INDICATORS FOR THE MEASUREMENT OF EMERGENCY NURSING PERSONNEL[1]

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ABSTRACT: This exploratory-descriptive study was performed with a qualitative approach, aiming at finding indicators for the measurement of nursing personnel in adult emergency services. Data were collected using nursing work observation and a semi-structured interview with nurses; data were analyzed based upon the theory of working process, originating the following categories: working process and nursing personnel measurement, and indicators for the measurement of nursing personnel in emergency. The study presents both quantitative and qualitative indicators to ground personnel measurement, amongst which the need to evaluate the working organization, the degree of users' care besides biological aspects and the emergency service characteristic itself, which encompasses hospitalization and urgency care.

DESCRIPTORS: Emergency nursing. Personnel downsizing. Personnel administration, Hospital.

INDICATIVOS PARA O DIMENSIONAMENTO DE PESSOAL DE ENFERMAGEM EM EMERGÊNCIA

RESUMO: Trata-se de um estudo exploratório-descritivo qualitativo, com o objetivo de levantar indicativos para o dimensionamento de pessoal de enfermagem em serviços de emergência. Os dados foram coletados utilizando-se observação do trabalho de enfermagem e entrevista semiestruturada com enfermeiros, sendo analisados à luz da teoria do processo de trabalho, originando as categorias: processo de trabalho e dimensionamento de pessoal de enfermagem, e indicativos para o dimensionamento de pessoal de enfermagem em emergência. O estudo aponta indicativos quantitativos e qualitativos para subsidiar o dimensionamento de pessoal, entre os quais, a necessidade de se avaliar a organização do trabalho, o grau de cuidado dos usuários para além dos aspectos biológicos e a própria característica do serviço de emergência, que congrega internação e atendimento das urgências.

DESCRITORES: Enfermagem em emergência. Downsizing organizacional. Administração de recursos humanos em hospitais.

INDICATIVOS PARA EL DIMENSIONAMIENTO DE PERSONAL DE ENFERMERÍA EN URGENCIA

RESUMEN: Estudio exploratorio-descriptivo con abordaje cualitativa, con el objetivo de obtener indicativos para el dimensionamiento de personal de enfermería en urgencia adulto. Los datos fueron colectados utilizando-se la observación del trabajo de enfermería y entrevista semiestructurada con enfermeros, y analizados de acuerdo con la teoría del trabajo, originando las categorías: proceso de trabajo y dimensionamiento de personal de enfermería, e indicativos para el dimensionamiento de personal de enfermería en urgencia. Apunta indicativos cuantitativos y cualitativos para subsidiar el dimensionamiento de personal, entre los cuales la necesidad de evaluarse la organización del trabajo, el grado de cuidado de los usuarios bien como de los aspectos biológicos e la propia característica del servicio de urgencia, que congrega internación y atendimiento de las urgencias.

DESCRIPTORES: Enfermería de urgência. Reducción de personal. Administración de personal en hospitales.

INTRODUCTION

Nursing personnel measurement is an important aspect of the personnel management policy, and an important topic to be studied. To plan the working process in healthcare, which includes nursing, it is essential to restructure the organization models that seek to meet the challenges of demand for care in the Unified Health System (SUS, as per the acronym in Portuguese for the Brazilian National Health System), from the perspective of changing situations of inequality in the users' access to healthcare.[1] Human resources constitute the basis of health services and SUS itself.

