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Association of the diagnosis of physical injury class with its components: a cross-sectional study

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ABSTRACT

Aim: to verify the association between nursing diagnoses of physical injury class and its components in critically ill patients. **Method:** A cross-sectional study of 86 individuals admitted to the intensive care unit of a teaching hospital in north-eastern Brazil. **Results:** We identified 18 of the 20 diagnoses related to the personal injury class of Nanda-International; of these, nine were present in over 75% of respondents and were statistically associated with its components. **Conclusion:** the diagnoses of physical injury class showed significant relationships with its components.

Descriptors: Delivery of Health Care; Intensive Care Unit; Nursing Diagnosis.

INTRODUCTION

The Intensive Care Unit (ICU) is a sector in which individuals are usually in severe and hemodynamically unstable states, requiring specific care. Furthermore, these patients are commonly bedridden, under the effect of sedatives and surrounded by several devices, which makes them dependent upon professional care[1].

In this context, the ICU is interpreted as a hostile environment, marked by technological complexity, delicate clinical conditions and high mortality rates[1-2]. For this reason, the nurses who work in ICUs should, in addition to managing the nursing team's actions to promote direct contact with critical patients, combine their technical and scientific knowledge with the mastery of technology, humanisation and individualisation of care[3].

It is known that one of the striking features of the intensive care nurse is the need to know, to decide and answer carefully in the care required by patients, quickly and assertively[4]. Aiming to reach these objectives, it is essential to plan holistic and organised care, satisfying the customer's real needs. To this end, the implementation of that care may be feasible from the Systematization of Nursing Assistance (SAE) and operationalized in the form of the Nursing Process (PE)[5].

Among the elements of PE, there is the nursing diagnosis (DE) as an essential tool for the planning of specific interventions, which aims to take effective action to address the problems identified. This step is based upon the use of their professional language, from a specific body of scientific knowledge, and guided by developing a clinical reasoning for the judgment of diagnosis[6].

Regarding the customer under intensive care, this step requires increased attention, due to the need for rapid recognition of the early signs of homeostasis deviation. The familiarity of the provider of professional assistance with the elements of the care plan to be instituted facilitates rapid identification of the problems and thus promotes greater efficiency in their interventions[6,7].

In order to standardize the diagnostic language, one of the classifications most used worldwide is the Taxonomy II of Nanda International. In this classification, the nursing diagnoses are divided into 13 domains and 47 classes, among which stands out the domain 11, entitled Safety / Protection. Among the classes of this domain, class 2 (Physical Damage) is defined as damage or injury to the organism[8], the object of study of this article.

Before the aforementioned context of the specificities of an intensive care environment, we can see a greater vulnerability to physical injury in these patients. This susceptibility to unwanted events causes that the identification of risk diagnoses assume extreme relevance to the care; in this way, the factors are identified upon which you want to act, in order to prevent risks. In the class of Physical Injury, 14 of the 20 diagnoses are risky, which justifies their high prevalence in ICU patients[9].

In this context, this study questioned: is there an association between nursing diagnoses and components of the class of Physical Injury of the domain safety/protection of Nanda-International between ICU patients? Given this, it aimed to verify the association between nursing diagnoses of the class of physical injury and its components in critically ill patients.

METHOD

This is a cross-sectional study, whose aim is to produce an instantaneous crop of the particular health status of a population, carried out in the ICU of an integrated teaching hospital of a university in the north-east of Brazil.

The study population was of 791 patients during the period from October 1st, 2011 to September 30th, 2012, according to the computerised system of hospital records' data. The observation during this time frame served solely for subsidy purposes as a sample calculation. The sample was obtained through the formula developed for studies with a finite population. In order to reach this quantitative were considered a confidence interval of 95% (Z∞ = 1.96), sampling error of 10% and a population of 791 patients. In not having found studies that estimated the prevalence of nursing diagnoses of the domain safety/protection in ICU patients, it estimated a conservative value of 50%. A sample size of 86 individuals resulted from the formula.

