Review Article

Nursing workload of trauma victims: an integrative literature review

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Abstract: Trauma victims, due to the severity of the injuries, present a high demand for care during hospitalization. However, it is not clear in the literature the nursing workload measurement instruments used in this population, nor the results found. In this context, the aim of this study is to investigate studies that analyze the nursing workload required by trauma victims according to the instrument applied and the results identified. It is a literature review carried out in the Scopus, Medline, LILACS, SCIELO, and IBECS database during October 2018. The studies inclusion criteria in this review were: be available in full for free access and be an original article published in English, Portuguese or Spanish that exclusively addresses trauma victims. The following health descriptors were used to the search: *nursing*, *workload* and *wounds and injuries* and the keyword *trauma*, combined with boolean operators "or" and "and". As the result, eight studies were selected to this review. The Nursing Activities Score (NAS) was the most applied nursing workload measurement instrument, highlighting the results on the positive relation between workload and severity of the victims. One study showed the importance of preventing delirium in reducing the nursing workload. During children resuscitation, higher-level activations and events without previous notification increased the demand of care of the nursing team. The analysis showed that the most frequently performed nursing interventions in ICU trauma victims were: monitoring and titration, laboratory investigations, medication apart from vasoactive drugs, hygiene procedures, mobilization and positioning, administrative and managerial tasks, and quantitative urine output measurement. The studies included in this review allowed to conclude that NAS was the instrument of choice to measure the nursing workload required by trauma victims and that more researches need to be done in different countries and the possible relationship between care demand and aspects of trauma, including the severity of the injuries/trauma, need to be better explored.

Keywords: Nursing; review; workload; wounds and injuries

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Introduction

Patients with severe trauma are a challenge for the care management provided by the nursing team, since they present imminent risk of death and require specialized assistance (1). In the perception of trauma nurses, these victims demand high nursing workload during hospitalization.

According to the literature review, nursing workload is defined by the totality of time, represented by nursing activities (direct and/or indirect care) that a nurse can dedicate towards patients, workplace and professional development. In this context, there are five categories of nursing workload attributes: the complexity of care; the amount of nursing time;

the level of nursing competency; the weight of direct patient care; and the amount of physical exertion (2).

Studies have showed that nursing workload is associated with quality of patient care (3,4), since an inadequate staffing (higher numbers of patients assigned to nursing professional) has a negative impact on safety for patients (5), as well as high nursing workload influences the occurrence of adverse events (6).

There are many instruments to assess nursing workload, especially in intensive care unit (ICU) (7). However, it is not clear in the literature the nursing workload measurement instruments used to evaluate trauma victims, nor the results found.

Because of this, some questions emerged: what are the instruments of measurement of nursing workload applied to trauma victims? Is there any standard? What are the main results analyzed by the researchers about the nursing workload required by this population? Our hypothesis is that there is no consensus about the best instrument to measure nursing workload for traumatized patients and the results analyzed by the researchers are heterogeneous, reflecting the need for an international multicenter study on the subject.

In this context, the aim of this review is to investigate studies that analyze the nursing workload required by trauma victims according to the instrument applied and the results identified.

Methods

This study is an integrative literature review carried out in the Scopus, Medline via Pubmed and Literatura Latina Americana e do Caribe em Ciências da Saúde (LILACS), Scientific Eletronic Library Online (SCIELO), and Índice Bibliográfico Espanhol de Ciências da Saúde (IBECS) via Biblioteca Virtual em Saúde (BVS) during October 2018. In addition, a manual search was performed based on the references cited in the articles selected for final review.

The search strategy was defined by PICO where the population (P) was the trauma victims and the Outcome (O) was the nursing workload including the instrument applied and the results identified. It is important to highlight that the elements I (Intervention) and C (Comparison) were not addressed because the aim of this review was not to analyze and compare interventions.

The studies inclusion criteria in the review were: be available in full for free access and be an original article published in English, Portuguese or Spanish that exclusively addresses trauma victims. No temporal cut was established. Books chapters, editorials, theses, dissertations and fact sheets were excluded.

The following health descriptors were used to search for articles: *nursing*, *workload* and *wounds and injuries* and the keyword *trauma*, combined with boolean operators "or" and "and". Chart 1 describes the search strategy.

The studies selection was performed through the analysis of the title, followed by the abstracts reading for the identification of those that would be evaluated in their entirety, independently, by two researchers. The following data were extracted from the studies: country and year of publication, aims, study design, study period, unit of hospital, inclusion criteria, nursing workload measurement instrument, sample characteristics and main results.

The data were presented in a descriptive way and organized in tables. Due to the heterogeneity of the workload instrument applied and of the characteristics of the studies' samples and the results analyzed, it was not possible to perform meta-analysis.

For the accomplishment of this study, it was not necessary to evaluate the Research Ethics Committee because it is an analysis of free access studies that do not require ethical secrecy.

Results

From the search strategies, 14 studies were included for comprehensively reading, and 8 articles were part of the final sample. No studies were included after manual search. *Figure 1* shows this selection process.

