ABSTRACT

Objectives: to measure the average time spent by the nursing staff during patient admission and investigate their compliance with the activities described by the Nursing Interventions Classification; evaluate the degree of interference in the workload of the team. Methods: observational with time measurement through software. We followed 199 admissions made by the nursing staff in seven units, using two validated instruments. Total scores ≥ 70% and 50% validated the process. Results: the average time of nurses ranged from 5.5 (standard deviation = 2.3) to 13 (standard deviation = 1.1) minutes; and the auxiliary / technician, between 4.7 (standard deviation = 2.1) and 6.8 (standard deviation = 2.0) minutes (p ≤ 0.01). We qualified six admissions made by nurses and 33 by assistants/technicians. The intervention spent 16.3% to 31.5% of the working hours of the team. Conclusions: admission impacts nursing workload and needs to be considered both in the measurement of activities and in the sizing of the nursing staff.

Descriptors: Workload; Process Assessment, Health Care; Time Management; Workflow; Nursing Human Resources.

RESUMO

Objetivos: mensurar o tempo médio despendido pela equipe de enfermagem durante a admissão de pacientes e investigar sua conformidade em relação às atividades descritas pela Classificação das Intervenções de Enfermagem; avaliar o grau de interferência sobre a carga de trabalho da equipe. Métodos: observacional com cronometragem de tempo por meio de um software. Acompanharam-se 199 admissões realizadas pela equipe de enfermagem em sete unidades utilizando-se dois instrumentos validados. Escores total ≥ 70% e 50% validavam o processo. Resultados: o tempo médio dos enfermeiros variou de 5,5 (desvio padrão = 2,3) a 13 (desvio padrão = 1,1) minutos; e dos auxiliares/técnicos, entre 4,7 (desvio padrão = 2,1) e 6,8 (desvio padrão = 2,0) minutos (p ≤ 0,01). Seis admissões realizadas por enfermeiros e 33 por auxiliares/técnicos mostraram-se qualificadas. A intervenção despendeu de 16,3% a 31,5% do tempo da jornada de trabalho da equipe. Conclusões: a admissão impacta a carga de trabalho e precisa ser considerada tanto na mensuração das atividades como no dimensionamento da equipe de enfermagem.

Descritores: Carga de Trabalho; Avaliação de Processos, Atendimento de Saúde; Gerenciamento do Tempo; Fluxo de Trabalho; Recursos Humanos de Enfermagem.

RESUMEN

Objetivos: mensurar el tiempo medio ha gastado por el equipo de enfermería durante a admisión de pacientes e investigar su conformidad en relación a las actividades descriptas por la Clasificación de las Intervenciones de Enfermería; evaluar el grau de interferencia sobre la carga de trabajo del equipo. Métodos: observacional con cronometragem de tiempo por medio de un software. Acompañaron-ase 199 admsiones realizadas pela equipo de enfermagem en siete unidades utilizando-se dos instrumentos validados. Escos total ≥ 70% e 50% validavam o processo. Resultados: o tempo médio dos enfermeiros variou de 5,5 (desvio padrão = 2,3) a 13 (desvio padrão = 1,1) minutos; e dos auxiliares/técnicos, entre 4,7 (desvio padrão = 2,1) e 6,8 (desvio padrão = 2,0) minutos (p ≤ 0,01). Seis admissões realizadas por enfermeiros e 33 por auxiliares/técnicos mostraram-se qualificadas. A intervención despendeu de 16,3% a 31,5% del tiempo de la jornada de trabajo del equipo. Conclusiones: la admisión impacta sobre la carga de trabajo y precisa ser considerada tanto en la medición de las actividades como en el dimensionamiento del equipo de enfermería.

Descriptores: Carga de Trabajo; Evaluación de Procesos, Atención de Salud; Administración del Tiempo; Flujo de Trabajo; Recursos Humanos de Enfermería.
INTRODUCTION

One of the indicators considered in bed management is patient turnover. It can be described as the movement of patients in and out of the inpatient unit encompassing admission activities, transfers in and out of the unit, and discharge (1-3).