Was included people aged 18 years and more, and who needed to be submitted to a medical or surgical treatment. Excluded from the study were patients whose hospital stay was less than 24 hours and those who were re-admitted to the unit. The sampling procedure adopted was for convenience, consecutively.

The study was conducted in two stages: data collection, identifying the components of the DE of the class "Physical Injury" in critically ill patients; and a diagnostic inference in which diagnosticians judged the eligibility of diagnosis for each patient by the presence or absence of clinical indicators previously selected.

Throughout the data collection, an interview form and physical examination was used as a tool, with open and closed questions about the socio-economic data, defining characteristics (DC), and related or risk factors (RR), known collectively as clinical indicators, present in the physical injury class of the domain security/protection of Nanda-International[8]. Similarly, each of the 20 diagnoses of the class in question was awarded to the instrument from questions and/or measurement of its clinical indicators. This instrument has been validated for the appearance and content of three masters in nursing.

The stage of data collection was preceded by training for collectors, by an extension course. This step took part in addition to the principal investigator being a resident nurse and a fellow of undergraduate nursing. The period for collection was from October 2013 to May 2014.

The last step of diagnostic inference, elapsed between August and September 2014, included recruiting six specialist nurses, recognized by the development of studies in the SAE area. The screening of these occurred intentionally from the assessment of their resumés and, as a selection criterion was used, the publication of articles related to SAE and/or expertise or experience in the intensive care area.

These experts were subjected to a test of capability diagnostic from the resolution of clinical cases. It verified the correlation between them through the Kappa test, from which we obtained general coefficients that showed almost perfect concordances for all the judges. Thus, we selected the three diagnosticians according to the Kappa values in descending order.

Then, each specialist received 86 sheets constructed by a researcher, each relating to a patient and containing all the clinical

indicators of the domain under study already mentioned for the presence (P), the absence (A) or not applying (NA), as well as additional information regarding the socioeconomic data, clinical data and observations relevant to the diagnostic inference process. From this, each diagnostician inferred about the presence or absence of the diagnosis. After individual evaluation, a majority test was applied to decide about the presence or absence of the diagnosis.

The data relating to clinical indicators of each diagnosis, as well as those on the prevalence of nursing diagnoses of the class under study from the decision of diagnosticians were analysed, using descriptive and inferential statistics after being tabulated in spreadsheets of Microsoft Office Excel®. To this end, it counted with the help of IBM SPSS Statistic software version 20.0 for Windows®.

Regarding the socioeconomic and clinical data, the frequencies were calculated as relative and absolute, average, median and standard deviation using descriptive statistics, besides the application of the Kolmogorov-Smirnov test to verify the normality of the numerical data.

For the inferential analysis, chi-square tests were used, Pearson and Fisher's exact test to verify the statistical association between DE and their clinical indicators, adopting a p-value <0.05 for significance statistic. Thus, as a reference we used the p value for the chi-square test when the four table squares 2x2 (presence and absence of the DE and the presence and absence of clinical indicator) were greater than or equal to the value five. When any of these squares was equal to or less than five, Fisher's exact test showed the p value representative.

Thus, diagnoses such as "risk for dry eye", "risk for vascular trauma", "impaired skin integrity" and "impaired dentition", which was presented as absent in five or fewer patients studied, had their association with clinical indicators demonstrated through p representative from the Fisher test.

The association tests were applied only to the diagnoses that showed a higher frequency than 75% compared to the representativeness of these to the analysed sample. Data were presented in tables and discussed according to the literature.

As for the ethical aspects, there was approval of this research after scrutiny of the ethics committee, expressed in the opinion nº. 440/414 with Certificate of Presentation for Ethics Assessment (CAAE) nº 22955113.2.0000.5292.

RESULTS

We evaluated 86 individuals admitted in that hospital study, among which 52.3% were female, 95.3% had some kind of religion, and 61.6% were from the interior of the state and with an average age of 53.4 years.

