Original article

NURSING STAFF DIMENSIONING AT THE ADULT ICU OF A PUBLIC TEACHING HOSPITAL

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ABSTRACT: The objective was to dimension the nursing staff at an Intensive Care Unit for adults in the state of Paraná and compare it with the existing staff. Cross-sectional research using a documentary source. The data were collected during 122 uninterrupted days between June and September 2016 – concerning the sociodemographic and clinical characteristics and daily Nursing Activities Score of the patient sample (n=128); and concerning the professionals working at the sector. The collected data were subject to descriptive statistical analysis, application of an intensive care staff dimensioning equation and adjustment of the dimensioned staff to the professional category according to the new Resolution by the Brazilian Federal Nursing Council, No.543/2017. The average Nursing Activities Score at the unit was 1514.89. The comparison between the dimensioned (n=87) and the actual staff (n=60) revealed a shortage of 38 nurses and a surplus of 11 nursing technicians. The actual staff does not correspond to the need for nurses.
DESCRIPTORS: Personnel downsizing; Intensive care units; Nursing, team; Personnel management; Workload.

DIMENSIONAMENTO DE PESSOAL DE ENFERMAGEM NA UTI-ADULTO DE HOSPITAL UNIVERSITÁRIO PÚBLICO

RESUMO: O objetivo foi dimensionar o quadro de pessoal de enfermagem de uma Unidade de Terapia Intensiva para adultos do Paraná e compará-lo com o quadro real existente. Pesquisa transversal, com uso de fonte documental. Os dados foram coletados sobre 122 dias ininterruptos prévios de junho a setembro de 2016 – referentes às características sociodemográficas, clínicas e pontuação diária do *Nursing Activities Score* da amostra (n=128) de pacientes; e aos trabalhadores do setor. Aos dados tabulados, procedeu-se análise estatística descritiva, aplicação de equação própria do dimensionamento de pessoal em terapia intensiva e ajuste do quantitativo dimensionado à categoria profissional segundo a nova Resolução do Conselho Federal de Enfermagem, nº 543/2017. A média do *Nursing Activities Score* da unidade foi 1514,89. Na comparação do quadro dimensionado (n=87) com o real (n=60), houve um déficit de 38 enfermeiros e superávit de 11 técnicos de enfermagem. O quadro de pessoal real não corresponde à necessidade de enfermeiros.
DESCRITORES: *Downsizing* organizacional; Unidades de terapia intensiva; Equipe de enfermagem; Administração de recursos humanos; Carga de trabalho.

DIMENSIONAMIENTO DE PERSONAL DE ENFERMERÍA EN LA UCI-ADULTO DE HOSPITAL UNIVERSITARIO PÚBLICO

RESUMEN: El objetivo fue dimensionar el cuadro de personal de enfermería de una Unidad de Terapia Intensiva para adultos de Paraná y compararlo con el grupo real existente. Investigación trasversal con uso de fuente documental. Los datos fueron recolectados sobre 122 días ininterrumpidos de junio a septiembre del 2016 – referentes a las características sociodemográficas, clínicas y puntuación diaria del *Nursing Activities Score* de la muestra (n=128) de pacientes; y a los trabajadores del sector. A los datos tabulados fue aplicado análisis estadístico descriptivo, aplicación de ecuación propia del dimensionamiento de personal en terapia intensiva y ajuste de la cuantidad dimensionada a la categoría profesional según la nueva Resolución del Consejo Federal de Enfermería, nº 543/2017. El promedio de la *Nursing Activities Score* de la unidad fue 1514.89. En la comparación del cuadro dimensionado (n=87) y real (n=60), fue encontrado un déficit de 38 enfermeros y superávit de 11 técnicos de enfermería. El cuadro de personal real no corresponde a la necesidad de enfermeros.
DESCRIPTORES: Reducción de personal; Unidades de cuidados intensivos; Grupo de enfermería; Administración de personal; Carga de trabajo.

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INTRODUCTION

The Intensive Care Unit (ICU) plays a fundamental role for the recovery of people in critical health conditions. This is a highly complex sector, which is characterized by the peculiarity of the patients treated, who often need several invasive and complex diagnostic-therapeutic interventions. In addition to the technological apparatus linked to care, ICU care needs specialized human resources able to apply the knowledge in a safe way, with a view to the better recovery of severely ill clients[1].