Occurring often during the day, in any work shift, this activity spends a significant working time of the nursing staff, making it difficult to deliver safe and quality care (4). It is possible to define the nursing workload as the proportion of activity demanded by available staff resources, reflecting on quality issues and patient outcomes (5). Patient turnover influences this overload due to physical and cognitive effort and can bring unsatisfactory results regarding work, the decline in communication, and team interaction (6).

Compared to the discharge process, admissions require more time and intensity, considering the duration of data collection and physical examination activities. The range of time depends on the patient’s condition, i.e., whether it is a scheduled or urgent admission. This fact directly impacts the nursing staff responsible for this activity (7). Such a time demand, if high, can generate adverse events, especially during unscheduled admissions, often due to the professional’s rush to perform the activity. There are reports on identification errors and incidents related to other patients who are momentarily unattended (8).

The repercussion of movements directly affects the workload of the nursing staff and, therefore, the number of professionals needed to meet the care demands of patients (9). The inadequate calculation of professionals, as it does not portray the real workload, thus acquires particular relevance. Besides reflecting on the results of patient care and safety, it generates a feeling of stress, dissatisfaction, and burnout in the team due to the inability to deliver the necessary care.

This research is an offshoot of the project “Workload dimensions: factors not related to Patient Care Complexity” (As dimensões da carga de trabalho: fatores não relacionados à complexidade assistencial do paciente), linked to the Health Services and Nursing Services research group (GESTSAÚDE). The research was conducted to measure the average time spent by the nursing staff during patient admission, investigate their compliance with the activities described by the Nursing Interventions Classification (NIC) (9), and evaluate the degree of interference of this intervention in the workload of the team. This research proposes to answer the following questions: “What is the average time spent by the nursing staff to perform admission of patients in the unit? Do the activities related to this intervention comply with those described by the NIC? How long does the nursing team require to perform the largest number of activities, qualifying these interventions? What is the influence of patient admission to the unit on the workload of the nursing staff?”

OBJECTIVES

To measure the average time spent by the nursing staff during patient admission and investigate their compliance with the activities described by the Nursing Interventions Classification; evaluate the degree of interference in the workload of the team.

METHODS

Ethical aspects

The Research Ethics Committee approved the study (under opinion 980.660/2015). It also received the endorsement of the Hospital Administrator and Nursing Manager of the investigated institutions and the acceptance of the participants by signing the Informed Consent Form (ICF).

Study Design, location, and period

The observational method (10) was used to assess the frequency, average time spent, and quality of patient admissions to hospital units. To describe the impact on the nursing workload, we adopted the descriptive method. The investigation took place in four inpatient units (three surgical clinics and one medical-surgical) and three specialized units (adult intensive care, urgent and emergency care, and maternal-infant care) of two hospitals in the state of São Paulo, Brazil, named Hospital 1 (H1) and Hospital 2 (H2).

The H1 has 198 beds and is a private, philanthropic, and teaching hospital. The H2 has 144 beds exclusively for hospitalization of SUS (Single Health System) patients and outpatient clinics. The choice of units met the criterion of higher patient turnover, i.e., a higher number of admissions.

Monthly, there are about 1,070 admissions to H1 and about 500 admissions to H2. These processes are formalized in Standard Operating Procedures (SOPs) and are used to guide nursing practice in both institutions. The activities performed by the team upon admission are complementary, considering the professional competences and the different perspectives of care.

Sample: inclusion and exclusion criteria

We defined the sample size considering the power of 80% and p ≤ 0.05. Thus, 199 admissions (97 by nurses and 102 by assistants/technicians) were observed among the units studied, performed by 22 members of the nursing team from both institutions. During the day and night periods, professionals with work experience were accompanied over 90 days and who agreed to have their care activities observed and measured.

Study Protocol

We elaborated two instruments related to the admissions of the categories “nurses” and “nursing assistants/technicians”, considering the complementarity of the actions involved in this activity. To characterize the participants, we used a questionnaire addressing aspects related to age, gender, length of work in the institution, work shift, and professional qualification.

