



Revista da Escola de Enfermagem da USP

ISSN: 0080-6234

reeusp@usp.br

Universidade de São Paulo

Brasil

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Revista da Escola de Enfermagem da USP, vol. 44, núm. 2, junio, 2010, pp. 497-503

Universidade de São Paulo

São Paulo, Brasil

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# Monitoring performance indicators regarding the length of care by the nursing team

MONITORANDO INDICADORES DE DESEMPENHO RELACIONADOS AO TEMPO DE ASSISTÊNCIA DA EQUIPE DE ENFERMAGEM

IDENTIFICANDO INDICADORES DE DESEMPEÑO RELATIVOS AL TIEMPO DE ASISTENCIA DEL EQUIPO DE ENFERMERÍA

Danielle Fabiana Cucolo<sup>1</sup>, Márcia Galan Perroca<sup>2</sup>

## ABSTRACT

The objectives of the present study were to: characterize medical-surgical clinic units of a philanthropic hospital and the nursing team performing in these units; identify the clientele's care profile, investigate the time length of care provided to the patients by the nursing team. Data were collected from documents of Personnel and Nursing Departments and the application of the classification instrument of patients. To calculate the care hours; the equation proposed by the Hospital Commitment Quality (HCQ) was used. The findings showed relationship of 1:1 nursing professional/bedside and variation from 0.10 to 0.21 nursing/bedside. The patients needed, mainly, minimum (47.1% to 79.6%) and intermediate (17.7% to 38.6%) care, and the average time spent by the nursing team ranged from 4.1 to 5.1 hours. The values showed that the care hours provided by the nursing team were not enough to assist to the patients' care complexity.

## KEY WORDS

Nursing staff.  
Nursing staff, hospital.  
Inpatients.  
Classification.  
Workload.  
Quality of health care.

## RESUMO

Este estudo descritivo objetivou: caracterizar unidades de clínica médica-cirúrgica de um hospital filantrópico, e a equipe de enfermagem lotada nestas unidades; identificar o perfil assistencial da clientela e investigar o tempo de assistência dispensado aos pacientes pela equipe de enfermagem. Os dados foram coletados a partir de documentos dos Departamentos de Pessoal e de Enfermagem, e aplicação de instrumento de classificação de pacientes. Para cálculo das horas de assistência, utilizou-se equação proposta pelo Compromisso com a Qualidade Hospitalar (CQH). Os achados evidenciaram relação de 1:1 profissional de enfermagem/leito e variação de 0,10 a 0,21 enfermeiros/leito. Os pacientes demandaram, predominantemente, cuidados mínimos (47,1% a 79,6%) e intermediários (17,7% a 38,6%) e o tempo médio dispensado pela equipe de enfermagem variou de 4,1 a 5,1 horas. Os valores mostraram que as horas de assistência dispensadas pela equipe de enfermagem estavam insuficientes para atender à complexidade assistencial dos pacientes.

## DESCRIPTORES

Recursos humanos em enfermagem.  
Recursos humanos de enfermagem no hospital.  
Pacientes internados.  
Classificação.  
Carga de trabalho.  
Qualidade da assistência à saúde.

## RESUMEN

Este estudio descriptivo tuvo como objetivos: caracterizar unidades de clínica médico-quirúrgica de un hospital filantrópico y el equipo de enfermería asignado a esas unidades; identificar el perfil asistencial de los pacientes e investigar el tiempo de asistencia dispensado a los pacientes por el equipo de enfermería. Los datos fueron recopilados a partir de documentos de los Departamentos de Personal y de Enfermería, y de la aplicación de un instrumento de clasificación de pacientes. Para el cálculo de las horas de asistencia se utilizó la ecuación propuesta por el Compromiso con la Calidad Hospitalaria (CCH). Los resultados evidenciaron relación de 1:1 profesional de enfermería/lecho y variación de 0,10 a 0,21 enfermeros/lecho. Los pacientes necesitaron, predominantemente, cuidados mínimos (47,1% a 79,6%) e intermedios (17,7% a 38,6%) y el promedio de tiempo dispensado por el equipo de enfermería varió entre 4,1 a 5,1 horas. Los valores mostraron que las horas de asistencia dispensadas por el equipo de enfermería eran insuficientes para atender a la complejidad asistencial de los pacientes.