Regarding the characterisation of the clinical data, the majority (73.3%) were admitted for surgical reasons and 70.9% had some comorbidity.

Identified in the patients studied were eighteen of the twenty components of the nursing diagnoses of the physical injury class of Nanda International and, of these, nine were present in over 75% of the sample, namely, "injury risk" (100%); "risk of falling" (100%); "trauma risk" (100%); "risk for dry eye" (98.8%); "risk for vascular trauma" (96.5%); "impaired skin integrity" (95.3%); "impaired dentition" (93.0%); "bleeding risk" (83.7%) and "impaired tissue integrity" (76.7%).

In the diagnostics present in 100% of the sample, the statistics do not allow that be ob-

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Table 1 - Distribution of risk factors related to the nursing diagnosis "risk for dry eye" and "risk for vascular trauma" in critically ill patients. Natal, 2014.

Diagnósticos de Enfermagem	Present		Absent		p Value
	N	%	N	%	
Risk for dry eye					
Risk Factors					
Environmental factors	86	100	-	-	-
Side effects of treatment	85	98,8	1	1,2	0,9881
Female gender	45	52,3	41	47,7	0,4771
Aging	33	38,4	53	61,6	0,6161
Autoimmune diseases	31	36,1	55	63,9	0,6401
Lifestyle	30	34,9	56	65,1	0,6511
Neurological damage with motor reflex sensory loss	21	24,4	65	75,6	0,7561
Therapy with mechanical ventilation	18	20,9	68	79,1	0,7911
History of allergies	14	16,3	72	83,7	0,8371
Hormones	4	4,7	82	95,3	0,9531
Risk of vascular trauma					
Risk factors					
Inertion time duration	77	89,5	9	10,5	*0,028[1]
Width of the catheter	56	65,1	30	34,9	*0,040[1]
Type of catheter	52	60,5	34	39,5	0,3441
Insertion site	50	58,1	36	41,9	0,0701
Origim of solution	27	31,4	59	68,6	0,3181
Infusion rate	18	20,9	68	79,1	0,4901
Impaired ability to view the insertion site	16	18,6	70	81,4	0,5351
Inadeuate catheter fixation	4	4,7	82	95,3	0,8651

*Legend: [1] Fisher's Exact Test; p <0.05; * Statistical Association.*

served associations between variables, since it cannot generate a 2x2 table. Therefore, for these it wasn't possible to apply inferential statistics. It notes that some risk factors of these diagnoses were present in the entire sample, such as biological, physical, human and chemical in the DE "risk of injury".

Regarding the diagnosis "risk of falling" among its 55 risk factors' constituents, only two were present in 100% of the sample, as follows: no family room and impaired physical mobility. As for the "risk for trauma", which has 68 risk factors, the factors of high beds and excessive radiation exposure were present in 100% of patients.

The following tables show the nursing diagnoses with a prevalence greater than 75% and its components, evaluating the existence of possible statistically significant associa-

tions between diagnoses and constituents.

When performing a bivariate analysis of the diagnostics with its components, it was observed that the diagnosis "risk for dry eye" did not show a statistically significant association with any component. As for the diagnosis "risk for vascular trauma", there was a statistically significant association with the risk factors insertion time duration (p = 0.028) and the width of the catheter (p = 0.040).

The diagnosis "impaired skin integrity" has three defining characteristics from these, two of which showed a statistically significant association with the diagnosis: body structures invasion (p = 0.000) and disruption of the skin surface (p = 0.000).

When evaluating the related factors, it was observed that there was no statistical association between these and the said

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diagnosis, but it is worth noting that some factors were present in over 50% of the sample: physical restraint, radiation, mechanical factors and changes in the hydrous status, bone prominences, changes in turgor and impaired metabolic state.

When analysing the diagnosis "impaired dentition," it was noted that this is composed of 17 defining characteristics, among which five showed statistically significant association for a 5% significance level with the diagnosis: tooth loss (p = 0.000), lack of some teeth (p = 0.000), the absence of teeth (p = 0.000), worn teeth (p = 0.001) and damaged teeth (p = 0.008).