Initially, a list of activities corresponding to the investigated intervention were made, in which we selected those pertinent to the national practice scenario based on the NIC (9). Secondly, the Admission activities (NIC 7310) performed by nurses were grouped into six items: Service and Routine (Admit the patient by available staff resources, reflecting on quality issues and patient outcomes (5)). Patient turnover influences this overload due to physical and cognitive effort and can bring unsatisfactory results regarding work, the decline in communication, and team interaction (6).

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time and quality of admissions: nursing workload
Trovo SA, Cucolo DF, Perroca MG.

The significance level was adopted. We presented the categorical variables as absolute, and numerical variables, with mean (M), standard deviation (SD), minimum and maximum values, median (MD) and quartiles (Q1-Q3); The Chi-square test was applied to compare categorical variables; and, in the presence of expected values lower than 5, Fisher’s exact test was used.

The results analysis and statistics

We used for statistical testing the SAS System for Windows (Statistical Analysis System) software, version 9.2, SAS Institute Inc, 2002-2008, Cary, NC, USA. The significance level $p<0.05$ was adopted. We presented the categorical variables as absolute, and percentage frequency; and numerical variables, with mean (M), standard deviation (SD), minimum and maximum values, median (MD) and quartiles (Q1-Q3); The Chi-square test was applied to compare categorical variables; and, in the presence of expected values lower than 5, Fisher’s exact test was used.

To compare the numerical variables between the two groups, the Mann-Whitney test was used. Among three or more groups, due to the absence of normal distribution of variables, the Kruskal-Wallis test was adopted. For significant differences, Dunn’s multiple comparisons test.

To verify the quality of the admission process, initially, the limit of 70% in the total admission score (nurses, 11 to 16; assistants/technicians, 7 to 10) was considered. The reduced number of admissions made by assistants/technicians, with a total score of ≥ 70%, made statistical calculations difficult. Thus, to enable the measurement of time spent, we decided to reduce this limit to 50% (score 5 to 10).

For monthly measurement of the number of activities performed by unit, shift, and professional category, a historical series of three months in the units investigated was verified. We based the calculation of the percentage of time spent within the working hours on the hours worked per shift, excluding day and night working breaks, in which:

$$\text{Total time} = \frac{\text{admissions average time}}{\text{Category and unit}} \times \text{average number of admissions}$$

Working hours (%) = admissions average time converted in %

Considering 5.75 hours (345 minutes) really worked during the day; and 11 hours (660 minutes) at night.

Results analysis and statistics

We observed a total of 199 patient admission activities performed by the nursing staff (97 nurses [N] and 102 assistants/technicians [NA/NT]), performed predominantly by female professionals with an average age of 28.3 (SD = 6.4; NA/NT) and 30.1 years (SD = 3, N), and length of work in the institution ranging from 3.1 (SD = 1.6; NA/NT) to 6.4 (SD = 2.7; N). The highest percentage of admissions occurred in the surgical unit 1, 57.8% (n = 59; NA/NT); and in maternal infant care unit, 50.5% (n = 49; N), mostly in the morning - 69% (n = 67; N) and 46.1% (n = 47; NA/NT).

Among the admissions made by nurses (n = 97), the average time spent in the units ranged from 5.5 (SD = 2.3) to 13 (SD = 1.1) minutes (p ≤ 0.01); and, in the observed shifts, from 7.2 (SD = 2.7) to 7.5 (SD = 3.2). Nursing assistants/technicians, on average, demanded between 4.7 (SD = 2.1) and 6.8 minutes (SD = 2.0) in the units investigated; and between shifts, the time ranged from 4.4 (SD = 2) to 6.1 minutes (SD = 2.4) (p ≤ 0.05) (Table 1).

Considering the activities verified in the admissions made by nurses (n = 16) and by assistant/technician (n = 10) in accordance with the NIC, the total score showed, respectively, SD = 7 (Q1-Q3 = 6-9) and SD= 4 (Q1-Q3 = 4-5). The items most performed by nurses were: Service and routine (SD = 2; Q1-Q3 = 1-2), Security (SD = 2; Q1-Q3 = 1-2) and Interview/Physical Examination (SD = 2; Q1-Q3 = 2-3). And by the assistants/technicians were: Documentation (SD = 1; Q1-Q3 = 0-1), Interview/Physical Examination (SD = 1; Q1-Q3 = 1-1) and Security (SD = 1; Q1-Q3 = 1-1).
Brazil, 2018, N = 1,475 according to section in the score by 50% and 70%, Catanduva, São Paulo, dedicated to nursing staff admissions by unit, shift, and the second section – Average total time (minutes) and percentage of daily working hours.