## DESCRIPTORES

Personal de enfermería.  
Personal de enfermería en hospital.  
Pacientes internos.  
Clasificación.  
Carga de trabajo.  
Calidad de la atención de salud.

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## INTRODUCTION

Nowadays, Nursing Services face challenges to respond to client demands with excellence and continuous quality improvement. Nursing professionals are responsible for developing and putting in practice actions and instruments for the systematic assessment of care quality<sup>(1)</sup>.

Patient classification systems (PCSs) are one of the instruments for management and care, used to categorize patients according to their degree of dependence on nursing care, that is, based on the clients' needs in terms of the quantity of nursing hours demanded<sup>(2)</sup>. The PCS was developed in the United States in 1960 and introduced in Brazil in 1972. Since then, other instruments have been constructed and validated, among which the most used ones are: the PCS by Fugulin<sup>(3)</sup> and the patient classification instrument by Perroca<sup>(4)</sup>.

The PCS can be defined as a method that is capable of determining, validating and monitoring individualized care through the identification and classification of patients into care categories<sup>(5)</sup>. It can also be understood as a form of determining a patient's dependence level on the nursing team, with a view to establishing the time spent on direct and indirect care, as well as staff numbers needed to attend to that client's needs<sup>(2)</sup>. The identification of the average daily number of patients per complexity level helps in decision making on staff allocation, productivity and care cost monitoring and maintenance of intended quality standards<sup>(5)</sup>. Moreover, it can be of help in additional staff negotiations and team workload assessments and represents the first step in the nursing staff calculation method<sup>(6)</sup>.

Almost 40 years after their introduction in Brazil though, PCSs still have not been fully incorporated yet. In Brazilian nurses' clinical practice, empirical and subjective methods are still used to assess care complexity and, consequently, to forecast and allocate the nursing team<sup>(7)</sup>.

The search for health service quality is a behavioral posture in favor of better processes and results, a prerequisite for survival in an increasingly competitive market. In Brazil, the Hospital Quality and Accreditation program was launched in 1998 and the assessment process involved three aspects: organizational structure, processes and results. Nowadays, five quality assessment initiatives are used in Brazilian institutions: ISO certification, the hospital accreditation program, the integrated management system in hospital organizations, auditing and risk management. Nursing professionals have contributed to the development of care and institutional quality by participating in assessment processes. Over the years, these processes have evolved, improving the identification of crite-

ria, standards and indicators to measure and compare health services' performance<sup>(8)</sup>.

The construction, validation and use of indicators in health and particularly in nursing have stimulated many actions to improve care, affecting different care practice contexts. Among nursing indicators, the staff management indicator by the Hospital Quality Commitment (CQH in Portuguese) permits the evaluation of nursing care hours per professional category and care category, supporting decision making by assessing the quality of care and nursing professionals' workload<sup>(1)</sup>.

The nursing team's work overload can jeopardize care practice, increasing patient morbidity and mortality rates, extending hospitalization times and, consequently, raising hospital costs. Likewise, an overestimated patient/nurse ratio or overcrowded units affect the quality of care delivery, increasing the risks of adverse events like: patient falls, medication errors and health care-related infection<sup>(9)</sup>.

Thus, it becomes relevant to identify the profile of the care clientele in hospitalization units and the hours spent by the nursing team according to the institution's reality, considering the impact of these indicators on the quality of care delivery.

The nursing team's work overload can jeopardize care practice, increasing patient morbidity and mortality rates...

## OBJECTIVES

- 1) To characterize medical-surgical clinical units at a philanthropic hospital and the nursing team working at these units;
- 2) Identify the care profile of the clientele;
- 3) Investigate the duration of care the nursing team delivers to the patients.