As for the related factors, there is insufficient knowledge about the dental health (p = 0.035), which showed a statistically significant association with the diagnosis.

It is noted that from the twelve risk factors pertaining to the diagnosis "risk of bleeding", nine were present in the patients in the study, of which four showed a significant statistical association, and they were lack of knowledge (p = 0.016), side effects related to treatment (p = 0.000), trauma (p = 0.005), and impaired liver function (p = 0.043).

It was an identified yet statistically significant association between the diagnosis "impaired tissue integrity" and the defining damaged tissue characteristics (p = 0.000) and destroyed tissue (p = 0.000), as well as factors related to knowledge deficit (p = 0.001) and circulation amended (p = 0.032).

DISCUSSION

Among the nursing diagnoses assigned to the customers under study, some were present in 100% of it; "injury risk", "risk of falling" and "trauma risk." In a study of patients on invasive mechanical ventilation in the ICU, the DE "risk of injury" was present in 100% of the sample. Other diagnoses were also present, but in smaller proportions, between 88.2% and 86.3% of clients, respectively[6].

The diagnosis "risk for dry eye" was present in 98.8% of the sample, but this finding was not found in similar studies[7,9]. However, in a prospective cohort study conducted in the state of Minas Gerais with critically ill patients, 59.4% of 254 subjects were identified as having corneal injury. Among the possible risk factors indicated was; intubation, mechanical ventilation, oedema, sedation, eye blinking per minute and the use of sedatives[10]. This reveals, therefore, the urgent need to identify patients who demonstrate the risk of injury so that they can act to prevent it.

The diagnosis "risk for vascular trauma" was present in 96.5% of patients evaluated. To this DE were observed two risk factors with a statistically significant association; the duration of the time of insertion and the width of the catheter. Despite the widespread use of a central venous catheter in patients in critical health situations, many complications arise from its use and, from these, stand out the infectious ones. In this regard, studies show that an extended period of use of the catheter, over 21 days, is a risk factor for infection, so its early removal is cited in the international literature as a key to reducing complications related to it[11].

In addition, the multiple therapies to which the patients are submitted in intensive care (such as vasoactive drugs, hyperosmolar or vesicant solutions) greatly increase the chances of vascular complications. Thus, the gauge of intravenous device deserves attention from professionals, given that catheters with smaller gauges decrease vascular trauma during venepuncture. Furthermore, it is

Table 2 - Distribution of the defining characteristics and related factors related to the nursing diagnosis "impaired skin integrity" and "impaired dentition" in critically ill patients. Natal, 2014.

