

STAFF COST IN DIRECT NURSING CARE AT AN INTENSIVE CARE UNIT¹

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Telles SCR, Castilho V. Staff cost in direct nursing care at an intensive care unit. Rev Latino-am Enfermagem 2007 setembro-outubro; 15(5):1005-9.

This quantitative case study aimed to learn and analyze the personnel cost in nursing direct care in the intensive care unit. We opted to use a therapeutic intervention score index, TISS-28, for the analysis of the indirect gravity of patients and the dimension of the nursing staff working time. Evaluating the cost by a gravity score presented to be a logical and relatively simple method to allocate costs per patient in the intensive care unit. In this exploratory and descriptive study, the average TISS-28 per patient was 31 points, requiring a daily expenditure of care hours of R\$ 298.69. It was evidenced in this study that personnel costs are variable since there are patients with different complexities. Therefore is possible to estimate the nursing staff cost by assessing its work load.

DESCRIPTORS: costs and cost analysis; intensive care; nursing

COSTO DE LOS PROFESIONALES EN LA ATENCIÓN DIRECTA DE ENFERMERÍA EN LA UNIDAD DE CUIDADOS INTENSIVOS

Con este estudio de caso con aproximación cuantitativa, pretendemos conocer y analizar el costo de los profesionales en la atención directa de enfermería en una unidad de cuidados intensivos. Optamos por la utilización de un índice de intervenciones terapéuticas, TISS-28, para análisis de la gravedad indirecta de los pacientes y dimensionamiento del tiempo de trabajo del equipo de enfermería. Al indagar el costo como un índice de gravedad éste se mostró un método lógico y relativamente sencillo de presupuestar costos por paciente en la unidad de cuidados intensivos. En este estudio, el TISS-28 promedio por paciente fue de 31 puntos, lo que demandó un costo diario de R\$ 298,69 de horas de atención de enfermería. En este trabajo, se identificó que el costo de los profesionales es variable, pues existen pacientes con diversas complejidades y muy diferentes, siendo posible, por medio de la evaluación de la carga de trabajo del equipo de enfermería, establecer estimativas individuales de su costo.

DESCRIPTORES: costos y análisis de costo; cuidados intensivos; enfermería

CUSTO DE PESSOAL NA ASSISTÊNCIA DIRETA DE ENFERMAGEM EM UNIDADE DE TERAPIA INTENSIVA

Pretendeu-se com este estudo de caso, com abordagem quantitativa, conhecer e analisar o custo de pessoal na assistência direta de enfermagem em unidade de terapia intensiva. Optou-se pela utilização de um índice de intervenções terapêuticas, TISS-28, para análise da gravidade indireta dos pacientes e dimensionamento do tempo de trabalho da equipe de enfermagem. Evidenciou-se, neste trabalho, que o custo com pessoal é variável, pois há pacientes com complexidades bem diferentes, sendo possível, por meio da avaliação da carga de trabalho da equipe de enfermagem, estabelecer estimativas individuais de seu custo. Neste estudo o TISS-28 médio por paciente foi de 31 pontos, demandando custo diário de horas de assistência de enfermagem de R\$ 298,69. Apurar o custo por um índice de gravidade mostrou-se método lógico e relativamente simples de alocação de custos por paciente em unidade de terapia intensiva.

DESCRIPTORES: custos e análise de custo; cuidados intensivos; enfermagem

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INTRODUCTION

Considering the intensive care unit (ICU) as the place in hospitals where care delivery to severe and high-risk patients is centralized, joining human resources, material and equipment, it is fundamental to balance the patients' needs with the infrastructure for their care. More and more, the high cost of maintaining a structure as complex as the ICU has justified strict cost control in this area, especially in terms of staff. One of the main responsible for ICU hospital costs has been the sophisticated technology used for diagnosis and treatment. In parallel, care delivery to these patients demands many hours, as hospitalization time and complexity are increasing.

Specialized intensive care literature shows a growing number of publications that use severity indices to measure the work load and nursing care needs, due to their easy application and interpretation in characterizing patient. Moreover, the dynamics of the unit, the efficacy of the treatment and its cost can be monitored and analyzed, leading to an adequate allocation of the available human and material resources.

Research carried out at 36 ICUs from twelve countries in the European community detected that these are responsible for the admission of 5% of patients but consume 20% of the hospital budget⁽¹⁾. These studies also highlight that 90% of ICU staff consists of the nursing team.

A study on the cost of nursing care in ICUs from Australia and New Zealand, using a sample of 139 patients, verified that the nursing team was responsible for between 30 and 40% of total care costs⁽²⁾.

The most used cost verification methodology in health organizations is a process in which costs related to service production are grouped to the units that produce end services, which is called absorption costing⁽³⁾. However, one critique against this methodology is that, although it provides knowledge about the fixed costs of labor, it ignores variations due to patient complexity.

In general, statistical data related to bed occupation refer to the ICU occupation percentage. In this type of analysis, however, the daily variability in care complexity and in care delivery costs for these patients cannot be perceived, as different care complexity levels can represent the same occupation rate.