## METHOD

This descriptive and quantitative research was carried out at four medical-surgical clinical hospitalization units of a large philanthropic hospital in São Paulo State. These units represent 60% of installed bed capacity at the institution and demand care delivery by the Unique Health System (SUS in Portuguese), health insurance operators and private insurances. The research was developed in May and June 2007.

To characterize the hospitalization units (mean occupancy rate, mean patients/day) and the nursing team working at these units, the following were used: 1. Reports from the Informatics Department about the number of beds and occupancy rates at these units; 2. Personnel Department records about the team's sociodemographic data; 3. Monthly nursing scale and 4. Semistructured questionnaire with sociodemographic data for additional information.

The patients' care profile was identified through the application of the patient classification instrument elaborated and validated by Perroca, with 13 care areas<sup>(4)</sup>. Scores in each area range from one (lowest nursing care level) to five (highest nursing care level). The minimum score is 13 and the maximum 65 points. Through the instrument, the patient can be classified in one of the four care categories: Minimum (13-26 points), Intermediary (27-39 points), Semi-Intensive (40-52 points) and Intensive (53-65 points).

The study goals and procedures were presented to the administration and the nursing service management. Data collection started after a favorable opinion from the Research Ethics Committee (opinion No 1883/2007).

The following concepts were considered in the elaboration of this research:

- Occupancy rate = mean patients-day/number of beds
- Nursing/bed ratio = number of nursing professionals/mean number of patients-day.
- Nurse/bed ratio = number of nurses/mean number of patients-day.
- Nurse technician and/or auxiliary/bed ratio = number of nurse technicians and auxiliaries/mean number of patients-day.

With a view to the application of this instrument, an orientation program was held, involving the nursing service manager and nine clinical nurses who were active at the four units focused on in this research (five nurses from the morning and four from the afternoon period), during the research period. Orientations took two hours for each shift. Initially, the way the patient classification instrument should be used was discussed. Next, a hypothetical situation was presented and the clinical nurses applied the instrument, expressing their doubts. The time available for the orientation was flexible, depending on the nurse groups' needs or requests.

Patients were classified from Monday to Friday, as the instrument could not be applied at weekend, as less nurses worked on those days and in longer shifts. Thus, the instrument was applied for six consecutive weeks, totaling 30 days. The number of patients to be assessed at each hospitalization unit was equally divided between nurses from the morning and afternoon periods, so as to involve more nurses in the application of the method. Patient classifications were recorded daily on a special form and organized in Microsoft Excel worksheets.

The nursing team hours indicator was obtained by using the equation proposed by the CQH<sup>(1)</sup> for minimal and intermediary care, where:

$$\text{Nurse Hours} = \frac{\text{Number of hours delivered per nurse}}{\text{Number of patients-day during period}}$$

$$\frac{\text{Nurse Tec. and/or Aux. Hours}}{\text{Number of patients-day during period}} = \frac{\text{Number of hours delivered per Nurse Tec. and/or Aux.}}{\text{Number of patients-day during period}}$$

- Number of patients-day = sum of number of patients hospitalized per day at each unit over a given period.

The number of nursing hours delivered per professional category was obtained by the number of hours delivered during a given period, discounting hours not worked, such as: holidays, weekly paid leave, coverage at another unit, discount of hours, medical leave, delay, suspension, absence and others. Actual work journeys were considered as 5.75 hours (day) and 11 hours (night), discounting rest periods established by labor legislation. For the nurses, only clinical nurses' hours were calculated.

## RESULTS

### *Characterization of medical-surgical clinical units and nursing team*

The mean occupancy rate ranged from 57.3 to 70.5% and the average number of patients-day varied between 14.1 and 28.5. The nursing team predominantly included nurse auxiliaries (n=62) and this team's mean age ranged from 29.9(7.2) to 36.1(11) years. With regard to the time on the job, the average time for these professionals varied between 6.2(5.4) and 11.3(9.3) years. The nurse/bed ratio varied from 0.10 to 0.21 and the nursing/bed ratio from 0.94 to 1.08 (Table 1).