Chart 2 presents the main characteristics of the studies included in the review. Research on nursing workload required by trauma victims was conducted on three different continents: American [Brazil (1,8-10) and USA (11)], Asian [China (12) and Iran (13)] and European [Swiss (14)]; the first investigation was carried out in 2009 (14) and, after three years, new studies were presented, highlighting the year 2014 (8,10,12).

Regarding the design of the studies, all the researchers carried out prospective collection and the cross-sectional observational surveys prevailed (8-13). Only the Swiss research was a quasi-experimental type and aimed to analyze the effects of a delirium prevention scale in reducing the nursing workload of the elderly (14).

Data collection period ranged from one month to two years and 50% of the investigations analyzed trauma victims hospitalized at a trauma ICU (1,8,9,13). Regarding

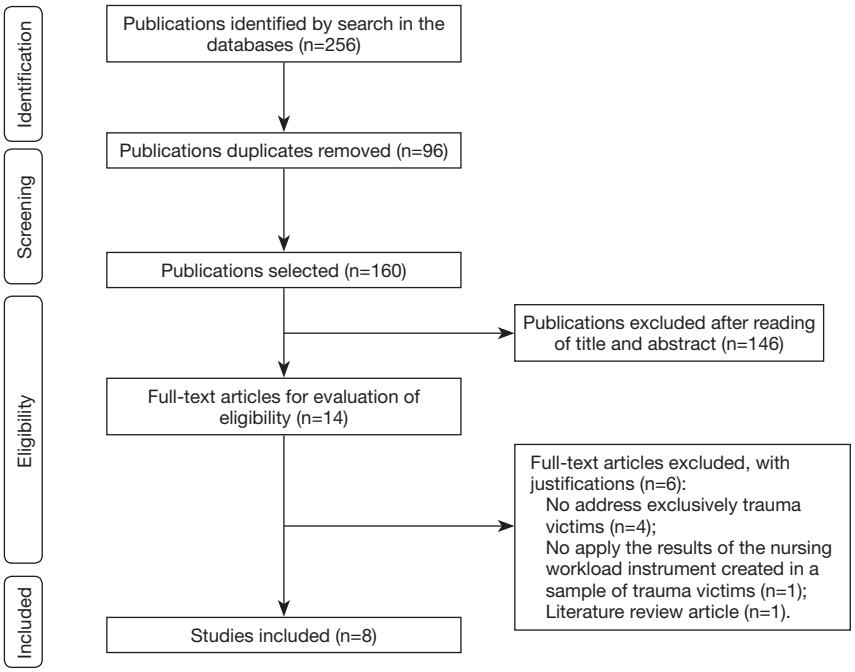

Figure 1 Flow chart of the process of studies' selection.

the criteria for inclusion of the patients in the series, we highlighted an age greater than or equal to 18 years and a minimum stay of 24 hours in the investigated unit (1,8-10,12). The extremes of age were addressed in two investigations: children during initial resuscitation (11) and elderly hospitalized after pelvic fracture (14).

The chart 3 shows information about the nursing workload instrument used, sample characteristics, and main results. It is possible to observe that the nursing workload instrument analysis most frequently applied was the Nursing Activities Score (NAS) (1,8-10,12,13).

The sample characteristics were heterogeneous: the number of patients evaluated ranged from 32 (1) to 229 trauma patients (12), and the participants age from months (11) to the mean of 82.9 (14) years. Traumatic events prevailed in males (1,8-10,12,13), with the exception of the study that analyzed hip fracture victims in which women were the most frequent, 74.5% (14). Concerning the trauma mechanism, the most notable were traffic accidents (8,12,13).

The relationship between nursing workload and severity indexes was identified in three studies that showed that the greater the severity of the patient, the greater the demand for care (1,8,12). In addition, a study conducted in Iran showed a positive correlation between length of ICU stay and NAS (13).

Considering the high incidence of delirium in hospitalized elderly, Swiss researchers identified a reduction in the nursing workload required by hip fracture victims over 65 years of age during night shifts on the trauma ward after the implementation of Delirium Prevention and Management Program (DPMP) (14).

In the analysis of the nursing workload required by children during the resuscitation, American researchers identified that the increased demand for care measured by the National Aeronautics and Space Administration Task Load Index (NASA-TLX) occurred during higher level activations and events without previous notification (11).

Analysis of the nursing interventions most frequently performed in trauma victims admitted in general (9) or burn (10) ICU, showed: monitoring and titration, laboratory investigations, medication apart from vasoactive drugs, hygiene procedures, mobilization and positioning, administrative and managerial tasks, treatment for improving lung function, and quantitative urine output measurement.

Only one study analyzed the relationship between aspects of trauma and nursing workload and identified that the addition of an affected body region increased the likelihood of a patient requiring a high nursing workload (NAS >75)

by 33% (8).

Discussion

This integrative review aimed to identify in the literature the nursing workload measurement instruments used to specifically evaluate trauma victims and the results founded. The findings are worth to discussion.

The workload analysis required by trauma victims is recent (first study published in 2009) (14). This fact may be associated to the improvement in the quality of care of the traumatized by the prehospital and intra-hospital teams, and consequent serious victims who previously died at the scene of the event arrive at the hospital and require numerous nursing care during the critical phase. The professionals recognized the importance of evaluating this demand in greater detail in order to maintain the process of improving the quality of care and the need to know the correct size of the team for care.

