Nursing diagnoses in trauma victims in the first six hours after the event*

Diagnósticos de enfermagem em vítimas de trauma nas primeiras seis horas após o evento

Diagnósticos de enfermería en víctimas de trauma en las primeras seis horas después del evento

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ABSTRACT

Objective: To identify the frequency of nursing diagnoses in trauma victims in the first 6 hours, after the traumatic event, and to verify the relationship of these diagnoses with mortality. **Methods:** A prospective, cross-sectional study using quantitative analysis, performed in a tertiary hospital, the trauma referral center in São Paulo (Brazil). During six months, we evaluated 407 patients 18 years of age or older, treated at the emergency room of this hospital . **Results:** The most frequent nursing diagnoses were: *risk for infection* (84.5%), *impaired skin integrity* (77.9%), *acute pain* (71.5%), *impaired comfort* (68.3%) and *impaired tissue integrity* (54.1%). The association between nursing diagnoses and mortality was observed in 28 (66.7%) of the diagnoses identified. **Conclusion:** The data added information that may assist in education and performance of nurses in the setting of trauma emergency, and evidenced the potential of nursing diagnoses to evaluate the results and quality of care.
Keywords: Nursing diagnosis; Nursing records; Emergency medical services; Wounds and injuries; Incidence; Mortality

RESUMO

Objetivo: Identificar a frequência dos diagnósticos de enfermagem em vítimas de trauma nas primeiras 6 horas, após o evento traumático e verificar a relação desses diagnósticos com a mortalidade. **Métodos**: Estudo prospectivo transversal com análise quantitativa, realizado em hospital terciário, centro de referência ao trauma no Município de São Paulo. Durante seis meses, foram avaliados 407 pacientes maiores de 18 anos atendidos no Pronto -Socorro desse hospital. **Resultados**: Os diagnósticos de enfermagem mais frequentes foram: Risco de Infecção (84,5%), Integridade da pele prejudicada (77,9%), Dor aguda (71,5%), Conforto prejudicado (68,3%) e Integridade tissular prejudicada (54,1%). A associação entre diagnósticos de enfermagem e mortalidade foi observada em 28 (66,7%) dos diagnósticos identificados. **Conclusão**: Os dados acrescentaram informações que poderão auxiliar na formação e atuação do enfermeiro no cenário das emergências em trauma e evidenciaram o potencial dos diagnósticos de enfermagem para avaliar os resultados e a qualidade da assistência.
Descritores: Diagnóstico de enfermagem; Registros de enfermagem; Serviços médicos de emergência; Ferimentos e lesões; Incidência; Mortalidade

RESUMEN

Objetivo: Identificar la frecuencia de los diagnósticos de enfermería en víctimas de trauma en las primeras 6 horas, después del evento traumático y verificar la relación de esos diagnósticos con la mortalidad. **Métodos:** Estudio prospectivo transversal con análisis cuantitativo, realizado en un hospital terciario, centro de referencia al trauma en el Municipio de Sao Paulo. Durante seis meses, fueron evaluados 407 pacientes mayores de 18 años atendidos en el servicio de Emergencia de ese hospital. **Resultados:** Los diagnósticos de enfermería más frecuentes fueron: Riesgo de Infección (84,5%), Integridad de la piel perjudicada (77,9%), Dolor agudo (71,5%), Confort perjudicado (68,3%) e Integridad tisular perjudicada (54,1%). La asociación entre diagnósticos de enfermería y mortalidad fue observada en 28 (66,7%) de los diagnósticos identificados. **Conclusión:** Los datos acrecentaron las informaciones que podrán auxiliar en la formación y actuación del enfermero en el escenario de las emergencias en trauma y evidenciaron el potencial de los diagnósticos de enfermería para evaluar los resultados y la calidad de la asistencia.
Descriptores: Diagnóstico de enfermería; Registros de enfermería; Servicios médicos de urgencia; Heridas y traumatismos; incidencia; Mortalidad

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INTRODUCTION

The Brazilian epidemiological profile shows that external causes have occupied a leading position in mortality and morbidity rankings for the last four decades [1].