Nursing Diagnosis	Present		Absent		p Value
	N	%	N	%	
Impaired skin integrity					
Defining Characteristics					
Body structures invasion	76	88,4	10	11,6	*0,000[1]
Disruption of the skin surface	75	87,2	11	12,8	*0,000[1]
Destruction of skin layers	40	46,5	46	53,5	0,0771
Related Factors					
Physical restraint	86	100	-	-	-
Radiation	86	100	-	-	-
Mechanical factors (abrasive forces, pressure, containment)	85	98,8	1	1,2	0,9531
Changes in the hydrous status	85	98,8	1	1,2	0,9531
Bony prominences	83	96,5	3	3,5	0,8651
Changes in turgor	69	80,2	17	19,8	0,4071
Impaired metabolic state	48	55,8	38	44,8	0,2251
Damp skin	43	50	43	50	0,0581
Humidity	42	48,8	44	51,2	0,0641
Unbalanced nutritional status (obesity, weight loss)	37	43	49	57	0,5791
Extremes of age	32	37,2	54	62,8	0,1491
Sensations impaired	24	27,9	62	72,1	0,2631
Medications	16	18,6	70	81,4	0,4321
Immune deficit	16	18,6	70	81,4	0,5681
Impaired circulation	11	12,8	75	87,2	0,5721
Hyperthermia	5	5,8	81	94,2	0,7831
Development factors	1	1,2	85	98,8	0,9531
Dentition impaired					
Defining Characteristics					
Loss of teeth	79	91,9	7	8,1	*0,000[1]
Missing some teeth	77	89,5	9	10,5	*0,000[1]
Absence of teeth	68	79,1	18	20,9	*0,000[1]
Worn teeth	56	65,1	30	34,9	*0,001[1]
Bad teeth	46	53,5	40	46,5	*0,008[1]
Occlusion inadequate	43	50	43	50	0,1011
Erosion of teeth	26	30,2	60	69,8	0,1061
Halitosis	22	25,6	64	74,4	0,4841
Misaligned teeth	17	19,8	69	80,2	0,2551
Discoloration of the teeth enamel	13	15,1	73	84,9	0,3621
Excessive plaque	8	9,3	78	90,7	0,4541
Tartar excess	6	7	80	93	0,3611
Asymmetric facial expression	2	2,3	84	97,7	0,8651
Toothache	1	1,2	85	98,8	0,9301
Related Factors					
Barriers of self-care	86	100	-	-	-
Eating habits	67	77,9	19	22,1	0,1191
Poor knowledge about dental health	64	74,4	22	25,6	*0,035[1]
Nutricional deficits	54	62,8	32	37,2	0,3961
Economically disadvantaged	53	61,6	33	38,4	0,5791
Ineffective oral hygiene	40	46,5	46	53,5	0,0731
Chronic use of coffee	31	36,1	55	63,9	0,0621
Chronic use of tobacco	14	16,3	72	83,7	0,3321
Lack of access to professional care	2	2,3	84	97,7	0,8651
Selected prescription drugs	1	1,2	85	98,8	0,9301

*Legend: [1] Fisher's Exact Test; p <0.05; * Statistical Association.*

Table 3 - Distribution of the defining characteristics and related factors/risk related to nursing diagnosis "risk of bleeding" and "impaired tissue integrity" in critically ill patients. Natal, 2014.

Nursing Diagnosis	Present		Absent		p Value
	N	%	N	%	
Risk of Bleeding					
Risk Factors					
Poor knowledge	61	70,9	25	29,1	*0,016[1]
Side effects related to treatment	53	61,6	33	38,4	*0,000[1]
Trauma	25	29,1	61	70,9	*0,005[1]
Impaired liver function	16	18,6	70	81,4	*0,043[1]
Coagulopathy inherent	14	16,3	72	83,7	0,0661
History of falls	14	16,3	72	83,7	0,2851
Aneurism	12	14	74	86	0,1001
Gastrointestinal disorders	9	10,5	77	89,5	0,1851
Complication related to pregnancy	1	1,2	85	98,8	0,8371
Impaired Tissue Integrity					
Defining characteristics					
Injured tissue (cornea, mucous, skin or subcutaneous tissue)	66	76,7	20	23,3	*0,000[1]
Destroyed tissue	36	41,9	50	58,1	*0,000[2]
Related Risks					
Mechanical factors (pressure, abrasion and friction)	86	100	-	-	-
Impaired physical mobility	86	100	-	-	-
Radiation (including radiotherapy)	86	100	-	-	-
Knowledge deficit	61		25		*0,001[2]
Nutritional factors (deficit or suplus)	53	61,6	33	38,4	0,7232
Deficit of liquids	36	41,9	50	58,1	0,1742
Excess of liquids	26	30,2	60	69,8	0,5962
Circulation altered	12	14	74	86	*0,032[1]
Extremes of temperature	3	3,5	83	96,5	0,5531
Chemical irritants	2	2,3	84	97,7	0,4131

*Legend: [1]Teste Fisher exact; [2]Teste chi-square Pearson; p <0.05; * Statistical Association.*

known that the smaller device diameter in relation to the vessel facilitates blood circulation around, assisting in haemodilution of the drugs[12].