Despite the impact of human capital on the quality of intensive care, it is important to highlight the importance of the nursing team, which represents the largest contingent of workers in this and other hospital sectors, as well as the only professional category that remains with the hospitalized patient uninterruptedly[2].

For the leadership of the nursing team, the role of nurses in the setting of an ICU should be well defined since, in addition to direct care, the nurse should be responsible for the improvement of professionals; technology management; humanization; interdisciplinary practices; and, no less important, the management of the team under its supervision[3].

Although complex, nursing management, including at the ICU, can be facilitated by the use of means and instruments for this purpose, mainly derived from administrative knowledge that favor nurses' managerial work[3-4]. In this respect, one of the instruments the nurse needs to use in the field of human resource management is the dimensioning, which provides for the quantitative and qualitative personnel needed to meet the care demands required by a given clientele[5].

In Brazil, for more than ten years, the dimensioning was officially guided by the Federal Nursing Council (COFEN) through a resolution that very recently (May 2017) received a well-deserved and acclaimed update[5]. We believe that this fact alone justifies the need for new studies on the dimensioning of Brazilian nursing, since the update contemplates changes in the proportion of professionals per patient and in the nursing hours required for the care categories (degrees of dependency)[5].

The dimensioning is a method based on mathematical expressions that uses variables inherent to the clientele, the nursing service and the organization, with great emphasis on the workload of the nursing team in its operationalization[5-6]. The Nursing Activities Score (NAS) is widely used and recommended to measure the workload of intensive care nursing, in addition to mediating staffing itself[7].

In the ICU context, the increase in the workload of the nursing staff - commonly associated with the deficit in the staff - has presented alarming results for patient care, such as: increased length of hospitalization[8]; elevation of care-related infection rates, pressure ulcers, falls and drug administration errors[9]; and even greater propensity to death[10].

Considering the relevance of the nursing team in the quality and safety of ICU care, as well as the recent update of the official Resolution that sets rules for staffing in Brazil, it is considered that investigating the issue in question is socially and scientifically relevant, as the results can offer formal and up-to-date support for possible redimensioning of the staff.

This may contribute directly to the quality of patient care and safety. No less important, recent studies have reported on the nursing workload in the ICU, not the dimensioning itself as a research problem[6-11], which reinforces the justification for further research.

In view of the above, the concerns for this study culminated in the following question: Does the nursing personnel dimensioned in an adult ICU correspond to the actual staff? In order to answer the question, we aimed to size the nursing staff of an Intensive Care Unit for adults in Paraná and compare it with the existing real staff.

METHODS

Cross-sectional research, using documentary sources and a quantitative approach. The place of study was the adult ICU of a public university hospital located in the state of Paraná, Brazil. The

hospital has 210 beds exclusively linked to the Unified Health System (SUS), and serves a population of around two million inhabitants, being a reference institution for trauma care, high-risk pregnancy and treatment of Human Immunodeficiency Virus (HIV).

At the investigated ICU, there are 14 beds, five of which are destined for hemodialysis, according to the clinical need of the patients attended. Nursing work at the unit is divided into five teams for the morning, afternoon and evening shift.

The research was conducted on all inpatients and nursing professionals at work during a period of 122 days of prior observation, corresponding to the months of June to September 2016. Data collection took place in November 2016. For this purpose, the nursing management worksheet was used, a formal document of the institution. In addition, the data related to the sociodemographic and clinical characteristics of the patients hospitalized in the timeframe were compiled by means of an electronic medical record that uses software outsourced by the hospital.

The data collected from each hospitalized patient in the period were: sex; age; medical specialty responsible for ICU admission; time spent in the unit; and daily NAS score, which is applied by the nurses at the sector, who have been trained for this purpose and have performed the electronic measuring and registration of the NAS since 2011.

In addition, information about the number of workers per category in the sector and about the leaves of absence from work was extracted from the worksheets of the Nursing Management. The absence of the NAS measure from the management worksheet throughout the patient's hospitalization period was the only exclusion criterion in the research for the patients. The workers on leave for any reason during the research period were not considered in the actual (available) staff at the unit.

The NAS is a nursing workload measuring instrument composed of 32 assessment activities, distributed in the following dimensions: basic activities, ventilation support, cardiovascular support, renal support, neurological support, metabolic support and specific interventions[12-13]. The maximum NAS score per patient in 24 hours is 176.8%[12-13].