Traffic accidents are one example of this leading role. In 2007, 383,371 events affected 513,510 victims. On average, statistics project 1,406 accidents/day and 1,369 victims/day (1.3 victim per accident), resulting in 15.5% of hospitalizations due to injuries [1].

Many of the victims of external causes evolve towards situations characterized as emergencies and receive care at emergency units, the initial hospital care location for the large majority of these patients. In that context, the quality of care delivery and the care time can define the prognosis and presence of sequelae [2].

As the nursing team coordinator, nurses are responsible for programming and prioritizing care delivery, in view of differences among these victims, as well as for establishing preventive and reparatory measures, in a context in which the time between life and death is subtle [3].

Trauma deaths are distributed in three ways. Immediate deaths after trauma are due to fatal injuries, such as the rupture of large heart vessels; early deaths occur within the first six hours after trauma; and late deaths, which happen after days or weeks, happen because of infection and multiple organ failure. The main characteristic of the second peak of deaths, which includes early deaths, is the potential treatment of injuries for the people dying in this phase [4,5]. Given their frequency and potential treatment, these early deaths during the first post-trauma hours, highlight the first six post-trauma hours in victim care and turn this period into the focus of the present study's contributions.

Studying the causes and consequences of a disease is essential to establish a diagnosis and contribute to the adoption of prevention, control, care and education measures [6]. In that sense, knowledge about the incidence of nursing diagnoses in trauma victims is in line with the Brazilian morbidity and mortality profile, and also supports safer nursing activities in this field.

Nursing diagnoses are a clinical judgment about the individual, family or community's responses to health problems and actual or potential vital processes [7]. Nursing diagnoses sustain the selection of nursing interventions, with a view to achieving outcomes nursing is responsible for [8-10].

Considering the complexity of trauma, the Brazilian epidemiological situation, incipient literature on the theme and the particularities of care delivery to victims in the proposed period, this research was developed with the following **aims**: to discover the frequency of nursing diagnoses in trauma victims within the first six hours after the trauma event and to verify the statistical relation between these diagnoses and mortality.

METHODS

A cross-sectional prospective, descriptive and exploratory research with quantitative analysis was developed.

The study took place at the Surgical Emergency Care Unit of an extra-large tertiary care hospital in São Paulo City, which serves as a referral institution for trauma victim care.

The sample comprises victims of external causes, attended within the first six hours after the trauma event, aged 18 years or older, coming directly from the event scene. The external causes included for the sake of this research were: traffic accidents, aggression, suicide attempts, falls and burns.

Either the pre-hospital care services/military police/relatives/friends or the patient him/herself defined the time of trauma; in case this information was not available, the patient was excluded from the study.

Data collection took six months and covered the period from December 1st 2009 till May 31st 2010. Data were collected during daily six or twelve-hour shifts, alternating between the morning (7 a.m.-1 p.m.), afternoon (1 p.m.-7 p.m.) and night (7 p.m.-7 a.m.), following by a one-day leave, during the entire data collection period.

Data were collected using an instrument, created based on a list of nursing diagnoses, defining characteristics and risk and related factors, selected by seven nurse experts in trauma or nursing diagnoses. These experts selected the 42 nursing diagnoses, defining characteristics and risk and related factors in view of their pertinence and possible identification during the first six hours of care delivery to trauma victims at an emergency service. Initially, 42 nursing diagnoses were selected from the North American Nursing Diagnosis Association (NANDA) 2009-11 [7]. After this selection, the experts selected the list of defining characteristics and pertinent risk and related factors. Detailed information on the experts' analysis and procedures followed to select the nursing diagnoses, defining characteristics, related factors and risk factors is presented in an additional publication [1].

Data collection started after authorization had been obtained from the Hospital's Ethics Committee, under Protocol 843/09. Patients and/or relatives were asked to manifest their agreement to participate in the research and received a copy of the Informed Consent Term.