### *Client care profile*

During the 30-day period, 2291 patients-day were classified, hospitalized in the 117 beds of the four medical-surgical clinical units under analysis. The patients' distribution per care category showed higher percentages for minimal (47.1% to 79.6%) and intermediary care (17.7% to 38.6%), followed by semi-intensive care (1.9% to 12.3%). Patients in the intensive care category were found at wards IV (0.2%) and VI (2%) (Table 2).

**Table 1** - Characterization of hospital wards and nursing team at medical-surgical clinical units, in May and June - São José do Rio Preto - 2007

Variables	Ward I (n=20)	Ward II (n=30)	Ward IV (n=24)	Ward VI (n=41)
Mean occupancy rate (%)	70.5	57.3	69.2	69.5
Average patients/day	14.1	17.2	16.6	28.5
<b>Nursing staff (f)</b>				
Nurses*	3	3	3	3
Technicians	1	2	-	-
Auxiliaries	10	13	15	24
Total	14	18	18	27
<b>Age team (years)</b>				
Variation	21 to 49	23 to 57	21 to 58	21 to 46
Mean (SD)	33.1 (8.5)	33 (9.1)	36.1 (11)	29.9 (7.2)
<b>Time on the job (years)**</b>				
Variation	1 to 28	1 to 19	1 to 26	1 to 18
Mean (SD)	9.9 (8.1)	8.9 (6.1)	11.3 (9.3)	6.2 (5.4)
<b>Institution time (years)</b>				
Variation	1 to 19	1 to 19	1 to 26	1 to 18
Mean (SD)	7.5 (6.2)	7.6 (6.5)	9.1 (8.8)	6.2 (4.9)
<b>Ratio</b>				
Nursing/bed	0.99	1.04	1.08	0.94
Nurse/bed	0.21	0.17	0.18	0.10
Technicians/Aux/bed	0.78	0.87	0.90	0.84

\* Nurses work at more than one unit in the night period; \*\* Lost data.

**Table 2** - Numerical and percentage distribution and average number of patients hospitalized and medical-surgical clinical units, according to nursing care categories, in May and June - São José do Rio Preto - 2007

Care categories	Ward I	Ward II	Ward IV	Ward VI
<b>Minimal</b>				
N (%)	336 (79.6)	409 (79.4)	360 (72.2)	403 (47.1)
Average	11.2	13.6	12	13.4
<b>Intermediary</b>				
N (%)	78 (18.5)	91 (17.7)	96 (19.2)	330 (38.6)
Average	2.6	3	3.3	11
<b>Semi-intensive</b>				
N (%)	8 (1.9)	15 (2.9)	42 (8.4)	105 (12.3)
Average	0.3	0.5	1.4	3.5
<b>Intensive</b>				
N (%)	-	-	1 (0.2)	17 (2)
Average	-	-	0	0.6
<b>TOTAL</b>				
N (%)	422 (100)	515 (100)	499 (100)	855 (100)
Average	14.1	711	16.7	28.5

### Time of nursing team care delivery

The equation proposed by the CQH<sup>(1)</sup> to calculate the number of nursing team hours per professional category also specifies the following care categories: minimum/ intermediary and semi-intensive/ intensive. The predominance of patients from the minimum and intermediary care

categories, however, determined the use of the care hour calculation corresponding to these care categories.

The number of care hours the nurses delivered at the study wards ranged from 0.5 to 1.0 hour and, for nurse technicians and/or auxiliaries, from 3.6 to 4.1. (Table 3 and Table 4).

