Instrument for patient classification: users' opinions and analysis of healthcare indicators*

INSTRUMENTO PARA CLASSIFICAÇÃO DE PACIENTES: OPINIÃO DE USUÁRIOS E ANÁLISE DE INDICADORES DE CUIDADO

INSTRUMENTO PARA CLASIFICACIÓN DE PACIENTES: OPINIÓN DE LOS USUARIOS Y ANÁLISIS DE INDICADORES DEL CUIDADO

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ABSTRACT

This descriptive study was aimed at: 1.) investigating the users' opinions about an instrument for patient classification; 2.) analyzing the healthcare indicators that most contribute to classify patients in the healthcare categories. A questionnaire was used to collect the opinions of 24 users. The classification instrument was applied on 796 patients in a medical school hospital in the state of São Paulo, from September 2006 to May, 2007. Principal Components Analysis (PCA) and Discriminant Analysis were used for statistical analysis. Overall, the investigated users were satisfied with the instrument; however, they pointed out a certain tendency of the instrument to underestimate the nursing care category to which the patients belonged. The results revealed some healthcare indicators such as Therapy, Personal Hygiene, Skin Integrity and Health Education as the greatest discriminating care categories. The effective classification varied from 89.8% (semi-intensive care) to 95.6% (intensive care).

KEY WORDS

Patients/classification.
Workload.
Nursing assessment.

RESUMO

Esta pesquisa descritiva foi conduzida com o intuito de: 1- investigar a opinião de usuários sobre um instrumento de classificação de pacientes; e 2 - analisar os indicadores de cuidados que mais contribuem para a classificação dos pacientes nas diferentes categorias de cuidados. A opinião dos 24 usuários foi obtida por meio de questionário. O instrumento de classificação foi aplicado em 796 pacientes em um hospital de ensino no interior do Estado de São Paulo, no período de setembro de 2006 a maio de 2007. Para o tratamento estatístico, utilizou-se a Análise de Componentes Principais (ACP) e Análise Discriminante. Os usuários investigados mostraram-se satisfeitos com o instrumento utilizado, mas apontaram uma tendência do mesmo à subestimar a categoria de cuidados à qual o paciente pertence. Os resultados evidenciaram os indicadores Terapêutica, Cuidado Corporal, Educação à Saúde e Integridade Cutâneo-Mucosa como aqueles com maior capacidade discriminatória. A classificação correta dos pacientes variou de 89,8% (cuidados semi-intensivos) a 95,6% (cuidados intensivos).

DESCRITORES

Pacientes/classificação.
Carga de trabalho.
Avaliação em enfermagem.

RESUMEN

Investigación descriptiva conducida con la intención de: 1-investigar la opinión de los usuarios con relación a un instrumento de clasificación de pacientes y 2- analizar los indicadores de cuidados que más contribuyeron para clasificar pacientes en sus diferentes categorías de cuidados. La opinión de los 24 usuarios fue obtenida a través de un cuestionario. El instrumento de clasificación fue aplicado en 796 pacientes de un hospital de enseñanza del interior de São Paulo, durante setiembre del 2006 a mayo del 2007. El análisis estadístico realizado por Análisis de Componentes Principales (ACP) y Discriminativo. Los usuarios se mostraron satisfechos con el instrumento utilizado, sin embargo indicaron una tendencia del mismo para subestimar la categoría de cuidado al cual el paciente pertenece. Los resultados mostraron los indicadores: Terapéutica, Cuidado Corporal, Educación para la Salud e Integridad Cutáneo-Mucosa, como aquellos con mayor capacidad discriminativa. La clasificación correcta de los pacientes varió de 89.8% (cuidados semintesivos) a 95,6% (cuidados intensivos).

DESCRIPTORES

Pacientes/clasificación.
Carga de trabajo.
Evaluación en enfermería.