Staff measurement should consider the organization of the working process and, therefore, each institution should evaluate its context, based on scientific methods, and then apply existing formulations, because there are different ways to estimate staff size.[2]

The use of indicators as a tool in the management process of nursing work establishes normative standards from which one can assess the reality of a fact, building a diagnosis with strategies and priorities definitions. One can also evaluate the performance of policies and programs, measuring the degree to which the objectives were achieved and the level of resource utilization or changes that took place in society.[3-4]

In the organization of nursing work, using parameters to set objectives and indicators as a tool for management control remains incipient. That would verify the efficiency and effectiveness and compare management situations at workplaces, between workplaces or between periods in one region.[5] Studies explain some of the aspects regarding emergency personnel measurement, such as verifying nurses' mean work productivity in an emergency situation, which aimed to identify and analyze time distribution of nurses in an emergency service, pointing out that the their work is mainly related to the direct care of clients[6] and a study on the need of the nurses' work to be focused on planning care and on estimating the provision of nursing personnel.[7]

Based on these arguments, this study aimed at raising indicators for emergency personnel measurement, which were built in association with the working process reference.[8-9]

METHODOLOGY

The study is grounded on the qualitative approach, as it seeks to analyze facts and meanings among structures and their representations and worries with reality, which cannot be quantified. In this study, a descriptive exploratory approach was used, which allows describing the facts or phenomena of a reality with its characteristics, including the survey of opinions and atitudes.[10]

The research site was the Adult Emergency Service (AES) of *Professor Polydoro Ernani de São Thiago* University Hospital, Federal University of Santa Catarina (HU/UFSC) and the subjects consisted of ten nurses who had been on the job for at least six months, chosen because they were aware of the reality of the nursing team work and because personnel measurement was considered to be part of the nurse's work.

Data were collected with the strategy of observing the work of the nursing team and the semi-structured interview with nurses was guided by the questions: does personnel measurement affect in the development of your work and that of your team? What do you suggest should be considered as an indication to calculate the number of workers needed to provide emergency nursing care?

Data were transcribed and analyzed generating categories and showing fundamental indicators to perform the sizing of the nursing staff in the Adult Emergency Service.

The analysis was conducted from the perusal of the data, and the similar data were grouped into pre-categories to result in analytical categories,[11] which were analyzed based on the theoretical reference of the work process[8-9] and on studies about personnel sizing.

To develop the study, some procedures were considered, such as: approval of the research project by the Ethics Research Committee involving Humans of UFSC (certificate n. 612/2010); application for authorization of the institution's research site upon presentation of the study design, and to request interviews with nurses who would be willing to participate in the study voluntarily, after reading and signing the Informed Consent, ensuring anonymity by means of the use of flour names to the subjects under investigation.

RESULTS AND DISCUSSION

Upon pooling the data, two categories emerged from the analysis: the work process and sizing of the nursing staff, and indicators to the sizing of emergency nursing personnel.

Work process and nursing staff sizing

In the experience of nurses in the emergency service, it is the unanimous perception that the work organization is influenced by personnel sizing and that articulation interferes with amount of care and the workload of the nursing staff. This perception can be confirmed in the following statements:

[...] *the better proportioned the nursing staff, the better will patient care be; if the number is insufficient, care will be carried out with more physical and mental effort, leading to lack of quality (*Tulipa*).*

[...] *when the number of employees is not enough, care is compromised, and one cannot work the part of education and health, and the relationship with the patient, family and work team work is jeopardized (*Gérbera*).*

It is possible to note that there is the concern of nurses in relation to the outcome of care provided, i.e. in performing quality and safe work and in a timely manner, generating user's and worker's satisfaction. The relationship between quantity and qualification of nursing professionals with regard to working conditions, makes up a determining factor to perform the job safely, essential to the health of the user.[12]

It is also worth emphasizing that when compared to other countries, one identifies a shortfall in amount of nursing workers in Brazil, considering that the labor force in the country in 2007 was 0.94 nurses and 5.63 nursing aids and technicians per 1000 inhabitants, totaling 6.57 nursing workers per 1000 inhabitants.[12] During this same year, the countries members of the Organization for the Cooperation of Economic Development (OCDE), involving high-level economic and social development countries, had, on average, 9.6 nursing workers per 1000 inhabitants.[13]

Thus, considering only the number of nursing professionals in Brazil, compared to that of more developed countries, one has a reduced number of staff and, consequently, taking into no account any calculation, the data that led to undersizing, which implies in quantity and quality in the development of safe work for the nursing team.