In this research, the DE "impaired skin integrity" and "impaired tissue integrity" were present in 95.3% and 76.7% of the sample, respectively. The high prevalence of these diagnoses in the clientele studied was due to the fact that the majority (73.3%) were admitted for surgical reasons, mostly post-operative, with the continuity solution of the skin related to mechanical factors such as surgical incision, the presence of catheters, probes and drains, in addition to a possible rise in pressure ulcers, resulting from perioperative positioning[13].

A cross-sectional study corroborates this finding by showing a total of 92.8% of patients with "impaired integrity of the skin/tissue" among those whose reason for admission was surgical. Thus, this population was subjected to invasive procedures such as surgery and the collection of biological materials for examination and venepuncture. Allied to this are the pathological process, immobilization in bed, decreased motor activity and the lack of adequate peripheral perfusion, factors also responsible for tissue damage[14].

With the DE "impaired skin integrity," were associated the CD body structures' invasion and disruption of the skin layers, both easily understood in the aforementioned

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context. For the DE "impaired tissue integrity," was associated with CD: injured tissue, destroyed tissue, lack of knowledge and altered circulation.

The diagnosis "impaired dentition," which was present in 93% of the sample could be associated with the following CD: loss of some teeth, missing some teeth, missing teeth, worn teeth and bad teeth; as well as the factor related to lack of knowledge about dental health.

Corroborating these findings, in a study of hospitalised patients, we found a frequency of 92.1% of the DE "impaired dentition"[15]. This result could be associated with the fact that most patients are elderly, and this is the stage of life in which appears a greater loss of teeth, despite that fact not being inherent in the normal ageing process[15]. Moreover, the lack of knowledge about dental health could be influenced by factors such as low education and low income, a common reality for consumers of public health services in Brazil.

Concerning the "bleeding risk", present in 83.7% of patients, there was an association with the following risk: lack of knowledge, side effects of the treatment, trauma and impaired liver function. Regarding this DE, the reason for surgical hospitalization in most patients deserves to be mentioned, given that surgery is a predisposing factor for deep vein thrombosis (TVP), a condition that requires the use of prophylactic anticoagulants. In addition to the risk inherent in the procedure, this population is also exposed to other trigger factors for thromboembolic events, such as restrictions on the bed and the use of central venous catheters. Thus, anticoagulant therapy can be considered one of the main causes of bleeding in these patients[16].

Given the above, were identified the most prevalent diagnoses of the Physical Injury class in face of the sample studied, besides the active factors as influencers of the presence of diagnosis, thereby facilitating the nurse's direction in efforts to reduce the risks to which this population is exposed.

CONCLUSION

It was concluded that the nursing diagnoses of the class of Physical Injury are associated with its components, indicating a possible relationship between these. The DE "risk for vascular trauma" associated with the length of time of the insertion and the width of the catheter; "Impaired skin integrity" is associated with the invasion of body structures and disruption of the skin surface; the "impaired dentition" joined the CD tooth loss, missing some teeth, worn and damaged teeth, as well as to the FR, poor knowledge about dental health; the "bleeding risk" was associated with a lack of knowledge, side effects to the treatment, trauma and impaired liver function; finally, the "impaired tissue integrity" showed significant association with the CD tissue damaged and destroyed, and FR knowledge of deficit and altered circulation.

The development of this type of study enables nursing to have greater ownership of the specific scientific content of their profession. From this, nurses not only identify the problems presented by the client, but can also take over the range of knowledge that permeates the rise of these problems, so that they understand the associations between the diagnosis, its antecedents and the consequences.

As a limiting factor to the development of the study, it was found that the lack of publications focusing on a class and the specific nursing diagnoses, related to a critical patient,

hampering the process of discussion of some aspects of the literature applied to the same audience. Allied to this, is the fact that clinical assessment is a subjective process and is therefore susceptible to uncertainties. It is suggested, therefore, to carry out studies with methods that allow for the testing of possible relationships to be identified crosswise.

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