INTRODUCTION

The patient classification system (PCS) consists in the identification of the patients' individual healthcare necessities, grouping them into categories. Since its development in the United States, in the 1960s, its utilization has been internationally acknowledged as being highly important to help in management decision making. This category allows for the identification of the patient's healthcare profile and the nursing team workload, supporting staff dimensioning and allocation[1], and enhancing discussions in the negotiation process with hospital management. It also makes it possible to monitor productivity, nursing service costs and the quality of the healthcare provided[2-3].

In Brazil, the patient classification system was first addressed in 1972[4], as a concept of Progressive Patient Care (PPC), i.e. a way of organizing medical and nursing care according to the degree of the disease and the required care (for example, intensive, intermediate, minimal care, etc).

However, in spite of this study, the PCS only started to be developed in the 1990s in different specialties and employed in hospital institutions[5]. Its use was only recommended in 1996, through COFEN Resolution #189/1996[6], which also determined its use as an exclusive competence of nurses. In 2004, this recommendation was updated, becoming COFEN resolution #293/2004[7].

With the goal of identifying both the patients' healthcare needs and the nursing staff workload, an instrument[8-9] was developed, based on individual nursing care needs. Investigations were done to evaluate the psychometric properties of the instruments, among them content validity by judges[8], inter-rater reliability[10], predictive capacity to determine the several levels of care[11], construct validity[12] and comparison with another international instrument[13]. The results of these studies show that the instrument presented evidence of reliability and validity for application in nursing practice.

Since then, the proposed patient classification instrument[8-9] has been applied in hospital institutions and elicited scientific investigations[14-16]. Both favorable and unfavorable comments have emerged from these studies. The most common criticism is that the instrument would underestimate the patient's real nursing care category. These comments, expressing the personal opinions of some nurses who used the instrument, were based on clinical experience and need to be taken into account. Therefore, it is important to systematically review the structure and content of the proposed instrument, considering its update (the instrument was composed in the late 1990s) to allow for a more accurate measurement of the complexity degree of the patient's healthcare and the nursing resources used.

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This article represents the first stage of the refinement, discussing the opinion of the instrument users regarding simplicity, comprehensiveness, applicability and reliability of the generated data and the most relevant variables (critical indicators) for inter- and intra-categories of care.

OBJECTIVES

• Investigate the opinions of users of a patient classification instrument;

• Analyze the healthcare indicators that most contribute to the classification of patients in each healthcare category (minimal, intermediate, semi-intensive and intensive).

METHOD

The methodological sequence of this descriptive study occurred in two stages, in consonance with the proposed goals. Data collection happened from September 2006 to May 2007, after receiving approval from the Faculdade de Medicina de São José do Rio Preto Review Board (Protocol n° 3262/2006), the authorization of the nursing management service and consent from the research subjects.

Initially, users of the proposed patient classification instrument were identified, contacting them by telephone, e-mail and also through articles about the topic. Twenty-four nurses agreed to participate in the study. A previously-tested questionnaire was used to investigate their opinions, containing semi-structured questions. This instrument was designed in three parts, followed by a brief explanation. The first part, besides information about the institution, personal and professional characteristics, also covered also information related to the use of the instrument (how long it has been in use, frequency, goals, units); the second part consisted in a 5-point Likert scale containing 14 statements. The statements focused on characteristics of the instrument (ease of usage, objectivity), reliability (interpretation, adequacy of the classification and utilization of the generated data) and acceptance. A 5-point score was attributed to the most positive answers and one to the most negative. The last part of the questionnaire allowed the subjects to present their considerations about the indicators that compose the instrument.

For the analysis of the healthcare indicators, a minimum statistical sample of 800 patients was defined, with 200 in each category. In total, 796 patients were obtained, with 208 undergoing minimal care, 224 intermediate care and 227 intensive care. The low number of patients hospitalized in the semi-intensive care category yielded a sample of 137 patients.

The classification instrument[9] was applied to patients chosen by nurses assigned to Medical Clinic, Surgical and

Intensive Care units at a private teaching hospital with extra capacity in the state of São Paulo. The choice of units where the instrument was applied related to the diversity of the healthcare complexity, dynamics of the unit and availability of the nurses. Since the investigated hospital does not use classification instruments in its daily practice, each nurse was asked to classify from four to five patients per shift until the sample reached the predetermined size, so as not to overload their activities.