Table 3 - Average / month distribution of nursing staff admissions by unit, shift, from August to October 2018; and mean time (in minutes) to perform admissions, Catanduva, São Paulo, Brazil, 2018, N = 1,475.

Table 4 - Average total time (minutes) and percentage of daily working hours dedicated to nursing staff admissions by unit, shift, and the second section in the score by 50% and 70%, Catanduva, São Paulo, Brazil, 2018, N = 199.

- In the admissions observed, it was found that the activities provided for in the item Documentation were not performed by 66% of nurses (n = 64) and 33% of assistants/technicians (n = 34); and those related to Care were also omitted by 61.8% (n = 60) of nurses and 65.7% (n = 67) of assistants/technicians. The questions regarding the Facilities, listed only for nurses, were not performed in 58.8% of admissions (Table 2).

- In the investigation of the admission activities (according to the NIC) performed by nurses (n = 97), in a 70% section in the total score, only six admissions occurred in this interval (≥ 11 activities) and required time ≥ 9 minutes. For assistants/technicians (n = 102), only two admissions attended 70% of the observed activities; therefore, to enable time measurement, a section of 50% was admitted. Thus, 33 admissions were considered qualified, and most of them (n = 12) occurred in time ≤ 4 minutes.

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Between August and October 2018, the nursing staff made an average of 1,475 admissions to the units studied, of which 514 (SD = 85.4), performed by nurses, and 961 (SD = 43.5), by assistants/technicians. The average number of admissions made by the nursing staff ranged from 26 (SD = 18) to 323 (SD = 33) between the units and from 150 (SD = 25.2) to 383 (SD = 36.2) in shifts. The average time to perform the largest number of activities was 14.3 minutes (SD = 1.6) for nurses and 5.2 minutes (SD = 2.5) for assistants/technicians, as shown in Table 3.

Regarding the average time devoted to admissions by the nursing staff, there was a variation from 18.8 (surgical 3) to 46.9 (maternal-infant care) minutes. The daily percentage spent on working hours for the activity ranged from 16.3% (night) to 31.5% (morning). To contemplate ≥11 score items, the nurses spent a total of 245 minutes, and the assistants/technicians, to reach ≥5, dedicated a total time of 166.6 minutes (Table 4).

**DISCUSSION**

This study evaluated the time and quality of patient admissions performed in hospital units without pretending to standardize time for this intervention, but rather to look more closely at its influence on the nursing workload.

In the institutions studied, we identified the average time of 7.4 minutes for patient admissions by nurses; and 5.7 minutes by nursing assistants and technicians - totaling 13.1 minutes for the team. It is worth mentioning the complementarity in the actions developed by these professionals. Even when the assistants/technicians performed the admission, the nurse, as team coordinator, participated in the patient's reception, identifying care needs to systematize nursing care.

The activities performed during admissions require both physical and mental effort. Therefore, they are considered time-consuming and intense and have been associated with workload. Some studies relate the time consumed to the discharge process and documentation, making impossible an exact comparison with the time observed in this investigation. There are also estimates of nurses’ time from data generated through participant observation and interviews at US medical and surgical units of approximately one hour for a patient in need of minimal care. According to NIC, considered a reference for professional practice, patient admission may require 16 to 30 minutes.

Regarding the units, the time consumption was higher in intensive care (13 minutes - nurses) and surgical unit 2 (6.8 minutes - assistants/technicians). The increased degree of complexity and the level of attention required in ICUs influence the increased demand for care time, as the patient can change their condition quickly and unpredictably. In surgical unit 2, the profile of post-trauma patients with orthopedic comorbidities from the emergency room, often with surgical devices such as external bone fixators and situations of physical immobility, requires careful initial evaluation, which reflects on the time.