**Table 3** - Relation between nurses' total work hours and number of patients-day, per hospitalization unit, in June - São José do Rio Preto - 2007

Variables	Ward I	Ward II	Ward IV	Ward VI
Total work hours	413.7	422.7	422.7	430.5
Number of patients-day	422	515	499	855
Hours of Nurse	1.0	0.8	0.8	0.5

**Table 4** - Relation between total work hours of nurse technicians and/or auxiliaries and number of patients-day, per hospitalization unit, in May and June - São José do Rio Preto - 2007

Variables	Ward I	Ward II	Ward IV	Ward VI
Total work hours	1521.5	2118.7	1988.7	3158.2
Number of patients-day	422	515	499	855
Hours of Nurse Technician and/or Auxiliary	3.6	4.1	4.0	3.7

## DISCUSSION

Through the characterization of the wards under analysis, the intensity of bed use could be identified through the occupancy rate (between 57.3% and 70.5%), representing these wards' productivity and indirectly evidencing the work demand and the hospital's performance. In Brazilian teaching hospitals<sup>(10)</sup>, this occupancy rate varied between 47.1% and 91.3% and, specifically at a philanthropic hospital in São Paulo, the mean occupancy rate was 71.9%. These rates are in line with the rates at the medical-surgical clinical units under analysis, and close to the occupancy rate of medical-surgical clinical units at a university hospital in Paraná state (70% to 87%)<sup>(11)</sup>.

In this research, the nursing team working at the hospital wards contained 80.5% of nurse auxiliaries. Some nurse technicians were found at wards where care complexity is lower, although they should act at wards that demand critical care. These findings call attention to the use of care client profile assessment instruments, with a view to helping to (re)distribute the nursing team according to the patients' clinical needs.

This team is experienced, considering that time on the job ranged from 6.2(5.4) to 11.3(9.3) years. Over the years, the nursing staff at this institution has gone through changes, as many newly graduated professionals have been hired, working together with more technically skilled and experienced workers.

The nursing professional/bed ratio at the hospitalization units of the philanthropic hospital under analysis ranged from 0.94 to 1.08 professionals/bed. In comparison with the findings at teaching hospitals in São Paulo State, this range went from 0.3 to 2.86 professionals/bed, considering the average of 1.62 nursing professionals/bed<sup>(12)</sup>. In the same sense, data presented by the CQH for the second semester of 2008<sup>(13)</sup> showed a median of 1.87 nursing team professionals/bed at general hospitals. It should be highlighted that, in these two studies, nursing staff numbers per operating beds at the institution were taken into account.

These ratios show different realities in the proportion of nursing staff/bed at different health services in São Paulo State and evidence that the nursing/bed ratio at the medical-surgical clinical units of the research institution is considerably lower. This scenario becomes even more concerning when looking at the number of nurses/beds in this research (0.10 to 0.21) with Human Resource indicators at hospitals in São Paulo State (0.03 to 0.76)<sup>(12)</sup>, with an average of 0.41 nurses/bed. In general hospitals that participated in the CQH Program in the second term of 2008<sup>(13)</sup>, the median was 0.33 nurses/bed.

The results show the reality at Brazilian health institutions, as maintaining a small number of nurses can jeopardize service supervision and nursing care quality. Likewise, this puts patient safety at risk, as exclusive nursing activities are delegated to technical staff and mainly to nurse auxiliaries, which can cause ethical-legal consequences for nursing professionals and for the institution.

In the identification of the clientele's care profile at this philanthropic hospital, among the 2291 patients who were classified, a majority demanded minimal care (47.1% to 79.6%), followed by intermediary care (17.7% to 38.6%), although the institution is characterized as a tertiary care institution that is a referral for high-complexity procedures. A research at a university hospital in Ribeirão Preto<sup>(6)</sup> showed a range from 66.9% to 70.3% for minimal care and from 18.3% to 28.7% for intermediary care patients. According to other authors, the findings predominantly represented 30.8% of minimal care and 27.5% of intermediary care<sup>(14)</sup>. At another teaching hospital, percentages ranged from 53.6% for minimal care to 28.6% for intermediary care at medical-surgical clinical units<sup>(15)</sup>.