The classification instrument is based on individual nursing healthcare needs, and directed at adult patients. It is composed of 12 critical healthcare indicators: Mental status and Level of Awareness, Oxygenation, Vital Signs, Nutrition and Hydration, Motility, Locomotion, Body Care, Eliminations, Therapy, Health education, Behavior, Communication and Skin integrity. The score for each of the indicators varied from 1 (lowest level of nursing care) to 5 (maximum level of healthcare complexity). The lowest possible score is 13, and the maximum is 65. Through this instrument, the patient could be classified in one of the four healthcare categories: Minimal (13-26 points), Intermediate (27-39 points), Semi-Intensive (40-52 points) and Intensive (53-65 points).

For statistical analysis, Minitab Statistical Software (MINITAB) v. 12.22 and SPSS v. 15.0 were used. The descriptive data are presented in frequencies, percentages, averages and standard deviations. The Likert scale was considered an ordinal measurement level, and the medians and quarters (Q1 and Q3) were calculated. The internal consistency, i.e. the reliability of the instrument was tested by Cronbach's Alpha coefficient, and Spearman's two-tailed correlation coefficient, with a significance level of $p < 0.05$ considered acceptable. The Principal Components Analysis (PCA) and Discriminant Analysis were used to study the behavior of the variables (critical indicators). Subjective data were grouped, categorized and related according to the study goals.

RESULTS

Users' opinion

The study subjects were female, with an average age of 34.5 ± 14.8 years, (varying from 24 to 56 years old), work-ing in the professional area for 15.2 ± 16.3 years (varying from 1 to 29 years). Two were directors of the Nursing service, 16 were clinical nurses and supervisors, five were professors and one performed teaching and healthcare activities. Regarding their professional qualification, five held a Doctoral Degree, four a Master's, twelve a Specialization Degree, one had a Teaching Diploma and two were Registered Nurses, without graduate degrees.

The users applied the instrument in Medical Clinic, Surgery and Specialized units in mostly medium-sized, extra capacity public and teaching hospitals in the states of São Paulo, Paraná and Rio Grande do Sul. The main goals for the utilization of the instruments were: knowing the patient's healthcare profile at the unit and identifying the workload, in order to define the staff size. Its usage is periodical, mostly to develop the nurses own research projects or those of students. Regarding the operational aspects, the average time to classify each patient was around five minutes.

The users' opinions are presented in Table 1. The statements about the instrument characteristics, such as being too long (affirmative 2), needing too much time for assessment (affirmative 3) and being difficult to understand (affirmative 5) had medians of 2, showing the lowest level of agreement. The other characteristics (reliability, applicability, satisfaction) presented high agreement, with medians of 4, highlighting affirmation 11 regarding the instrument's tendency to underestimate the healthcare category the patient belongs to.

Through the Likert scale, the nurses were asked to provide comments about other characteristics of the instrument. Most agreed that it was important to maintain the presence of the companion in the indicators. Regarding the new structure of the instrument, 22 nurses expressed that it would be more adequate if the instrument were not limited to patient classification, but if it could also measure the workload of the nursing team more comprehensively. Some considered it important to evaluate other aspects of care, such as rest and sleep, patient security and transportation, and also management activities of teaching and supervision. The Health Education indicator was noted as being difficult to interpret.

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Table 1 – Users' opinion about the classification instrument - São José do Rio Preto – 2006

AFFIRMATIONS	MD (Q1-Q3)
1. It is easy to understand.	4 (3.75-5)
2. It is too long.	2 (2-4)
3. It takes too long to evaluate the patient.	2 (2-4)
4. It covers the most expressive healthcare areas (indicators) and/or aspects of care.	4 (4-4)
5. It is complex and makes comprehension difficult.	2 (2-2.5)
6. Provides adequate assessment of the patient's healthcare category.	3 (2-4)
7. It is easy to apply.	4 (2.75-4)
8. It yields reliable data.	4 (2-5)
9. The data are useful for managerial decision making.	4 (4-5)
10. The yielded data are used for management decision making.	4 (3-4)
11. It tends to underestimate the patient's healthcare category.	4 (2-4)
12. It tends to overestimate the patient's healthcare category.	3 (2-3)*
13. You feel satisfied with the utilization of this instrument in your unit.	4 (3-4)*
14. It can be inserted in the nurse's daily practice.	4 (4-4.75)*

Score varies from 1 to 5; the higher the score, the higher the agreement;   * Lost data
Note: (N=24): Median and Quarters (Q1, Q3).