All information was stored in Microsoft Office Excel® software, version 2010. After that, descriptive statistical analysis of the data was carried out, using proportion, central trend and dispersion measures, as well as the recommended equation for nursing team dimensioning in the ICU [14], namely:

$$PE = (E.\ (\text{mean NAS}/100) + 15\%$$

Where "PE" means the total number of nursing professionals required (dimensioned table) in the unit; "E" the number of teams available in the work shifts, which is multiplied by the unit's mean NAS. The mean NAS represented the sum of this score for all patients on each of the 122 days of analysis, divided by this value of days. This average was further divided by 100 since, according to the literature[13], this must correspond to a nursing professional. This result was increased by 15%, represented by the minimum Technical Security Index (TSI) recommended by the current COFEN Resolution [5] in order to cover anticipated and unforeseen absences in nursing human resources.

The qualitative definition phase - the proportion of nursing workers by professional category - was also obtained through the current Resolution (543/2017) of COFEN [5]. For this purpose, the minimum proportion of 52% of nurses (and the others, nursing technicians) was considered for the total number of patients in intensive care [5], due to the characteristic of the place of study, that is , ICU. The difference between nurses' positions (coordination versus care) was not considered, and these were compiled as a single professional category due to paired training.

The study complied with the ethical requirements of the National Health Council. In addition, the research project that fomented the study was submitted and approved by the Ethics Committee for Research involving Human Beings of *Universidade Estadual do Oeste do Paraná*, opinion No. 1.450.491.

RESULTS

What the investigated patient sample is concerned, it consisted of 128 subjects hospitalized at the ICU between June and September 2016. No loss occurred. The occupancy rate at the ICU corresponded to 97.2%. Thus, Table 1 summarizes the results regarding the patients' sociodemographic and clinical characteristics.

Table 1 – Sociodemographic and clinical characteristics of the patients (n=128). Cascavel, PR, Brazil, 2016

Variable	Categories	N (%)
Sex	Female	53 (41.40)
	Male	75 (58.60)
Age Range (Years)	15-24	15 (11.72)
	25-34	18 (14.07)
	34-44	15 (11.72)
	45-54	24 (18.75)
	55-64	27 (21.09)
	65-74	20 (15.62)
	75-84	9(7.03)
Medical Specialty	Endocrinology	25 (19.54)
	Neurosurgery	34 (26.57)
	General Surgery	32 (25)
	Cardiology	9(7.03)
	Thoracic Surgery	6(4.68)
	Medical Clinic	7(5.46)
	Gastroenterology	9(7.03)
	Plastic Surgery	1(0.78)
	Oral and Maxilo Facial Surgery	1(0.78)
	Orthopedics and Traumatology	3(2.35)
	Gynecology and Obstetrics	1(0.78)
Length of ICU hospitalization (days)	1-Apr	13 (10.16)
	May-14	43 (33.60)
	15-24	27 (21.09)
	25-34	27 (21.09)
	35-44	6(4.69)
	45-54	5(3.90)
	55-64	2(1.57)
	More than 64 days	5(3.90)

The NAS score of all patients on each analysis day (n=122) ranged between 1258.6 and 2259.0 points, resulting in an average of 1514.89 points (SD=500.2) which, although high, accompanied the average and range, that is, its dispersion was as expected. Thus, considering the five teams available at the investigated ICU and the additional technical safety index (TSI) of 15%, the total nursing staff was dimensioned at 87 workers.

In the period studied, there were 69 professionals at the unit, including 11 nurses (one coordinator and 10 clinical nurses) and 58 nursing technicians. Nevertheless, nine nursing technicians were excluded due to leaves of absence and licenses, totaling 60 active workers.

Considering the adjustment per professional category in the nursing staff dimensioned, in accordance with COFEN's current Resolution, Table 2 compares the dimensioned and actual staff in quantitative and qualitative terms (per professional category).

Table 2 – Comparison between dimensioned and actual ICU nursing staff per professional category. Cascavel, PR, Brazil, 2016

Staff	Nurses	Nursing Technicians	TOTAL
Dimensioned	49	38	87
Real	11	49	60

DISCUSSION

These research data indicated the predominance of the male gender with 75 (58.60%) in the ICU admission. This finding corroborates other studies that found the predominance of the male gender, corresponding to 58% of the patients (n = 104) hospitalized in the ICU of a hospital located in Rio Grande do Sul[15], and 74% of hospitalizations (n = 50) in an intensive burn treatment center[16]. Although this measure is not considered in the NAS, the gender of the clientele may subjectively reflect in the workload of the nursing team considering, for example, the weight of male patients which is commonly higher than that of women, although this is not a rule.