All data were entered in an Excel worksheet and results are shown in tables as absolute and relative frequencies. Fisher's and Pearson's Chi-Square tests were used to check the association between the nursing

diagnoses and mortality during hospitalization. For all analyses, significance was set at 5%.

After data collection, an expert on nursing diagnoses reassessed the nursing diagnoses of 20% of the sample, randomly selected. The analysis was based on the victims' data records and included the description of defining characteristics, related factors and risk factors observed in the selected cases. At the end of this process, the expert's agreement percentage with the nursing diagnoses established during the research was calculated.

RESULTS

Table 1. Distribution of victims (No. and %) according to gender, age and external cause. São Paulo, 2009/2010.

VARIABLE	No.	%
Gender		
Male	301	74.0
Female	106	26.0
Age		
18-37	210	51.6
38-57	121	29.7
58-77	59	14.5
Older than 78	17	4.2
External Cause		
Motorcycle driver/passenger	122	30.0
Run-over	78	19.2
Car driver/passenger	62	15.2
Bicycle	8	2.0
Fall	88	21.6
Aggression	36	8.8
Burn	8	2.0
Suicide attempt	5	1.2

During the six-month data collection period, 407 trauma victims were identified who complied with the inclusion criteria. The male gender predominated (74.0%), with about three men for every woman involved. Individuals under 38 years of age were a majority (51.6%) in the study sample. Motorcycle drivers/passengers represented 30.0% of all participants and, together with other traffic events, totaled 64.4% of cases.

Table 2. Frequency of nursing diagnoses in the study sample (n=407). São Paulo, 2009/2010.

Nursing Diagnoses	N	%
Risk for infection	344	84.5
Impaired skin integrity	317	77.9
Acute pain	291	71.5
Impaired comfort	278	68.3
Impaired tissue integrity	220	54.1
Impaired physical mobility	172	42.3
Anxiety	155	38.1
Risk for bleeding	150	36.9
Risk for aspiration	129	31.7
Impaired transfer ability	117	28.7
Risk for peripheral neurovascular dysfunction	92	22.6
Risk for ineffective cerebral tissue perfusion	90	22.1
Fear	88	21.6
Risk for imbalanced fluid volume	86	21.1
Ineffective breathing pattern	84	20.6
Impaired spontaneous ventilation	84	20.6
Impaired memory	77	18.9
Risk for acute confusion	74	18.2
Decreased intracranial adaptive capacity	74	18.2
Risk for shock	65	16.0
Impaired verbal communication	62	15.2
Acute confusion	61	15.0
Disturbed sensory perception – visual and kinesthetic	57	14.0
Risk for imbalanced body temperature	53	13.0
Impaired oral mucous membrane	50	12.3
Ineffective peripheral tissue perfusion	50	12.3
Decreased cardiac output	47	11.5
Impaired gas exchange	45	11.1
Hypothermia	39	9.6
Ineffective airway clearance	37	9.1
Risk for ineffective renal perfusion	32	7.9
Impaired dentition	31	7.6
Risk for decreased cardiac tissue perfusion	27	6.6
Risk for electrolyte imbalance	25	6.1
Deficient knowledge	25	6.1
Risk for ineffective gastrointestinal tissue perfusion	24	5.9
Deficient fluid volume	22	5.4
Ineffective thermoregulation	19	4.7
Nausea	18	4.4
Moral suffering	9	2.2
Mourning	8	2.0
Risk for disturbed maternal/fetal dyad	1	0.2

Data in Table 2 display the frequency levels of the 42 nursing diagnoses the experts selected in the study population. In the list, Risk for infection (84.5%), Impaired skin integrity (77.9%), Acute pain (71.5%), Impaired comfort (68.3%) and Impaired tissue integrity (54.1%) were present in more than half of the victims under analysis.

The expert's analysis of the nursing diagnoses identified in this research resulted in 97% of agreement and indicated adequate reliability of the nursing diagnoses established during the research.

The researchers found it useful and due to get to know the defining characteristics, related and risk factors that stood out among the nursing diagnoses, as displayed in Table 3.