Analysis of the Healthcare Indicators

796 classifications were performed at the study units. The average age of the patients was 56.4 (± 18.4), varying from 14 to 95 years old, with a predominance of male patients (59.4%). The instrument's internal reliability resulted in a Cronbach's Alpha of 0.94. Spearman's correlation (r_s) was used to determine the association between the healthcare indicators (inter-item) of the instrument. The (r_s) coefficient varied from 0.08 to 0.87. Skin Integrity showed association values with the other indicators, varying from 0.08 to 0.25 (Table 2).

Table 2 – Inter-item correlation coefficient of the instrument - São José do Rio Preto - 2006

Indicators	1	2	3	4	5	6	7	8	9	10	11	12
M. State												
Oxygenation	0.76*											
Vital Signs	0.54*	0.69*										
Nut/Hydrat	0.74*	0.7 1*	0.55*									
Motility	0.73*	0.72*	0.54*	0.76*								
Locomotion	0.63*	0.65*	0.51*	0.70*	0.80*							
Body Care	0.63*	0.64*	0.55*	0.70*	0.79*	0.90*						
Eliminations	0.65*	0.66*	0.53*	0.71*	0.78*	0.75*	0.78*					
Therapy	0.43*	0.51*	0.56*	0.44*	0.39*	0.38*	0.38*	0.39*				
Health Ed.	0.50*	0.44*	0.31*	0.51*	0.48*	0.47*	0.45*	0.44*	0.26*			
Behavior	0.77*	0.68*	0.47*	0.64*	0.67*	0.56*	0.56*	0.59*	0.42*	0.52*		
Communic.	0.87*	0.74*	0.47*	0.75*	0.74*	0.65*	0.64*	0.66*	0.39*	0.49*	0.77*	
Skin Int	0.18*	0.17*	0.08 **	0.25*	0.25*	0.24*	0.22*	0.25*	0.15*	0.20*	0.19*	0.20*

P < 0.01 (2-tailed); ** P < 0.05 (2-tailed).
Note: (n=796)

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By studying the gradation variation per healthcare type, it can be observed that: 1.) In the *minimal care* category, the indicator Therapy presented the highest average score (SD) of 2.4 (1.2); 2. in the *intermediate care* category, the indicators Locomotion (4.0 ± 1.1), Body Care (4.0 ± 0.9) and Eliminations (3.7 ± 1.1); Likewise, in the *semi-intensive care* category, the indicators Locomotion (4.9 ± 0.5), Body Care (4.8 ± 0.4) and Eliminations (4.5 ± 0.6); and the same indicators Locomotion (4.9 ± 0.5), Body Care (4.8 ± 0.4) and Eliminations (4.5 ± 0.6) had the highest average score in the *intensive care* category (Table 3).

Table 3 – Variation of the gradation found in the healthcare indicators in the different healthcare categories, averages and standard deviation - São José do Rio Preto - 2006