Regarding the age group, individuals aged 55-64 years predominated, which is also in line with another study that presented a mean age of 65.81 years, however, with a predominance of females (71%) in general hospitalization[17]. This reinforces that each service, individually, including the ICU, needs to behave proactively in the knowledge of its clients' profile, so that care actions can be planned with greater assertiveness, including the allocation and management of rational human resources.

It is observed that the results of the present study are similar to other investigations that present the age group between 50 and 59 years of age with the highest prevalence, followed by 60 to 69 years, totaling 36.1% of the patients assisted in the ICU[18]. In the North of the State of Paraná, in turn, the mean age of intensive care patients for burned patients was 41 years[16].

The findings regarding the age of the patients, even if not considered in the measuring of the nursing workload itself, may favor the strategic allocation of human resources, since elderly patients, a larger part of the research, are known to have differentiated care needs, such as more intensified skin care, nutrition monitoring and hydration, in order to prevent common adverse events in this care sector (ICU), such as pressure ulcers[19].

That said, it is pointed out that, even if age is not a factor compiled in the measuring of the nursing workload using the NAS, it can serve to support personnel management - a factor superimposed on staff dimensioning - like in the training of personnel in line with the clinical and demographic profile of the clients for example.

The most frequent medical specialty responsible for hospitalization at the ICU was neurosurgery, which may be related to the care profile of the institution, which is a reference in trauma in the region. The literature[20] points out that diseases of the nervous system correspond to the second cause of hospitalization in intensive care, which usually lead to surgical interventions. In this same study, the mean hospitalization time was 10 days, corroborating with the data of this research and that may have been linked to the high workload.

The clinical characteristics of the patient sample investigated contrast with the findings of a study carried out in the Northeast of Brazil, which identified that most ICU hospitalizations were related to cardiorespiratory (46%) and hepatic (17.5%) diseases[21]. In response to the above-mentioned debate, this is a fact that reaffirms the profile of the hospital organization, that is, using trauma reference to the detriment of clinical management diseases, such as those related to cardiology and pneumologyspecialties[19]. For example, it is expected that the ICU investigated will be primarily linked to hospitalizations from surgical-medical specialties, which are usually responsible for the management of multiple trauma patients, who due to a severe general clinical condition may demand increased nursing care, translating into an increased workload.

Regarding the length of stay in the ICU, a study carried out in Santa Catarina found that 53.2% of hospitalized patients remained for a period of 0 to 3 days and 29.7% of patients between 4 and 15 days[18]. In an educational institution, the length of stay in the ICU averaged 5.46 days[17]. In the studied hospital, the most constant period of hospitalization was 5 to 14 days, and it could also be related to the health profile of the sample which, due to the clinical severity, may have presented a need for a longer stay, consequently posing a greater demand for nursing work at the unit.

The ICU under study had a high occupancy rate (97.2%). It is postulated that this finding is possibly related to the fact that the hospital exclusively meets the demand of the SUS, which is known to suffer from a shortage of hospital beds, added to a scenario full of adversities, such as the lack and the scrapping of different types of resources, including human, as ratifies by the data of this research. This is a fact that certainly contributed to the high workload of the nursing team, measured every day in the ICU by means of the NAS, whose operational capacity not rarely was fully, or very near to fully occupied.

Regarding the average NAS score (1514.89) of the unit, it is considered that the workload of the nursing team was high compared to a study developed in another university hospital in the interior of Paraná, whose mean NAS for the adult intensive care sector was 697.3 points[14]. It should be noted that the ICU of the aforementioned study had only eight hospitalization beds, that is, close to half the operational capacity available at the unit investigated. Nevertheless, considering that the clinical profile of the clients in the study cited was similar to that of this study, the workload of the hospital located in Maringá-PR[14], if projected to double, would still be lower than that of the (similar) unit investigated, located in the same state and working under the same management regimen.

A study carried out in a semi-intensive care unit for adults found a mean NAS of 49.5 points[6], much lower than that of this study, which was performed in an intensive care unit. This parallels the fact that the clinical severity of the clients hospitalized in this research was in fact compatible with the ICU admission, which led to the high workload of the nursing team.