The hypothesis that nursing care is directly proportional to their cost was confirmed in studies through the Therapeutic Intervention Scoring System, TISS-28⁽⁴⁻⁶⁾. They have demonstrated that the use of this index to measure direct nursing care hours revealed to be a logical and relatively simple method of cost allocation per patient at ICUs.

What the identification of patients' different levels of severity and, hence, of nursing care needs is concerned, the Therapeutic Intervention Scoring System (TISS) was developed as a system that classifies the patient's indirect severity, based on the principle that the amount of therapeutic interventions patients are submitted to is related to the severity of the clinical picture, that is, the more severe the patient's condition, the higher the number of therapeutic interventions needed for treatment and, consequently, the longer the time nursing spends to deliver this care. The TISS was originally idealized in 1974 and consists of 57 therapeutic interventions in total⁽⁷⁾. In 1983, the index was reconsidered and updated to 76 therapeutic intervention items⁽⁸⁾. The TISS-28, a simplified version of the above, was idealized in 1996⁽⁴⁾. The final score of the TISS-28, which ranges from a minimum of zero to a maximum of 76 points, permits not only to estimate patient interventions, but also to dimension the nursing work load.

Assessing patients, through indices that objectively measure the severity of clinical conditions, the interventions used, as well as nursing care needs, has become compulsory in the current intensive care context, in view of the cost this entails for the health system.

Considering the lack of literature about this theme, this study aimed to explore and describe the use of an ICU care complexity level assessment method, which permits measuring the workload of the nursing team and its impact on care cost variations.

OBJECTIVES

- To identify the mean daily nursing care time dedicated to patients, according to the patients' complexity level, using the TISS-28 index.
- To calculate the mean daily cost of direct nursing care, according to the patients' complexity level.

METHOD

This exploratory and descriptive case study adopts a quantitative approach. It was carried out at the adult intensive care unit of the University Hospital at the University of São Paulo, Brazil.

The University Hospital is a secondary-level general teaching hospital. It offers 247 active beds, distributed among the four basic specialties: medical clinic, pediatrics, surgery and orthopedics, obstetrics and gynecology. The ICU, with 14 beds, is destined for care delivery to clinical and general surgery patients, admitting an average of 45 patients per month.

The study population included all patients consecutively admitted at the ICU as from February 1st 2003, as well as patients hospitalized on that day, totaling 120 patients. As inclusion criteria, patients aged fifteen or older were considered, with a minimum ICU stay of 24 hours, as required for the application of the TISS⁽⁴⁾.

Data were collection between February and April 2003, totaling 89 days. During this period, every day, the researcher analyzed the TISS-28 index, which the institution had already been applying to intensive care patients, classifying the complexity level of the patients hospitalized during the months under analysis. Thirty-three patients were not included in daily measurements because they did not complete 24 hours of hospitalization.

A mathematical expression was proposed to estimate the variable costs of labor consumed per day (cost of daily demand) in function of the daily TISS-28, including those patients who were not considered in daily calculations, as shown in the formula below.

$$C_{D/d} = 0.53 \times T_D \times s + 0.53 \times T_M \times s \times k$$

Where:

$C_{D/d}$ - Daily cost of nursing team according to daily demand assessed by the TISS-28.

0.53 - Factor needed to convert the TISS-28 into hours (10.6x3: 60)

T_D - Daily TISS-28.

s - Salary of the whole team per hour.

0.53 - Factor needed to convert the TISS-28 into hours.

T_M - average monthly TISS-28 at the unit

k - number of patients not considered in TD calculation

To convert the TISS-28 index into hours, it should be multiplied by 10.6 minutes⁽⁴⁾, which

represent the work time needed for each TISS-28 point per eight-hour work shift. Next, the result is multiplied by three, as one day consists of three eight-hour shifts. Finally, this is divided by 60 minutes in order to reach the number of nursing care hours needed for each patient. In short, the multiplication factor is 0.53, where $10.6 \times 3 : 60 = 0.53$.

To find the mean cost per hour of the nursing team, the salary of the categories included in the nursing team were surveyed at the University Hospital's Personnel Department. To the gross salary, 60% of taxes and charges were added. The monthly hour load was 180 hours, which the institution adopted as the basis for its calculations. Hence, the cost of a mean staff member per hour was R\$18.18, which corresponds to the sum of the whole team's salary and charges, divided by the sum of the number of hours.

As mentioned, due to the standardization of the TISS-28 index, patients hospitalized for less than 24 hours were not measured. However, to calculate costs, these patients' complexity was measured by the mean monthly TISS at the unit. This explains the need to include the K factor in the mathematical expression above.

The research project was approved by the teaching and research commission and by the research ethics committee at the study institution.

RESULTS

In the period of 89 days, with 722 measurements in total, the mean TISS-28 score per patient was 31 points.