Data in Table 4 revealed statistically significant differences between survivors and fatal victims when considering the frequency of the nursing diagnoses. The association between nursing diagnoses and mortality was observed in 28 (66.7%) of the identified diagnoses. The differences showed higher frequency levels among survivors (7 diagnoses) and also among fatal victims (21 diagnoses).

It is interesting to highlight that the most frequent nursing diagnoses in the sample, Risk for infection and Impaired skin integrity, demonstrated no statistically significant association with mortality.

The means and standard deviations for the number of nursing diagnoses were considerable higher among fatal victims than among survivors (Table 5). On average, the frequency of nursing diagnoses was 68% higher among fatal victims than among survivors.

DISCUSSION

The research participants' profile is similar to the findings of other studies that showed the male gender and young adults as the most frequent characteristics of victims of external causes [11]. Concerning the type of event, traffic events were predominant, particularly motorcycle accidents, which involved 30% of the victims. It is interesting that the mortality rate of motorcycle drivers showed the greatest increase in the period from 1996 to 2005: 540%, from 0.5 to 3.2 per hundred thousand inhabitants [1,11].

All nursing diagnoses the experts selected were identified in the study sample during the first six care hours at an emergency service, although with very varying frequencies, from 84.5% for Risk for Infection to 0.2% for Risk for disturbed maternal/fetal dyad. This result strengthens the experts' analysis, whose judgment was based on the pertinence and possibility of identifying the NANDA 2009-11 [7] nursing diagnoses when selecting the 42 nursing diagnoses that directed data collection for this research.

On the other hand, the varying frequency levels showed some diagnoses as more present in a research focused on care delivery to trauma victims in the first six hours, so that some nursing diagnoses were highlighted for this discussion.

Risk for infection was the most frequent nursing diagnosis and the main risk factors (invasive procedures, trauma and increased environmental exposure to pathogens). This finding, in line with another Brazilian study [12], appoints the need for safety measures in invasive interventions at the emergency sector and in pre-hospital care, considering the large number of invasive procedures victims need and,

Table 3. Main defining characteristics, related and risk factors among the most frequent nursing diagnoses in the study sample. São Paulo, 2009/2010.

Nursing Diagnoses	Risk factors	Defining characteristics	Related factors
Risk for infection	Trauma (100%) Invasive Procedures (78%) Increased environmental exposure to pathogens (66%)	-	-
Impaired skin integrity	-	Disruption of skin surface (62%) Destruction of skin layers (34%)	Physical immobilization (67%) Altered sensation (45%)
Acute pain	-	Verbal pain report (87%) Observed evidence of pain (69%)	Injury agents (98%)
Impaired comfort	-	Anxiety (66%) Irritability (41%)	-
Impaired tissue integrity	-	Damaged tissue (65%) Destroyed tissue (37%)	Impaired physical mobility (69%) Altered circulation (23%)

Table 4. Comparison of nursing diagnosis frequencies between fatal and surviving victims. São Paulo, 2009/2010.