It is interesting to observe that all studies carried out prospective collection and, in the majority, the design was of the transversal type (8-13). It is believed that the choice for prospective type collection is related to two factors: (I) many nursing interventions usually performed are not registered by professionals, which makes it impossible to collect data retrospectively since these interventions are part of the calculation of many instruments that analyze the nursing workload; (II) the use of pre-existing databases frequently used in retrospective studies may be incomplete and result in sampling bias, i.e., the inclusion of subjects not truly representative of the population (15). On the other hand, the high cost and collection time required for prospective investigations is a major challenge for researchers and often reflects in small sample sizes, as evidenced in this review: case series variation from 32 to 229 trauma patients.

It is worth mentioning that cross-sectional studies have advantages and disadvantages. As advantages, they are the best way to determine prevalence and identify associations. On the other hand, this type of study does not make it possible to differentiate cause and effect from simple association (15).

NAS was the instrument used to evaluate the most frequently used nursing workload (1,8-10,12,13). NAS (16) was created in 2003, based on modifications of the Therapeutic Intervention Scoring System (TISS-28) (17), and had the participation of 99 ICUs from 15 countries. The NAS evaluates 23 nursing interventions distributed in seven groups: basic activities, ventilatory, cardiovascular, renal, neurological and metabolic supports, in addition to specific interventions. Each nursing intervention has a weight (score) and the score obtained by the sum of the points expresses the percentage of time spent per nurse, per shift, in the direct or indirect assistance to the patient (16).

The professionals' interest in the NAS caused a group of researchers from different countries to publish an update guideline in 2015, since the instrument was proposed in 2003 and some problems were observed in its application by nurses around the world, especially related to the lack of clear operational explanations about certain items and the inclusion of new technologies (18).

Although it was created from the analysis of patients in the ICU, this review identified that the NAS is being applied in other sectors of the hospital, such as in the emergency room during resuscitation of the traumatized (12). In addition, NAS has been investigated in different countries, with emphasis on Brazil, as evidenced in a literature review conducted in 2015 (19). Considering the Donabedian's model that analyzes the quality of health care in three categories (structure, process, and outcomes) (20), this search identified that all 36 included studies investigated NAS as a process (19).

It is assumed that the researchers' preference for the NAS as evidenced in the present review is due to the fact that the instrument was created of data from different continents countries rather than from a specific population/region.

It is important to highlight two other instruments for evaluating the nursing workload in traumatized patients identified in this review: LEP (14) and NASA-TLX (11). LEP (14), a nursing workload management system, was developed in 1987 and is cataloged of 184 variables that are used in European countries to provide nursing data for management, planning, and control of nursing workload.

NASA-TLX is a tool developed to measure workload among pilots (21). Interesting how it is also applicable to other context, such as in medicine (22,23) to measure the relationship between provider workload and task and performance demands. The study that applied this tool identified, as a disadvantage, the necessity of a member of the study staff to be present to administer and collect data and this condition should be considered when choosing NASA-TLX to survey workload during trauma resuscitation (11).

The relationship between workload and severity was found in three investigations carried out in ICU (1,8,12). The applied indices were Acute Physiology and Chronic Health Evaluation II (APACHE II) (1,12) and Simplified Acute Physiology Score (SAPS II) (8). These indexes (24,25), considered physiological, were created from the analysis of

patients in the ICU, not specifically for victims of trauma.

A Brazilian study evaluated the anatomical indexes Injury Severity Score (ISS) (26) and New Injury Severity Score (NISS) (27) and identified that there was a significant difference between the high and medium/low NAS scores and these indices, patients who demanded a high nursing workload presented greater severity of the traumatic injuries. However, these indexes did not remain in the final modeling on factors associated with high workload (8).

Therefore, in view of the findings of this review, it is suggested that new studies be developed with the objective of analyzing this relationship (workload and severity) with the application of physiological (28) and/or mixed (29).

Regarding nursing care interventions for trauma victims (9,10), NAS items that appeared more frequently are related to routine ICU activities, regardless of patient type (trauma or non-trauma). Therefore, there is concern about the existence or not of specific nursing interventions in the care of certain traumatized groups as victims of penetrating trauma or traumatic brain injury, among others. The need for future studies on the workload and nursing interventions required by specific traumatized populations emerges and the results of them will help in training requirement identification.

It should be emphasized that the measurement of the nursing workload required by trauma victims is essential to estimate the optimal nurse-to-patient ratio per shift (8,12) to enhance care quality and reduce medical costs (13) related to trauma victim assistance. Therefore, studies that analyze these characteristics are fundamental to guide managers on the optimal team dimensioning aiming at the quality of care provided.

Finally, the choice to consider only the inclusion criteria of the studies may be considered a limitation of this review.

Conclusions

The studies included in this review allowed to conclude that NAS was the instrument of choice to measure the nursing workload required by trauma victims and that more researches need to be done in different countries and the possible relationship between care demand and aspects of trauma, including the severity of the injuries, need to be better explored.

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Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

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