In this research, the classification showed patients in the four care categories, showing their diversity and care complexity for the nursing team. The mean number of patients-day demanding semi-intensive care should be highlighted, mainly at wards IV (1.4) and VI (3.5), similar to other studies with means ranging from 1.3 to 2.8<sup>(11)</sup> and 1.3 (surgical clinical) and 3.1 (medical clinics)<sup>(6)</sup>. At ward VI, 2% of patients with intensive care needs were classified (mean of



0.6 patients-day), in line with other findings ranging from 0.6% to 2.3%<sup>(6)</sup> and means between 0.6 and 1.9<sup>(11)</sup>.

When looking at the number of nursing care hours per professional category at the four wards under analysis, hours for nurses ranged from 0.5 to 1.0 hour of care, against 3.6 to 4.1 hours for nurse technicians and/or auxiliaries, totaling 4.1 to 5.1 nursing care hours per patients every 24 hours. In a study carried out at medical-surgical clinical units of a university hospital in Londrina (PR)<sup>(16)</sup>, the mean care duration for nurses was 0.5 hours and for nurse technicians and/or auxiliaries 3.7 hours, totaling 4.2 hours of nursing team care. Another study at the São Paulo University Hospital<sup>(17)</sup> found a mean care time ranging from 1.3 to 1.4 hours for nurses and from 4.7 to 5.1 hours for nurse technicians and/or auxiliaries, that is, totaling 6 to 6.5 hours of care.

Brazilian Nursing Council Guideline 293, issued in 2004<sup>(18)</sup>, sets and establishes minimal parameters for nursing staff calculations and recommends 3.8 hours for minimal care and 5.6 hours for intermediary care. Hence, the nursing team care hours at the units under analysis are close to literature findings and to the Brazilian Nursing Council's Guideline. However, considering that patients in the semi-intensive care category were classified at all wards under study (1.9% to 12.3%), this team's care hours were below the Brazilian Nursing Council's recommendations of 9.4 hours per client for this category.

The classification of semi-intensive and intensive care patients at the medical-surgical clinical units becomes a source of concern in view of these clients' characteristics. Patients who demand intensive care are considered at imminent risk of death and demand continuing and specialized care<sup>(4)</sup>. Hence, they demand permanent care and more complex interventions from the nursing team, which means a heavier workload. These patients' stay at the units under analysis arouses reflections on whether this is due to the insufficient number of beds at this hospital's Intensive Care

Unit to respond to demands, or to the lack of a systematic assessment of patients' complexity, jeopardizing their allocation in line with the care profile.

In this research, ward VI revealed a smaller proportion of nursing professionals/bed (0.94), a higher percentage of patients in the semi-intensive (12.3%) and intensive (2%) care categories a the lowest number of nursing care hours delivered by nurses (0.5). These findings show that empirical nursing staff forecasts and distributions, merely based on clinical experience, can generate calculations that are inappropriate for the organization reality, putting an overload on the nursing team. Nurses are responsible for establishing the quantitative and qualitative number of staff members needed to respond to patients' health care demands<sup>(18)</sup>. Thus, knowing about the daily reality is not enough. Instead, intuition needs to be transformed into an evidence-based argument, using instruments that add value to practice.

In view of this context, the bed distribution and the Intensive Care Unit's capacity at the study hospital need to be re-evaluated, or the structuring of a semi-intensive care unit should be considered, adequate for patient demands or, yet, units need to be restructured with sufficient resources to deliver care to currently attended clients<sup>(11)</sup>. Thus, the nurse manager at the unit should identify, reassess and elaborate adaptation proposals that can guarantee care processes compatible with the patients' care needs.

## CONCLUSION

This research evidences that the care hours delivered by the nursing team at the units under analysis were insufficient to respond to the patients' care needs. These findings can support negotiations and decision making by nursing about structural re-evaluation, bed and work process redistribution and re-adaptation of the nursing staff.

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