In Brazil, it is not possible yet to identify unified data indicating the number of workers that would ensure a safe nursing job, although there is a growing concern about the safety of the user and the indicators and parameters that affect sizing of the staff.

In this context, it is difficult to predict the quantity and quality of the nursing team in adult emergency, mainly due to lack of a methodology that uses operating parameters to the service, whose users' flow is constant, in addition to the relative variety and simultaneity of activities and situations of death risks found in the service.

The empirical prediction of the amount of nursing teama, without the use of variables that can be measured and that can support such a measurement, it can make it difficult and underestimate the sizing of personnel, reflecting on the care provided the user and health of the worker aspects already highlighted in other studies.[2,5-7,14]

This is a nursing job scenario that requires scientific knowledge to support health actions. These considerations can also be observed in the following statement:

[...] *on an emergency it is difficult to predict how much work there is to be done. Sometimes you think and compare the emergency with a unit that has the same number of beds, but the kind of care in an emergency is different, it is unstable. I think that is where the problem lies of predicting the number of workers (*Tulipa*).*

Thus, the importance of nursing personnel to perform care is evident, as well as the difficulty in adapting the appropriate number of workers so that one can perform the work with quality before the demand, which indicates the need to reflect about the organization and development of the work and manners of care.

It can be said that the activities performed by the nursing teams in emergency result in effective and invisible work, presenting difficulty in being assessed, because it is finished when it is done,[9] and because it is intrinsic to subjectivity, since what is real in the job manifests itself in the way of affection to the workers when he performs the activity.[15]

This manifestation of subjectivity at permanent and invisible work can be noted in the following statement:

[...] *emotional distress is very high, it is larger than the physical stress, and seems to gain a dimension that is reflected physically, and people end up thinking*

that everything is bad and that here everything is too much (Jasmim).

The study site underwent renovation and expansion of physical space and in the meantime, there was the realization of a public tender, and emergency received new nursing workers. These factors, as perceived by nurses, interfered in the organization of the nursing work process, and resulted in improvements:

[...] *we had never had it so good as we do now, with this staff, we can better organize the service, care for the patient fully, which could not be done before* (Rosa).

However, based on the data obtained, there is a need to rethink the organization of nursing work at AES, which is subdivided into three areas: 1) The internal emergency (SEI): contemplates the resuscitation room, surgery, procedures and medication. The nursing workers, at least one nurse and five technicians and nursing aides, during the day, and one nurse and three technicians and nursing aids, at night, are responsible for caring of users in an emergency situation, users who are under observation in the medication room or on stretchers, and service to the users who look for service and that are not considered so urgent; 2) Rest (REP) has thirteen beds for service to hospitalized users who await a vacancy at the inpatient units or transfers to other hospitals. The nursing staff is composed of at least one nurse and three technicians and nursing aids in different work shifts, providing nursing care in full and using assistance methodology; and 3) Reception with assessment and risk classification (ACCR): activity performed by the nurse that prioritizes service in order of severity. This form of work organization, based on SUS premises, is under implementation.

The organization of the work is such that the amount of users, at rest, does not exceed thirteen admissions. Thus, workers who are responsible for SEI users absorb the demand as well as care to the users who remain hospitalized on stretchers in the hallway due to lack of internal and external spaces. Admissions on stretcher effectively increase the work of the nursing staff and interfere in decreased mobilization they the arrival of users with severe complications occurs.

In this sense, one must rethink the work organization, because it is understood that attention to users admitted on stretchers could be developed by the nursing team who is responsible for the users at rest, including the use of the methodology of care and with the performance of care in a full manner. Another reorganization possibility would be the distribution of the number of nursing workers, not necessarily by shifts, but by hours of greatest demand, since the busiest period for emergency services is between 12h and 24 hours, with 67.1% of care.[15] Thus, one asks: what prevents such changes and what causes the accommodation of the team with the way the work has been organized over the years?