As already explained, the influence of the workload on the development of adverse events is real, whereas the burden of the nursing staff represents a risk factor for the development of infections, pressure ulcers and medication errors[9], as well as worse results of indicators related to human resource management, such as absenteeism and turnover[2].

In addition, a study carried out in 12 European cities showed that, for nursing professionals, the overload associated with long work hours reflects in the development of low quality care, and also that the development of overtime is not one of the most effective solutions to this problem[22].

The high workload influenced the size of the nursing staff at the ICU studied, which presents a serious deficit (-38) in the category of nurses. This may be due to the fact that the current Resolution of COFEN recommends that the nursing team active in care for intensive care patients should be composed of at least 52% of nurses[5]. In contrast, the proportion of nurses in the actual ICU corresponded to only 18.3% of the total number of professionals.

When combining the official recommendation with the research results, the reflection emerges that the organization investigated tends to prioritize the hiring of mid-level personnel to the detriment of those at a higher level, since the category of nursing technicians obtained a surplus of 11 workers in the dimensioned staff. In addition, in the actual staff, the proportion of professionals at the secondary level was 81.7%, which indicates a complete disagreement with the current COFEN guideline[5].

The above fact is shared by other studies that assessed the ICU nursing staff dimensioning[14,23], or at other services, such as the hospital emergency room[24]. We need to reflect on the seriousness of this scenario in the Brazilian nursing context, because it is known that the nurses' work process has to synergistically permeate the management actions for direct care[3,6] and, when that many nurses are lacking, these professionals' work may be focused on bureaucratic actions that are totally disconnected from planning for the best care or even on direct care provision.

The adequacy of staff in quantitative and qualitative terms, especially in the context of nurses, can represent a taboo from the purely organizational / administrative point of view, since this factor will result in the expenditure of financial resources, linked to the payroll of personnel with higher

remuneration than the technical level. In this respect, a study identified that the adequacy of hospital nursing personnel can represent an increase by up to 40% of the total amount paid to the workforce, regardless of the category[25].

In contrast, a recent survey carried out at a large university hospital in Porto Alegre identified that the increase of 40% in the number of nurses and 16% in the total number of nursing technicians can greatly reduce the rates of sick leave, the total overtime in hours, overtime paid, as well as pressure ulcer rates, falls and infections related to the use of indwelling urinary catheters[26].

Considering the impact of the adequacy of nursing human capital on the quality and safety of the patient, there is a clear need for the leaderships at the place of study to more actively advocate for the hiring of additional personnel, especially nurses. Being a public hospital, it is known that this entails difficulties inherent in the recruitment process and slower selection, which usually occurs through public tender and / or selective tests with governmental consent.

In this regard, it is expected that nursing class entities can clearly represent the search for better work conditions with regard to human resources, and the updating of the official Resolution on staffing can serve as a facilitator for this undertaking.

CONCLUSION

In conclusion, the dimensioned nursing staff at the ICU does not correspond to the actual staff for the category of nurses. The shortage of professionals in this group was high and this was linked to the heavy work burden at the unit. In view of the clinical severity of the clients and COFEN's requirement, this entailed a wide-ranging demand for care by higher-trained professionals.

We believe that the most expressive limitation in this study was to consider only the nursing staff's workload and dimensioning, unrelated to results of direct applicability to care or occupational health. In addition to possibly being one of the first studies developed using the new Brazilian Resolution in force on staff dimensioning, which is very recent, the study can contribute to the dissemination of the topic to Brazilian and international nursing in the search for more dignified support for intensive care work.

REFERENCES

1. Soares MI, Terra FS, Oliveira LS, Resck ZMR, Esteves AMSD, Moura CC. Processo de enfermagem e sua aplicação em unidade de terapia intensiva: revisão integrativa. Rev. enferm. UFPE online. [Internet] 2013;7(n esp) [acessoem 17jan 2017]. Disponível:10.5205/reuol.4134-32743-1-SM-1.0705esp201311.

2. de Magalhães AMM, Dall'Agnol CM, Marck PB. Nursing workload and patient safety – a mixed method study with an ecological restorative approach. Rev. Latino-Am. Enfermagem. [Internet] 2013;21(n. esp) [acesso em 18 jan 2017]. Disponível: http://dx.doi.org/10.1590/S0104-11692013000700019.