Nursing Diagnoses	Frequency			P-value
	Total	Death	Survival	
Acute pain	291 (71.5)	8 (18.2)	283 (78.0)	** 0.000
Impaired comfort	278 (68.3)	8 (18.2)	270 (74.4)	** 0.000
Impaired physical mobility	172 (42.3)	6 (13.6)	166 (45.7)	** 0.000
Anxiety	155 (38.1)	4 (9.1)	151 (41.6)	** 0.000
Fear	88 (21.6)	2 (4.5)	86 (23.7)	** 0.000
Risk for bleeding	150 (36.9)	35 (79.5)	115 (31.7)	** 0.000
Risk for aspiration	129 (31.7)	29 (65.9)	100 (27.5)	** 0.000
Risk for ineffective cerebral tissue perfusion	90 (22.1)	29(65.9)	61 (16.8)	** 0.000
Risk for imbalanced fluid volume	86 (21.1)	21 (47.7)	65 (17.9)	** 0.000
Ineffective breathing pattern	84 (20.6)	36 (81.8)	48 (13.2)	** 0.000
Impaired spontaneous ventilation	84 (20.6)	34 (77.3)	50 (13.8)	** 0.000
Decreased intracranial adaptive capacity	74 (18.2)	34 (77.3)	40 (11.0)	** 0.000
Risk for shock	65 (16.0)	28(63.6)	37 (10.2)	** 0.000
Risk for imbalanced body temperature	53 (13.0)	16 (36.4)	37 (10.2)	** 0.000
Ineffective peripheral tissue perfusion	50 (12.3)	12 (27.3)	38 (10.5)	** 0.000
Decreased cardiac debit	47 (11.5)	26 (59.1)	21 (5.8)	** 0.000
Impaired gas exchange	45 (11.1)	23 (52.3)	22 (6.1)	* 0.000
Hypothermia	39 (9.6)	21 (47.7)	18 (5.0)	** 0.000
Ineffective airway clearance	37 (9.1)	14 (31.8)	23 (6.3)	* 0.000
Risk for ineffective renal perfusion	32 (7.9)	14 (31.8)	18(5.0)	* 0.000
Risk for decreased cardiac tissue perfusion	27 (6.6)	15 (34.1)	12 (3.3)	* 0.000
Risk for ineffective gastrointestinal tissue perfusion	24 (5.9)	14 (31.8)	10 (2.8)	* 0.000
Deficient fluid volume	22 (5.4)	12 (27.3)	10 (2.8)	* 0.000
Ineffective thermoregulation	19 (4.7)	7 (15.9)	12 (3.3)	* 0.002
Risk for electrolyte imbalance	25 (6.1)	8(18.2)	17 (4.7)	* 0.003
Risk for acute confusion	74 (18.2)	3 (6.8)	71 (19.6)	** 0.039
Impaired transfer ability	117 (28.7)	7 (15.9)	110 (30.3)	** 0.046
Impaired tissue integrity	220 (54.1)	30 (68.2)	190 (52.3)	** 0.046
Risk for infection	344 (84.5)	42 (95.5)	302 (83.2)	** 0.334
Impaired skin integrity	317(77.9)	37 (84.1)	280 (77.1)	** 0.294
Risk for peripheral neurovascular dysfunction	92 (22.6)	13 (29.5)	79 (21.8)	** 0.248
Impaired memory	77 (18.9)	4 (9.1)	73 (21.1)	** 0.078
Impaired verbal communication	62 (15.2)	7 (15.9)	55 (15.2)	** 0.895
Acute confusion	61 (15.0)	10 (22.7)	51 (14.0)	** 0.128
Disturbed sensory perception – visual and kinesthetic	57 (14.0)	5 (11.4)	52(14.3)	**0.593
Impaired oral mucous membrane	50 (12.3)	9 (20.5)	41 (11.3)	** 0.080
Impaired dentition	31 (7.6)	7 (15.9)	24 (6.6)	* 0.063
Deficient knowledge	25 (6.1)	1(2.3)	24 (6.6)	** 0.501
Nausea	18 (4.4)	2 (4.5)	16 (4.4)	* 1.000
Moral suffering	9 (2.2)	1 (2.3)	8 (2.2)	* 1.000
Mourning	8 (2.0)	1 (2.3)	7 (1.9)	** 0.877
Risk for disturbed maternal/fetal dyad	1 (0.2)	- (-)	1 (0.2)	* 1.000

* Fischer
** Chi-Square

Table 5. Mean, standard deviation and median for the number of nursing diagnoses between survivors and fatal victims. São Paulo, 2010.

Exit condition	Mean	Standard deviation	Median
Survivors (363 victims)	8.6	8.0	4.6
Death (44 victims)	14.5	14.0	4.8

at the same time, their increased environmental exposure to pathogens in care delivery to trauma cases.