Regarding the organization of nursing work, it is possible to identify factors in the statements of the nurses to rethink the practice:

[...] *how many nurses are there in the emergency call? It increased greatly in comparison to years ago. But let's think about how this changed or has changed in the care provided? Not always the fact of having more employees will ensure better care; sometimes there is a patient in resuscitation who is not given due attention, although there are enough employees* (Jasmim).

It is noteworthy that the nurse exercises all nursing activities. It is up to him, privately, to organize, plan, implement and evaluate care as well as nursing care of greater technical complexity, requiring scientific knowledge and ability to make immediate decisions, according to Law n. 7498, of June 25, 1986,[18] which provides on nursing practice.

It is believed that the scope and concept of the nurse's work require understanding when relating to the testimony:

[...] *only when a serious patient gets admitted, then that is where the problem of emergency employees comes up. One nurse is not enough, but two nurses, when there is no serious patient, are too much* (Margarida).

In the current context, in which 250 visits/day are held on average and there are on average 25 users admitted with a limited physical space, the presence of two nurses should reflect on differentiated actions of care, such as attention focused on basic human needs, pain evaluation, help with food and hydration, care with hygiene and comfort. However, these actions sometimes still seem to present themselves in the background and one can say that they are not of minor importance for the maintenance of health.

Therefore, we must rethink the activities performed by nurses, besides the number *per se*, justified by the need for this performance at several levels of the work: care for, manage, educate and research.

Personnel sizing is also related to quality of care, and in the perception of nurses, the fundamental indicators to ground emergency nursing personnel measurement, can be identified in the statements presented below:

[...] *consider the demand, the severity of the patient and the quality of service you one wishes to offer* [...] (Antúrio).

[...] *make a guess about the number of employees on top of the number of care performed per day and inpatients* [...] (Orquídea).

Indicators for the sizing of emergency nursing personnel

The measurement of nursing personnel is a process that aims at promoting safe conditions to users and workers. The parameters now cited, such as the demand, the number of hospitalizations, the number of visits, the severity, the quality and type of care, can be analyzed by the method of operation of the process of personnel measurement proposed in a previous study.[17] This method allows listing and systematize the measurement of variables, as long as they are identified at the work places. These are: the average load of the unit (average daily quantity of users and the average daily care according to the level of dependence or type of care); the technical safety rate (the planned absences: vacation and time off; those unplanned: absences, leaves and suspensions), and the effective working time (daily work hours). From the behavior of these variables one can apply the equation of the method that allows predicting the amount of nursing personnel.[18]

Another possible method to estimate nursing personnel, according to Resolution 293/2004 of the Brazilian Federal Nursing Council (COFEN),[19] is the use of the mathematical formula that considers the hospitalization unit (location where the inpatient stays), the Patient Classification System (PCS), the weekly work hours (for instance, of 20 hours, 30 hours, 36 hours), the weekdays (seven days or 168 hours), the technical safety rate (empirical coefficient of 15% to cover planned and unplanned absences), the occupation rate (average number of beds taken), the personnel size (based on PCS and on the occupancy rate), the total nursing hours (sum of hours required to take care of the users with minimum, intermediary, semi-intensive and intensive care demand), and Marinho's Constant (coefficient deduced as a result of the days of the week, weekly work hours and the technical safety rate). This method for measuring personnel is also indicated by the Regional Nursing Council of São Paulo.[20]

It is inferred that in the two methods of personnel measurement there is the combination of variables, which result from the addition of various activities and knowledge, however specific, whose integrated results provide the ground for the proposed equations, resulting in the appropriate staff size at a unit to perform safe care. Nevertheless, these variables must be identified at the workplace.