3. Vasconcelos RO, Bohrer CD, Rigo DFH, Marques LGS, de Oliveira JLC, Tonini NS, et al. Meios para a gerência de enfermagem utilizados em unidades hospitalares críticas. Enferm. Foco. [Internet] 2016;7(3/4) [acesso em 17 jan 2017].Disponível: http://revista.cofen.gov.br/index.php/enfermagem/article/view/944/354.

4. Chaves LDP, Laus AM, Camelo SH. Ações gerenciais e assistenciais do enfermeiro em unidade de terapia intensiva. Rev. Eletr. Enferm.[Internet] 2012;14(3) [acesso em 17 jan 2017]. Disponível: http://dx.doi.org/10.5216/ree.v14i3.15724.

5. Conselho Federal de Enfermagem. Resolução n.543/2017. Atualiza e estabelece parâmetros para o Dimensionamento do Quadro de Profissionais de Enfermagem nos serviços/locais em que são realizadas atividades de enfermagem. [Internet] Brasília: COFEN; 2017 [acesso em 24 mai 2017]. Disponível: http://www.cofen.gov.br/resolucao-cofen-5432017_51440.html.

6. Trettene AS, Luiz AG, Razera APR, Maximiano TO, Cintra FMRN, Monteiro LM. Carga de trabalho de enfermagem em Unidade de Terapia Semi-intensiva especializada: critérios para dimensionamento de pessoal.

Rev.esc. enferm. USP. [Internet] 2015;49(6)[acesso em 17 jan 2017]. Disponível: http://dx.doi.org/10.1590/S0080-623420150000600012.

7. Ferreira PC, Machado RC, Vitor AF, Lira ALBC, Martins QCS. Nursing measure in Intensive Care Unit: evidence about the Nursing Activities Score. Rev. Rene. [Internet] 2014;15(5) [acesso em 03 mai 2017]. Disponível: http://www.revistarene.ufc.br/revista/index.php/revista/article/view/1685/pdf_1.

8. Novaretti MCZ, Santos EV, Quitério LM, Daud-GallottiI RM. Sobrecarga de trabalho da enfermagem e incidentes e eventos adversos em pacientes internados em UTI. Rev.bras. enferm. [Internet] 2014;67(5) [acesso em 17 jan 2017].Disponível: http://dx.doi.org/10.1590/0034-7167.2014670504.

9. de Oliveira AC, Garcia PC, Nogueira LS. Nursing workload and occurrence of adverse events in intensive care: a systematic review. Rev.esc.enferm. USP. [Internet] 2016;50(4)[acesso em 17 jan 2017]. Disponível: http://dx.doi.org/10.1590/S0080-623420160000500020.

10.Neuraz A, Guérin C, Payet C, Polazzi S, Aubrun F, Dailler F,et al.Patient mortality is associated with staff resources and workload in the ICU: a multicenter observational study.CritCareMed. [Internet]2015;43(8) [acessoem 10 jan 2017]. Disponível: http://dx.doi.org/10.1097/CCM.0000000000001015.

11. Perão OF, BubMBC, Rodríguez AH, Zandonadi GC. Gravidade de pacientes e carga de trabalho de enfermagem em unidade de terapia intensiva. CogitareEnferm. [Internet] 2014;19(2) [acesso em 10 jan 2017].Disponível:http://dx.doi.org/10.5380/ce.v19i2.33750.

12. Queijo AF, Padilha KG. NursingActivities Score (NAS): adaptação transcultural e validação para a língua portuguesa. Rev. esc. enferm. USP. [Internet] 2009;43(n. esp) [acesso em 10 jan 2017]. Disponível: http://dx.doi.org/10.1590/S0080-62342009000500004.

13. Miranda DR, Nap R, Rijk A, Schaufeli W, Iapichino G, TISS Working Group. Therapeutic Intervention Scoring System. NursingActivities Score (NAS). CritCare Med. [Internet] 2003;31(2)[acesso em 17 jan 2017]. Disponível: http://dx.doi.org/10.1097/01.CCM.0000045567.78801.CC.

14. Inoue KC, Matsuda LM. Dimensionamento de pessoal de enfermagem em Unidade de Terapia Intensiva para adultos. Acta paul. enferm. [Internet] 2010;23(3)[acesso em 10 jan 2017]. Disponível: http://dx.doi.org/10.1590/S0103-21002010000300011.

15. Favarin SS, Camponogara S. Perfil dos pacientes internados na unidade de terapia intensiva adulto de um hospital universitário. Rev enferm. UFSM.[Internet] 2012;2(2) [acesso em 10 jan 2017]. Disponível: http://dx.doi.org/10.5902/217976925178.

