretária, e US$ 22,559.74 (37,07%) referentes à aquisição de produtos, acessórios e equipamentos. Espera-se que os resultados obtidos contribuam para subsidiar discussões acerca da imprescindibilidade de investimentos financeiros à efetivação de medidas preventivas de UPs.

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

INTRODUCTION

The development of pressure ulcers (PUs) impose physical, emotional and social overload to the patient and family. It reflects to the worsening of quality of life and the cost increase for health services, once it requires more hospitalization time, and an increase of the morbidity and mortality rates[1].

Studies shows that PUs represent a large financial burden for health services and contribute to increment of total costs related to patient's care, as the more advanced the lesions categories are, the more costs with treatments[2-3].

Thus, it is more advantageous to prevent the occurrence of PUs than to treat them. The reduction of PUs incidence would decrease the costs with dressings and antibiotic therapies; nursing teams would be compromised with other care not related to lesions, and would have an improvement of the patient's quality of life when avoiding the attrition caused by prolonged time of hospitalization[4].

Besides, to adopt a prevention protocol for PUs, when favoring the fast and effective attention and standardizing the conducts and decreasing costs, would also minimize intangible costs corresponding to the impact of the disease in the quality of life, associated losses, presence of pain and suffering that is also extended to their significant ones[5].

Therefore, when health professionals understand the risk factors for the occurrence of PUs, they need to assume in their clinical practice the daily assessment of patients. Thus, they would plan efficacious and effective preventive measures and, consequently, avoid the occurrence of more painful complications.

After the global assessment of the newly admitted patient in the health system, a specific assessment of the presence or risk to develop PUs should be conducted. It should include etiology investigation and a detailed wound assessment. The evidence suggests that the existence of a category I for pressure ulcer (PU), is a significant risk factor to develop a more severe PU[6].

The etiology of PUs include intrinsic and extrinsic factors, for example, age, comorbidities, mobility conditions, nutritional state and conscience level. Although its occurrence extrapolates the care from nursing professionals, these professionals have become responsible for the implementation of preventive and systematic care measures adopting protocols based on international guidelines[1].

On the last decades, the preoccupation with the structure and implementation of prevention protocols for PUs in Brazilian hospitals have been emphasized as result of quality improvement programs highlighting the incidence of UP as an indicator of nursing assistance quality[7].

The nursing care for patients with PUs beyond involving knowledge regarding psychological and emotional changes, complications caused by infections and prolonged hospitalization, should also contemplate the knowledge of political aspects and financial costs resulting from these lesions[8].

Thus, to make viable and improve preventive measures fundamented in better evidence based practices, in different assistential realities, the nurse should know the costs referring to its implementation to support its decisions in relation to the efficiency of human, material, physical and financial resources avaiable. In this direction, aiming to contribute to the deepening of knowledge about this theme, we conducted this study which objective was to calculate the direct costs related to the implementation of a prevention protocol for pressure ulcers in a university hospital.

METHODS

This quantitative, descriptive and exploratory case study[9], was conducted in the University Hospital from University of São Paulo (HU-USP) after approval from the Committee of Education and Research and of the Ethics in Research Committee from the Hospital (Registry nº: 881/09 / SISNEP-CAAE: 0002.0.198.196-09590/05).

The case study was used for being a useful method to answer questions as “how” and “why”, allowing to comprehend a real life phenomenon in depth, considering the contextual conditions, when adopting multiple evidence sources[9].

The HU-USP is designated for teaching and research, offering multidisciplinary integral assistance of medium complexity, based on the epidemiological profile of the population from the geographical area of Butantã District, from the Unified Health System (SUS) and the servers and students from the University. At the time of the study, the hospital had 247 beds and one Ambulatory to attend clinical-surgical, pediatric and gynecology-obstetric patients. The financial resources from the hospital comes from the budget allocation from USP and from the services provided to SUS[10].

The Nursing Department (ND) from the HU-USP coordinates, supervises, and controls assistencial, educational and research activities involving nursing. The nurses integrating the Stomal Therapy Group (STG) from the ND believe that patients with evident risk to develop PUs should be identified early and the preventive measures promptly adopted.

Knowing that the treatment for PUs is burdensome for the patient and family, for the Institution and society, a protocol[1] was implemented in July of 2005 targeting its prevention in the Units of Medical Clinic (MC), Surgical Clinic (SC) and Adult Intensive Care Unit (AICU) as those presents higher incidence of PUs. For that, it was based on the proposed guidelines by the European Pressure Ulcer Advisory Panel (EPUAP) and National Pressure Ulcer Advisory Panel (NPUAP), and it was adapted to the institutional reality.