The number of clients and the level of dependence on nursing care, or the type of care at inpatient units, in the two proposed methods, indicate that this can be identified with the use of a PCS[2,17,21] which includes biological aspects regarding the needs of the care, such as mental condition, oxygenation, vital signs, motility, walking, feeding, body care, elimination, therapy and mucocutaneous integrity. Besides the aspects described, another study[22] proposes that elements, in addition to the biological ones, such as health education/communication, hormonal regulation, emotional security, rest and sleep and perception of the sense organs, be inserted into the PCS because they demand work and are fundamental to nursing care.

The instruments for characterizing the client's level of dependence in relation to the nursing team's work used at the hospital units, where the infrastructure is adequate to take in inpatients, can also be used for emergency services.

However, the AES involves characteristics that go beyond an inpatient unit, adding to the difficulties already described, predicting the quantity and quality of the nursing staff. These difficulties can be noted in the following statement:

[...] *at rest it is more appropriate to an inpatient unit, the problem of personnel in emergency is in the front, the staff size and the care needed to provide to patients in the emergency ward can still be improved to avoid mistakes and accomplish safer care services* (Azalea).

The nursing team carries works in a place that has the characteristics of an inpatient unit, added to the instabilities and contingencies.

Considering the emergency unit, and according to COFEN Resolution 293/2004,[19] the following aspects should be highlighted: special care unit

(a place to assist the clients), with an operational area, also considering the activity performed (resuscitation room, surgical, procedure, and medication rooms) and the work period (resulting from the work hours up to 12 hours), whose measure unit is understood as a functional site (considering the operational area, the work performed and the work period, with the data obtained in historical series of weekly models).

It is known that at AES, the nursing team develops its activities during 24 hours, and personnel measurement using the functional site measure is restricted to a 12-hour working period to produce estimates of nursing personnel size.

In this sense, the nursing work at AES combines what should be expected for an inpatient unit and a special care unit, i.e., when estimating personnel size in an AES, it is necessary predict the activities required of these two units and not only the use of the functional site.

The indicators identified for the emergency service go beyond the identification of variables and applying the PCS at inpatient units. This is observed in the reports stating that, in order to measure the nursing personnel, it is necessary to:

[...] *also consider that the institution is a teaching hospital* (Rose).

The nursing work organization becomes more complex when we discuss the issue of the teaching hospital. The HU/UFSC can be understood as a university laboratory, where research is developed and practical classes are conducted in the various health areas, including nursing. The development of academic activities and the delivery of nursing care to clients occur concurrently and sometimes they are not the same, as it adds an even higher level of difficulty in issues related to the adequate number and quality of the nursing team.

Besides being a teaching hospital, the nursing personnel measurement must include:

[...] *think that in an emergency, the measurement is different from the units, it is more difficult to see the level of dependence, and from it, to predict personnel size. Patients arrive continuously with different levels of dependence and you can never know what is going to happen* (Azalea).

[...] *consider the areas in which the hospital is reference, such as burns; vascular; CIT, where patients with exogenous intoxication require considerable work; the digestive tract hemorrhages* [...] (Gerbera).

The emergency service is part of an institution that is reference to medium and high complexity health care services. Clients who need emergency services have been transferred from the Emergency Wards of the municipal First Aid Units (established since 2009) and the Mobile Emergency Care Service, established in 2006 in partnership with the rescue of the Fire Department and Federal Highway Patrol, which cover the region, thus following the reasoning of a regional and regulated network, in the perspective to improve emergency health services.[23]

With the establishment of a regulatory network in prehospital care, there is the worsening of health situations of the cases brought to the emergency ward and, consequently, the increased complexity of nursing care.

However, the guidelines of the Ministry of Health, explained in GM Ordinance 1020, of 2009,[24] and Ordinance 1600, of 2011,[25] regarding the implementation of the local regional networks of comprehensive emergency care as well as hospital care, and reformulation of the national policy for emergency care, highlight that adequate human resources are needed, in addition to daily capability to perform health care services, defining the minimum number of physicians per shift, and, in relation to the nursing team, it establishes the need for a coordinating nurse and nurses, technicians and nursing aids in sufficient number to take care of emergency services during 24 hours, without, however, stating any numbers.