The mean age of the patients classified within the study period was 61 years, ranging from fifteen to 90 years, with a prevalence (52%) of female patients. Patients with baseline chronic disease predominated (79%). In terms of origin, most patients came from the emergency care unit, followed by patients from the surgical center. Clinical causes predominated as the reason for hospitalization in 55% of patients. As to the patients' destiny after they left the unit, it was found that 59 % went to the semi-intensive unit.

The mean TISS-28 score of 31 points per patient demanded 16.43 care hours at a variable daily cost of R\$ 298.69, using the proposed formula.

In this study, the TISS-28 of less complex patient was 10 points, against 58 points for more complex patients.

The mean daily TISS-28 score was 251, which corresponds to the sum of the TISS-28 scores of all patients hospitalized on that day. The mean number of patients per day was 8.16, demanding 133 care hours at a cost of R\$ 2,531.13.

The most complex day during the study presented a TISS-28 score of 353 points, demanding 187 care hours at a cost of R\$ 3,399.39.

The least complex day during the study presented a TISS-28 score of 147 points, demanding 78 care hours at a cost of R\$ 1,415.61.

Figure 1 represents the cost of the nursing team according to the daily demand assessed by the TISS-28 (CD/d), including minimum, mean and maximum.

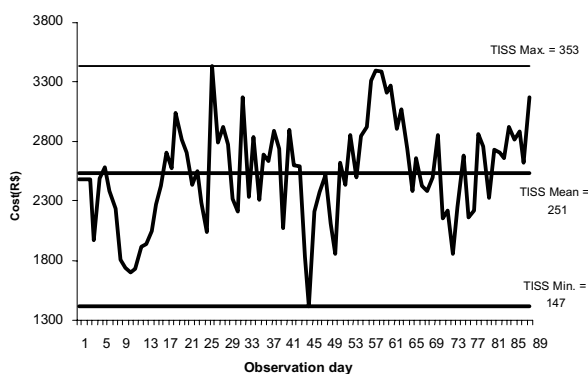


Figure 1 - Distribution of nursing care cost according to the variation in the daily TISS-28 and its minimum, mean and maximum values. São Paulo, SP, 2003

DISCUSSION

The mean TISS-28 score of 31 points found in this study is high in comparison with others, which varied from 20 to 26 points (4,9). In a study developed at ICUs in São Paulo City in the year 2000, the mean score found was 20 points (4). In another research, developed in the European Community, including 13,000 patients from twelve countries, a score of 26 points was found⁽⁹⁾.

As shown in the results, the assessment of the nursing team cost through the methodology adopted in this study presented great variations, as demonstrated in other studies⁽⁴⁻⁶⁾. The maximum cost was R\$ 3,438.07; mean cost R\$ 2,531.13 and minimum cost R\$ 1,415.61.

The possibility of using a severity index that measures individual complexity and, in parallel, assessed the daily cost and its variations, can be an excellent administrative tool.

At ICUs, calculating the cost of patient care by the fixed or standard costs has disadvantages. In research carried out in Germany in 1999⁽¹⁰⁾, disadvantages were shown from a budget perspective, as standard charges do not give a good view on the dynamics of costs per patient group, per hospitalization stage, per day of the week etc. Despite the high level of fixed costs per day at an ICUA, there are considerable variations in costs per day, which depend on the severity of the disease.

Staff costs have been systematically verified by dividing the total cost of human resources by the number of patients, reaching a fixed cost. This is a simpler value to reach a value to be used for estimating the cost of procedures or daily patient hospitalization fees. However, the use of the TISS-28 index showed that care costs are not fixed, but variable, as patients' complexities are very different. By assessing the work load of the nursing team, individual estimates can be made.

The methodological possibility of using the index as demonstrated in this study applies to the use of a new cost dimensioning method, besides serving as a support for technical and administrative decisions. However, further research is needed for a more thorough assessment of its application with this goal.

The nursing time dedicated to personal care delivery to each patient varies from case to case, especially in ICU patients⁽¹¹⁾. With a view to allocating the costs of nursing services directly to the patients who actually used them, it is important to apply a methodology that classifies each patient either according to the severity of his/her disease or based on the number of nursing hours predicted for his/her care.

The nursing service cost methodology must be based on the premise that patients are individuals with different nursing care needs, which vary from day to day, which is why prices must vary as well. Severity classification indices can be useful to differentiate between different care levels. Analyzing the type and the quantity of resources needed for patient care delivery according to the severity level has been a widely used mechanism at ICUs, making it possible to determine the greater or lesser need for nursing care⁽¹²⁾.

CONCLUSION

The mean daily nursing care time found at the ICU of the University Hospital under study was

133 hours, corresponding to 251 points on the TISS-28, for an average of 8.16 patients/day.

The mean daily cost of direct nursing care for 133 hours, applying the proposed mathematical expression, was R\$ 2,531.13.

The analysis of the 89 days of TISS-28 scores to measure the team's workload evidenced great variation. This demonstrates more clearly how these hours are consumed and makes it possible to estimate care costs of nursing staff more accurately.

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