During this period, the MC had 41 beds to attend patients from Adult Emergency Care Units (AECU), Ambulatory (Amb.), AICU and other Units from the HU-USP. Most patients were elderly and patients with chonic-degenerative diseases. The SC had 44 beds to attend patients during pre- and post-surgery, who needed general or orthopedic surgery. In the Unit, patients from AECU were admitted, normally for urgency/emergency surgeries, from the Amb. for elective surgeries and patients transfered from other Units. The AICU was composed by 20 beds, being 12 designed to Intensive Care and eight beds for Semi-intensive Care. This unit attended patients with chronic diseases that were acute at the time, also elderly in its majority, from diverse Units of the HU-USP, as well as from other hospital institutions.

The nurses from the Units studied, conduct assistance through the Nursing Process and they apply the Braden Scale to all patients, aiming to prevent PUs occurrence. Patients with scores lower or equal 11 are considered high risk (90% to 100% of chances to develop PUs); patients with score of 12 to 14, moderate risk (65% to 90% of chances to develop PUs of categories I and II) and patients with scores of 15 to 16, light risk (50% to 60% of chances to develop PUs of category I). If the scores in the Braden scale is lower or equal to 16, nursing professionals should adopt all preventive actions from the protocol[1].

Data collection was conducted during March to June of 2012.

Four steps constituting the process of protocol implementation to prevent PUs were identified: protocol creation, protocol feasibility, acquisition of products, accessories and equipment, and process assessment. The activities related to each step were mapped from registries coming from meetings proceedings STG, documents available in the archives of Educational Support Services from the ND and complemented with information obtained from the ND Directory, assuring the diversity of sources adequate to conduct a single case study[9]. After, the time consumed was assessed from each activity of Nurses (Division Director, Chief and Assistencial), Nursing Technicians/Assistants and the ND Secretary.

The Brazilian currency (R$) was originally used for calculations. It was converted to the North-American currency ((US$) with the exchange rate of US$ 0.49/R$

based on the quotation from 29 of June of 2012, from the Central Bank of Brazil.

The calculation of direct labor (DL) was based on the direct cost, that is, the monetary cost applied on the production of a product or a service in which there is the possibility of identification with the product or department[11]. Direct costs from hospital units are basically composed by labor, supplies and equipment directly used on assistencial process[12].

The DL refers to people who works directly with a product or a provided service, as long as it is possible to measure the time spent and to identify who performed the job. It is composed by payrolls, social expenses, provisions for vacations and the 13th salary[11].

Because there were salary adjustments at USP after the protocol implementation for PUs in 2005, we used the values referring to 2012 aiming to update the data. Thus, the mean wages provided by the Financial Director of the Hospital in accordance with the professional staff from the ND, MC, SC and AICU, corresponded to: Nurse Director of the Division - US$ 8,590.98; Chief Nurse US$ 7,703.97; Assistance Nurse - US$ 5,607.98; Nursing Technicians/Assistants- US$ 3,693.39 and Secretary - US$ 3,963.82.

At the HU-USP, the nursing professionals' workload is 36 hours per week. Thus, the cost of labor/hour obtained was: Nurse Director of the Division - US$ 59.65; Chief Nurse - US$ 53,54; Assistance Nurse - US$ 38.95; Nursing Technicians/Assistants - US$ 25.65. The Secretary' workload corresponds to 40 weekly hours, therefore the labor/hour was US$ 24.79.

The specification of the total quantity of products, accessories and equipment to be acquired to make the implementation of the protocol feasible was initially estimated having as reference the monthly average of 60 patients with risk to develop PUs. It was estimated according with the score obtained through the Braden Scale application, admitted in the MC, SC, and AICU and units and, since 2005, these expenses were adjusted and incorporated to material quotas of these units. Information about values paid in 2012 to maintain the quotas of those expenses, were provided by the Material Section, the warehouse and the Hospital Patrimony, and complemented by the Material Manager Nurse from the Nursing Department.

The hour/professional salary was multiplied by the time spent in each activity and the unit cost of products, accessories and equipment, multiplied by the quantity acquired to implement the protocol.

RESULTS

On Table 1, it is evident the labor cost involved in the protocol creation step corresponded to US$ 5,240.72. The development of the protocol (establishing the finality, objectives, defining PU and nursing interventions) was the activity that consumed the most (US$ 3,907.07) in this first step. The Nurse Director of the Division was the resource that presented higher DL cost (US$ 1,998.43), as the Director participated in all activities for being the STG coordinator and responsible for the implementation of the protocol in the MC, SC and AICU units, making a total of 33 hours and 30 minutes.

Table 1: Cost of DL involved in the protocol creation step to prevent PUs. São Paulo, SP, Brazil, 2012.