It is observed, in the Ordinances of the Ministry of Health, the difficulty of estimating the number of nursing workers, because they only mention the need for nursing workers in sufficient number to take care of the work during 24 hours. But, what exact number would be sufficient? This difficulty to establish the actions of the working process and measuring the nursing personnel, based on meeting spontaneous demand and cases referred by the regulatory network, can be identified in the following statement:

measuring the emergency personnel is difficult to do; it is necessary to think about the patients who are in surgery, resuscitation, in medication, and patients who are lying on stretchers, and also those who are at rest, and in addition, those that are coming in [...] (Lilly).

For the current work scenario at AES, based on the literature, interviews, observation and practical experience, indications for measuring emergency nursing personnel should take into

consideration the organization of the working process, as well as the combination of the service with the health network.

Thus, the quantitative indications to ground the measurement of nursing personnel are: the daily number of clients cared for; the level of dependence of the client for nursing care; the time devoted to care; the effective working time; the workload; the planned and unplanned absences; the structure, and the physical plant.

The quantitative indicators that were mentioned in the study, particularly those referred to in the statement of the nurses, are also identified in the literature.[2,6-7,14,17,19,26-27] Therefore, it can be said that, in relation to the quantitative aspects, no new parameters were found to evaluate the measurement of personnel.

However, with this study, it is believed that there is need for quantitative indications to be assessed in the workplace, so that they can be effectively used in emergency nursing personnel measurement. These quantitative indicators are not evaluated in the emergency ward, so it is necessary to consider them in the work context.

However, in addition to the quantitative aspects, the investigation identifies factors that constitute the qualitative indications that must be considered when establishing the size of emergency nursing personnel, which are: dynamics, mission and character of the institution (teaching hospital); the model of care, and the profile of the working team.[2,17,19,26-27]

Besides the qualitative indicators already described in the literature, this study points to the unpredictability of an emergency service; the work organization to meet spontaneous demand and demand by work shift; the references, of medium and high complexity, and the specialties and pathologies of references to be considered when measuring the work force; however, there is no indication as to how to turn them into measurable parameters to estimate personnel measurement. Note that these are new qualitative parameters that were identified and that must also be considered in emergency nursing personnel measurement.

A method should be developed, which would consider every qualitative factor and their interrelation with the quantitative parameters. There is also a need to think of a factor, for instance, a multiplier, which would express these qualitative indications as measurable data in order to turn them into numbers to measure emergency nursing personnel.

It can be assured that there is evidence of the need for more research in the field of health care, where only one resolution, one model or isolated data do not cover the magnitude of the organization of nursing work. Therefore, nurses must identify quantity parameters and indicators, and factors affecting quality, with integrated results, which in combination, could ground an adequate provision of quality and quantity of nursing workers, which will contemplate the specificity and particularity of workplaces and will correspond to the expectations of clients, workers and the institution.

CONCLUSION

It is believed that this study contributes to the debate about personnel measurement, particularly in emergency care, considering the gap there is in the scientific knowledge in this area. Therefore, when thinking about emergency nursing personnel measurement, it is necessary to consider that there are quantitative indicators, qualitative factors involved and the need to promote studies that combine aspects of nursing personnel measurement and the working process.

As identified, the quantity and quality of nursing personnel is one of the difficult and complex problems that must be solved in work scenarios, by having several facets and being inserted into the healthcare network. More than formulas, this work points to the need to consider the qualitative indicators in personnel measurement, which are specific to each particular institution. A deeper reflection is needed to seek strategies whereby these qualitative aspects can be considered and expressed in number of workers. This is a challenge to be overcome and that this study was not intended to exhaust.

There is a need to think of methods to measure nursing personnel, in order to achieve the satisfaction of clients, institutions and workers, aiming at developing safe nursing care.

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