Variables	Minimal Care (n=208) Md(Q1,Q3) M (SD)		Intermediate care (n=224) Md(Q1,Q3) M (SD)		Semi-Intensive care (n=137) Md (Q1,Q3) M (SD)		Intensive care (n=227) Md(Q1,Q3) M (SD)	
M. State	1(1.1)	1.1(0.3)	1(1.2)	1.5(0.9)	4(2.4)	3.2(1.3)	5(5.5)	3.2(1.3)
Oxygenation	1(1.1)	1.1(0.3)	1(1.2)	1.5(0.7)	2(2.3)	2.6(1.2)	5(5.5)	2.6(1.2)
Vital Signs	1(1.1)	1.3(0.7)	2(1.3)	2.0(0.9)	2(1.3)	2.1(1.0)	4(3.5)	2.1(1.0)
Nut/Hydrat	1(1.2)	1.4(0.7)	3(2.3)	2.6(1.0)	4(4.4)	3.9(0.7)	5(4.5)	3.9(0.7)
Motility	1(1.1)	1.2(0.5)	3(2.4)	2.9(1.1)	5(4.5)	4.3(0.9)	5(5.5)	4.3(0.9)
Locomotion	1(1.2)	1.7(0.9)	4(3.5)	4.0(1.1)	5(5.5)	4.9(0.5)	5(5.5)	4.9(0.5)
Body Care	1(1.2)	1.7(1.0)	4(3.5)	4.0(0.9)	5(5.5)	4.8(0.4)	5(5.5)	4,8(0.4)
Eliminations	1(1.2)	1.5(0.9)	4(3.5)	3.7(1.1)	5(4.5)	4.5(0.6)	5(5.5)	4.5(0.6)
Therapy	1(1.3)	2.4(1.2)	3(2.3)	2.8(0.8)	3(2.3)	3.0(1.1)	5(4.5)	3.0(1.1)
Health Ed.	1(1.1)	1.2 (0.5)	2(1.2)	1.8(1.0)	3(2.5)	3.1(1.5)	5(2.5)	3.1(1.5)
Behavior	1(1.1)	1.4(0.7)	2(1.2)	1.8(0.9)	4(2.5)	3.4(1.4)	5(5.5)	3.4(1.4)
Communic	1(1.1)	1.1(0.5)	1(1.2)	1.7(1.1)	4(3;4.5)	3.7(1.2)	5(5.5)	3.7(1.2)
Skin Int.	1(1.1)	1.6 (0.9)	2(1.3)	2.1(1.1)	2(1.5;4)	2.6(1.3)	2(1.3)	2.6(1.3)

Note: Median and Q$_1$ and Q$_3$ (n= 796)

The Principal Components Analysis was used to study the correlation between each intra-group variable (healthcare indicator) (Table 4). In the analysis below, only the three factors in each healthcare category were considered, which explained 58.7% (minimal care), 47.8% (intermediate care), 56.3% (semi-intensive care) and 73.6% (intensive care) of total data variation. The other factors will not be explored since they have a lower explanatory capacity.

The degree of importance of a variable in the studied factor can be determined by multiplying the maximum obtained value in one of the factor variables by 0.7. Since the factorial weights presented a significant dispersion among the factors in the different healthcare categories, it was difficult to determine the most relevant healthcare indicators with the highest discriminatory capacity. Therefore, after consulting a statistician, a choice was made to multiply the indicator's factorial weight by the explanation percentage of the factor (variance). For example, in the minimal care category, the Therapy indicator presented a factorial weight of 0.956 for factor 1 (CP1). Multiplying this value by the explanation percentage of the respective factor (20.2%) yields the value 19.31. When significant values of the healthcare indicators appeared in several factors in the same healthcare category, they were added up. The sorting of the values obtained in each category, then, allowed for the identification of the healthcare indicators with higher discriminatory capacity, in order of importance. 1. *Minimal care* –Therapy (25.7), Body Care (20.7), Locomotion (20.6) Indicators; *Intermediate care* – Body care (25.8), Communication (15.4), Skin Integrity (14.3), Locomotion (14.3), Motility (14.1), Eliminations (13.9), Vital Signs (12.4); *Semi-Intensive Care* – Health Education (23.7), Skin Integrity (20.0), Behavior (18.8), Mental State and Level of Awareness (17.7), Communication (17.4) and Oxygenation (16.2).