Activities	NDD (US$)	NC (US$)	AN (US$)	S (US$)	Total (US$)
Protocol development	1,789.64	1,338.62	778.81	-	3,907.07
Protocol confection	89.48	-	-	24.78	114.26
Protocol approval	119.31	321.27	778.81	-	1,219.39
TOTAL	**1,998.43**	**1,659.89**	**1,557.62**	**24.78**	**5,240.72**

NDD – Nurse Director of the Division; NC – Nursing Chief; AN – Assistance Nurse; S – Secretary.

The DL cost referring to the protocol implementation step at the HU-USP corresponded to US$ 29,912.00. As shown in Table 2, the participation of nursing professionals in training programs was the activity that consumed more resources (US$ 19,315.10/92 training hours) and the category Nursing Technician/Assistant presented the higher cost (US$ 13,746.72).

Table 2: DL cost for feasibility of the implementation step for the PUS prevention protocol. São Paulo, SP, Brazil, 2012.

Activities	NDD (US$)	NC (US$)	AN (US$)	NT/NA (US$)	Total (US$)
Research and request for purchase of products, accessories and equipment	894.51	803.17	389.40	-	2,087.08
Design of accessories to position patients	715.86	642.54	389.40	-	1,747.80
Request to produce accessories and purchase from specialized companies	298.27	2,677.56	116.82	-	3,092.65
Meeting coordination to implement the protocol	178.96	-	-	-	178.96
Participation in meetings to implement the protocol	-	1,606.34	1,168.21	-	2,774.55
Development of training program for agents to multiply the protocol	477.24	-	-	-	477.24
Conduction of training programs for nursing professionals	238.62	-	-	-	238.62
Participation in training programs	-	428.26	5,140.12	13,746.72	19,315.10
TOTAL	**2,803.46**	**6,157.87**	**7,203.95**	**13.746.72**	**29,912.00**

NDD – Nurse Director of the Division; NC – Nursing Chief; AN – Assistance Nurse; NT/NA – Nursing Technician/Nursing Assistant.

In accordance with Table 3, the direct cost from the acquisition of products, accessories and equipment needed to make the implementation of the protocol viable corresponded to US$ 22,559.74. Among these supplies, the items consuming most resources were the pneumatic mattress with compressor (US$ 9,034.80/30 units), pressure reducing pad (US$ 6,366.80/110 units) and the egg crate pad – density 33 (US$ 4,638.00/30 units).

Table 3: Cost of the purchase of products, accessories and equipment needed to implement the protocol for the prevention of PUs. São Paulo, SP, Brazil, 2012.

Products, accessories, equipment	Unit value US$	Quantity	Total (US$)
Essential Fatty Acids (AGE) - bottle 200 ml	2.47	152	375,44
Skin protector Cavilon® - bottle 28 ml	41.00	05	205.00
Hydro active dressing 10 cm x10cm extra- thin – unit	6.93	170	1,178.10
Pressure reducing pad – unit	57.88	110	6,366.80
Pillow – unit	10.88	70	761.60
Egg crate pad – density 33 –unit	61.84	75	4,638.00
Pneumatic mattress with compressor – unit	301.16	30	9,034.80
TOTAL	**-**	**-**	**22,559.74**

In accordance with Table 4, the cost of the DL involved on the step of the implementation process assessment was US$ 3,144.92, being the Assistance Nurse the resource that presented the higher DL cost (US$ 2,025.15), totalizing 52h with eight nurses giving interviews, in average of 30 minutes, and 12 participating in a focal group with the duration of 3 hours and 30 minutes.

Table 4: DL cost related to the step of assessment of the implementation of the prevention protocol for Pus. São Paulo, SP, Brazil, 2012.

Activity	NDD (US$)	NC (US$)	AN (US$)	Total (US$)
Conduction of strategies (interviews and focal groups) to assess the protocol implementation	477.23	-	-	477.23
Concession of interviews and participation in focal groups	-	642.54	2,025.15	2,667.69
TOTAL	**477.23**	**642.54**	**2,025.15**	**3,144.92**

NDD- Nurse Director of the Division; NC – Nursing Chief; AN – Assistance Nurse.

Table 5 indicates the direct costs of implementation totalizing R$ 123.012,50. The activities consuming more resources were related to the implementation of the protocol to prevent PUs (US$ 29,912,00) and purchase of products, accessories and equipment (US$ 22,559.74).

Table 5: Demonstrative of direct costs referring to the steps of implementation process of the protocol to prevent PUs. São Paulo, SP, Brazil, 2012.