When examining the compliance of admissions with the activities described in the NIC, it is possible to observe that nurses attended 43.7% (7/16) and assistants and technicians 40% (4/10) of the verification list items. This factor is worrying, as it signals a poor quality of this intervention by the team. The moment of admission is crucial for the identification of professionals, assessment of patients’ needs, guidance, and planning of care actions. Proper registration of these activities also subsidizes the care continuity. However, due to the workload of the nursing staff, this intervention is often compromised, and other times is not prioritized in educational processes.

The provision of evidence-based care is based on protocols and procedures described to guide professional practice, and the health team should continually discuss it, considering the updating and qualification of the work performed. In the institutions studied, these instruments are present and, in the case of admission, it was observed that two items (orientation on rights and duties of the patient/family; and communication of the multidisciplinary team about the admitted patient’s condition) were not included in the reference document for the team and the researcher listed and checked them. Therefore, the professionals may not have attended these activities considered from the NIC because they are not contemplated, yet, in the patient's admission by the nursing staff of these hospitals.

In this study, nurses seem to be more concerned with guidance on safety routines and institutional protocols, as well as interviewing and physical examination. On the other hand, they neglected items such as documentation (66%), care (61.8%), and facilities (58.8%). Information adequately registered in the medical record becomes a valuable document for the patient, health team and institution, providing legal support, and ensuring effective communication between professionals and, thus, safety. In the city of Recife, in a private hospital accredited by the Joint Commission, there was a study that reviewed medical records for verification of nursing records; and, upon admission, there was higher non-compliance with physical examination and pain notes (44%).

In the item “care,” we verified orientation activities regarding patient/family expectations and preparation for hospital discharge. The studied institutions adopt the process of planning and transferring care from one health unit to another, but research corroborates that the participation of the patient/family in the admission and discharge plan constitutes a weakness in the nurse’s performance. Professional time constraints and patients’ clinical conditions and preferences (e.g., not participating) may prevent patient and family from being included in care decisions.

The average time demanded by nurses on admissions increased from 7.4 to 14.3 minutes, considering the qualification of this process when performing a higher number of activities (score ≥11), which represents a percentage increase of 93.2%. As for the assistants and technicians, it fell 8.8%, i.e., from 5.7 to 5.2 minutes (score ≥ 5). Adding these values, the nursing staff increased the time dedicated to admissions by 48.8% (from 13.1 to 19.5 minutes), approaching the time reported by the NIC.

These findings show that to perform a more elaborate admission in line with the items described in the NIC, the nurses and staff have a more significant time consumption. However, only 6.2% (6/97) of nurses reached the proposed section value. It is important to note that a reduction of 50% of the total score was necessary considering the reduced number of qualified admissions (≥ 70% of the activities attended), in order to obtain 32.3%
interactions and interventions in clinical nursing practice, it is necessary to recognize some of its restrictive issues. Among them, we highlight the observer's effect on the observed people, leading them to change their behavior.

It was not possible to measure the time required by the team following the items described in the NIC, considering the 70% section and the simultaneous activities performed by nurses and assistants/technicians during admission.

Still, the findings regarding the quality and time demanded by patient admissions in the two investigated institutions may differ from other practice contexts due to the different cultures and institutional work dynamics.

**Contributions to nursing, health, or public policy**

In addition to pointing out critical activities in the patient admission and intra-hospital transfer, this study demonstrates that the qualification of these interventions demands more time from the nursing staff, which impacts the workload. As care coordinators, nurses need to analyze patient turnover as a generator of staff overload and a risk factor for sentinel events and care discontinuity. The findings, therefore, make it possible for clinical nurses and managers to redesign and improve processes, as well as to forecast, provide and allocate staff, also considering the flow of patients in units and work shifts. It can also support other researches and policy discussions related to nursing sizing in hospital care.

**CONCLUSIONS**

The quality of the admission process is also a factor of concern in clinical practice. The time devoted by the nursing team in this intervention impacts the workload of the team, especially when they performed it according to the best professional evidence. This process, representative of patient turnover, needs to be considered in the measurement of nursing activities for the sizing and distribution of personnel in different units and work shifts. It should also be improved considering quality aiming for the continuity of care.

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