16. Camuci MB, Martins JT, Cardeli AAM, Robazzi MLCC.NursingActivities Score: carga de trabalho de enfermagem em Unidade de Terapia Intensiva de queimados. Rev. Latino-Am. Enferm. [Internet] 2014;22(2) [acesso em10 jan 2017]. Disponível: http://dx.doi.org/10.1590/0104-1169.3193.2419.

17. Bezerra GKA. Unidade de Terapia Intensiva – Perfil das Admissões: Hospital Regional de Guarabira, Paraíba, Brasil. R bras ci Saúde. [Internet] 2012;16(4) [acesso em 28 dez 2016]. Disponível: http://www.ies.ufpb.br/ojs/index.php/rbcs/article/viewFile/11900/9116.

18. Rodriguez AH, Bub MBC, Perão OF, Zandonadi G, Rodriguez MJH. Epidemiological characteristics and causes of deaths in hospitalized patients under intensive care.Rev. bras. enferm. [Internet] 2016;69(2) [acesso em 23 dez 2016]. Disponível: http://dx.doi.org/10.1590/0034-7167.2016690204i.

19. Fernandes LM, da Silva L, de Oliveira JLC, de Souza VS, Nicola AL. Associação entre predição para lesão por pressão e marcadores bioquímicos.Rev. Rene. [Internet] 2016;17(4) [acesso em 18 jan 2017]. Disponível: http://www.periodicos.ufc.br/index.php/rene/article/view/4939/3640.

20. Melo ACL, Menegueti MG, Laus AM. Perfil de pacientes de terapia intensiva: subsídios para a equipe de enfermagem. Rev. enferm. UFPE online. [Internet] 2014;8(9) [acesso em 15 dez 2016]. Disponível: http://www.revista.ufpe.br/revistaenfermagem/index.php/revista/article/viewFile/4912/pdf_6129.

21. da Silva LS, Mont'alverne DGB, de Medeiros AIC, da Silva AGCB, Carvalho EM. Características dos pacientes sob assistência fisioterapêutica na UTI de um hospital universitário: estudo epidemiológico transversal. Rev Fisioter S Fun. Fortaleza. [Internet] 2015;5(1) [acesso em 23 dez 2016]. Disponível: http://www.fisioterapiaesaudefuncional.

ufc.br/index.php/fisioterapia/article/view/627/pdf.

22. Griffiths P, Dall'ora C, Simon M, Ball J, Linqvist R, Rafferty A, et al. Nurses' shift lengthandovertimeworking in 12 European countries: theAssociationwithperceivedqualityofcareandpatientsafety. MedCare. [Internet] 2014;52(11) [acesso em 21 dez 2016]. Disponível:http://dx.doi.org/10.1097/MLR.0000000000000233.

23. Pias C, Mascolo NP, da Silva ERR, Linch GFC, de Souza EM. Complexidade da assistência em unidade de terapia intensiva: subsídios para dimensionamento de pessoal de enfermagem.CogitareEnferm. [Internet] 2015;20(3) [acesso em 28 dez 2016]. Disponível: http://dx.doi.org/10.5380/ce.v20i3.41083.

24. da Paixão TCR, Campanharo CRV, Lopes MCBT, Okuno MFP, Batista REA. Nursing staff sizing in the emergency room of a university hospital. Rev. esc. enferm. USP. [Internet] 2015;49(3).[acesso em 18 jan 2017]. Disponível: http://dx.doi.org/10.1590/S0080-623420150000300017.

25. de Araújo TR, Menegueti MG, Auxiliadora-Martins M, Castilho V, Chaves LDP, Laus AM. Impacto financeiro do quadro de profissionais de enfermagem requerido em Unidade de Terapia Intensiva. Rev. Latino-Am. Enfermagem. [Internet] 2016;24(n. esp) [acesso em 18 jan 2017].Disponível:http://dx.doi.org/10.1590/1518-8345.1274.2818.

26. de Quadros DV, de Magalhães AMM, Mantovani VM, da Rosa DS, Echer IC. Analysis of managerial and healthcare indicators after nursing personnel upsizing.Rev.bras. enferm. [Internet] 2016;69(4)[acesso em 18 jan 2017]. Disponível: http://dx.doi.org/10.1590/0034-7167.2016690410i.