Developed activities/ products, accessories and purchased equipment	Direct costs (US$)	%
Protocol development	5,240.72	8,61
Protocol implementation	29,912,00	49,15
Purchase of products, accessories and equipment	22,559.74	37,07
Assessment of the protocol implementation	3,144.92	5,17
TOTAL	**60,857.38**	**100,00**

DISCUSSION

The improvement of nursing practice has been the focus of many discussions and reflections among professionals, as well as the participation, competency and qualification of nurses to manage economic-financial information aiming to find ways to strengthen the management function when presenting coherent results to client needs[13-14].

The adoption of assistencial protocols allows improvement of the assistance quality, reduction of complications from PUs, hospitalization time, mortality rates, therapeutic costs, workload from the health team, besides representing a large advance to reduce the physical and emotional suffering from patients and their family members[15-17].

Results from the present study show the expressive investment of the ND from the HU-USP in DL (US$ 29,912.00) to become feasible the implementation of the prevention protocol for PUs. Training programs for nursing professionals is the activity that consumed more resource (US$ 19,315.10). Twenty-three theory-practice programs were developed, with four hours of duration each, in which 33 participants (71%) were Nurses and 134 (78,4%) were nursing technicians/assistants from the MC, SC and AICU. The category nursing technician/assistant was the resource that presented higher cost (US$ 13,746.72) regarding DL caused by the high number of participants.

Studies[4,6,15-17] have shown the importance to conduct trainings directed to the nursing team, using a protocol for preventive measures to identify individuals at risk and the critical factors developed by PUs. Considering this, it is essential to favor the nursing team qualification to develop skills to assess the patient's risk to develop PUs and to better plan preventive actions[6].

In this direction, continuing education is essential to have conscience of the need to form professionals systematically, programmed in a way to reach all levels, offering the opportunity to grow professionally and personally to all[18-19].

However, it should be emphasized that in the search for a continuous improvement of nursing care, it is also indispensable the quantitative adequacy of professionals and to offer work conditions to allow the appropriate exercise of their functions and to attend demands and expectations from patients/clients[20], in this case, the prevention of PUs occurrence.

Besides, one cannot imagine that it is only the nursing team duty to solve this complex problem. There is the argument in favor to form multi-professional teams who search for solutions based in scientific works, bringing discoveries for the reality and for the daily practice of each institution[4].

As mentioned before, the relevance to adopt preventive actions for PUs is incontestable, especially when trying to avoid intangible costs specially those referred to the physical and/or psychical suffering, that are the most difficult to measure or value, as they depend on the perception that the patient has his/her health problems and its social consequences[5].

Thus, it is mandatory to adopt technological resources to avoid PUs occurrences and its costly complications. The purchase cost of products, accessories and equipment for the protocol implementation on MC, MS and AICU units corresponded to US$ 22,259.74. Among the products, accessories and equipment, the items that consumed more resources were the pneumatic mattress with compressor (US$ 9,034.80); pressure reducing pad (US$ 6,366.80) and the egg crate pad – density 33 (US$ 4,638.00).

In cases of patients with PUs categories I and II, besides the constant supervision of the skin, in order to identify alterations, repositioning in bed, to use mattress with high specification or pads able to reduce pressure is recommended as strategical measures to control the evolution of lesions and prevention of the occurrence of new PUs[21].

Facing the great challenge of the cost management process in the Brazilian public health, the need to improve cost management in university hospitals is needed, as they are reference of technology, they need to offer activities of high technology with efficiency of resource's use. Thus, the minimal knowledge of the costs from procedures is needed[13-14].

The measurement and control of hospital costs are relevant to identify and create effective strategies to contain costs, knowledge of rentability of diverse procedures and services, comparison and correct determinantion to allocate resources among their diverse sectors[22]. In this sense, the plan to purchase materials designated to the implementation of the protocol to prevent PUs in hospitalization units from the HU-USP was carefully conducted by nurses with clinical and management experience, who considered technological advances, the patient's needs and the economic viability to meet them.

Thus, we highlight the pertinence of the projection of the rational use of medical-hospital materials to manage resources in public health institutions in Brazil, considering the growing expenses in this field, while available resources do not increase at the same proportion[4].

Therefore, health professionals should value financial aspects related to assistance. They should understand that managing financial costs presuppose the increment of resources to guarantee access and the equity for users, with the maintenance of attendance quality. However, financial costs represent an extra tool to be used in decisive processes and should not be overlapped with technical, human, ethical and social aspects[12].

CONCLUSION

Nurses in the condition of managers of assistencial units and coordinators of patients care plans, need to know and to own financial information related to the adoption of new technologies and work proposals.

Facing the absence of cost related studies to implement protocols to prevent PUs in the national and international scenarios; this study contributes to the development of a method with potential to use it, including for other protocols, in diverse health assistance scenarios.

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