The need for rapid procedures does not make it less important to respect the technical premises of asepsis and antisepsis in their accomplishment, as ignoring them negatively affects the patient's evolution, mainly when considering the fragility of victims' vital condition. Nursing protocols should be developed and applied to practice the most common invasive procedures, and their outcomes should be disseminated and refined to improve the actions, which are sometimes done mechanically and hardly effective [13].

Impaired skin integrity and impaired tissue integrity are closely related with the most frequent injuries in trauma victims: external surface and limb injuries [12]. Reaffirming this relation, these diagnoses show physical immobilization, impaired sensations, altered circulation and impaired physical mobility as the most frequent related factors, besides disruption of skin surface, destruction of skin layer, injured tissue and destroyed tissue, as defining characteristics. These observations reveal the need to value specific interventions concerning these nursing diagnoses, which nurses working in and researching on the trauma area have hardly discussed.

In this research, acute pain and impaired comfort showed a close relation, as 92% of victims diagnosed with impaired comfort related this with the presence of pain.

Literature appoints the problem of insufficient acute pain assessment and treatment at the emergency sector, corresponding to approximately 70.0% in our context. One of the reasons for the limited importance attributed to analgesics at the emergency sector is the emergency situation itself, in which resuscitation and stabilization emerge as priorities. Priorities in care delivery to multiple trauma victims are unquestionable, but questioning other aspects that enhance care quality is fundamental, such as the inclusion of pain assessment and control, use of objective instruments for pain intensity assessment, use of protocols and the benefits of these practices[3,14].

Besides the nursing diagnoses discussed and present in more than 50% of the sample, others showed high frequencies among the victims under analysis, picturing the range of clinical symptoms among patients injured due to external causes, mainly because of the organic reactions deriving from the state of shock, altered hemodynamic and breathing parameters, besides about 40.0% of victims with more than one lesion[15]. In this variety, it should also be considered that traumas entail emotional and spiritual development that involve patients and relatives, from the moment they happen until patients' departure from hospital due to discharge or death.

Understanding the range of events involving trauma victims is not easy, as this is a complex phenomenon with distinct mortality peaks, related to the severity of injuries,

team training, human and material resources, rapid care, management, among so many other factors.

All health professionals committed to their practice need to constantly search for tools that indicate routes to improve the quality of their actions [16].

There are many reasons for using nursing diagnoses: knowing the patient's true needs, objectively outlining care plans, enhancing assessments and the way actions are documented in qualitative terms, setting priorities in view of detected problems, individualizing care, enhancing client/patient satisfaction, detecting the outcomes of planned actions, detecting knowledge gaps in patients and families, offering specific education on a theme and documenting the nursing process [8,9].

In that sense, another important research result is the difference in the number of nursing diagnoses between fatal victims (mean 14) and patients discharged from hospital (mean 8). In combination with the results that show statistically significant difference between survivors and fatal victims, these data offer knowledge to understand the difference in the severity of the physiopathological and psychosocial consequences of the trauma. In addition, recognizing the characteristics of individuals at greater risk of death early can improve the accuracy of hospital care outcome assessments and offer clues as to what actions and interventions the nursing team should adopt in view of multiple trauma patients' different problems.

As mentioned earlier, the relation between nursing diagnoses and intra-hospital mortality had previously been observed [10] and, in our study, it was identified in Table 5. Thus, this study's contribution concentrates on the target public, trauma victims, and on the period the victims were approached, within the first six hours, due to potential treatment during this period.

The fact that patients were assessed only once can be considered a research limitation. We do hope that other researchers can question, test, replicate and refine these findings though, and that the sum of this knowledge influences better care to a significant part of our population, daily victims of this severe public health problem – trauma due to external causes.

CONCLUSION

The most frequent nursing diagnoses for trauma victims in the first six hours after the event were: Risk for Infection, Impaired skin integrity, Acute pain, Impaired comfort and Impaired tissue integrity. A statistically significant association was found between most of the nursing diagnoses identified and the victim's discharge or death during hospitalization. The results added information that can support nurses' actions in the contact of trauma-related emergencies and evidenced the potential of nursing diagnoses to prioritize care delivery to trauma victims.

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