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Table 4 – Factorial weights of the Principal Components Analysis in the different healthcare categories. São José do Rio Preto - 2006

Variables	Minimal			Intermediate			Semi-Intensive			Intensive		
	CP1	CP2	CP3	CP1	CP2	CP3	CP1	CP2	CP3	CP1	CP2	CP3
M. State	0.03	0.02	0.07	0.26	0.30	0.02	0.52	0.07	0.22	0.08	0.04	0.02
Oxygenation	0.02	0.00	0.07	0.04	0.03	0.11	0.17	0.47	0.29	0.10	0.13	0.05
Vital Signs	0.09	0.01	0.25	0.19	0.23	0.44	0.18	0.08	0.33	0.36	0.53	0.34
Nut/Hydrat	0.17	0.06	0.34	0.07	0.50	0.07	0.02	0.10	0.07	0.07	0.13	0.13
Motility	0.19	0.03	0.02	0.36	0.33	0.12	0.09	0.05	0.01	0.02	0.05	0.04
Locomotion	0.58	0.11	0.29	0.49	0.19	0.07	0.04	0.01	0.02	0.00	0.00	0.00
Body Care	0.63	0.18	0.05	0.40	0.11	0.02	0.02	0.01	0.03	0.01	0.01	0.02
Eliminations	0.39	0.01	0.30	0.34	0.13	0.42	0.03	0.00	0.00	0.00	0.01	0.00
Therapy	0.19	0.96	0.12	0.06	0.22	0.08	0.24	0.03	0.31	0.21	0.48	0.38
Health Ed.	0.01	0.03	0.10	0.15	0.07	0.33	0.24	0.78	0.35	0.82	0.53	0.11
Behavior	0.04	0.10	0.15	0.31	0.00	0.10	0.57	0.11	0.18	0.00	0.09	0.09
Communic.	0.02	0.01	0.11	0.32	0.55	0.03	0.42	0.17	0.28	0.08	0.06	0.04
Skin Int.	0.03	0.16	0.76	0.13	0.29	0.68	0.21	0.32	0.65	0.34	0.40	0.83
Variance (%)	25.9	20.2	12.6	22.4	14.5	10.9	25.3	16.1	14.9	39.6	17.7	16.3

Note: (n=796)

The discriminant analysis made it possible to verify the adequacy of the patients in their healthcare categories. The results of the analysis showed that, in the studied sample, the percentage of discrimination and the correct classification of the patients in the many healthcare categories varied from 89.1% (semi-intensive care) to 95.6% (intensive care). Considering the score distribution for the categories of minimal care (13-26 points), intermediate (27-39 points), semi-intensive (40-52 points) and intensive care (53-65 points), the threshold zone would include the scores immediately above and below the one found in the category interval, and the attention zone would contain values immediately above and below those found in the threshold zone.

Therefore, of the 24 incorrect classifications between the intensive and semi-intensive healthcare categories, 11 had scores in threshold zones (52-53 points); eight (33.4%) in the attention zone (51 and 54) and only five (20.8%) had other score values. Among the minimal and intermediate healthcare categories, there were 26 incorrect classifications: in 13 of them (50%), the scores were in threshold zones (26-27); three (11.5%) in the attention zone (25 and 28), and ten (38.5%) had other values. Of the 29 incorrect classifications between the intermediate and semi-intermediate healthcare categories, 14 of them (48.3%) had scores in threshold zones (39-40); six (20.7%) classifications had scores in the attention zone (38 and 41), and nine (38.5%) had other values. The number of correct and incorrect classifications, the predicted category and the percentage of correct classifications can be seen in Table 5.

Table 5 – Discriminant analysis of the different healthcare categories in relation to the two first main components **-** São José do Rio Preto – 2006

Healthcare Category	Classifications N	Correct Classifications	Incorrect Classifications	Predicted Category	Correct Classifications (%)
Intensive	227	217	10		95.6
S-Intensive	137	123	14	S-intensive	89.8
Subtotal	364	340	24	Intensive	93.4
Intermediate	224	213	11		95.1
Minimal	208	193	15	Minimal	92.8
Subtotal	432	406	26	Intermediate	94.0
Intermediate	224	210	14		93.8
S-Intensive	137	122	15	S-intensive	89.1
Subtotal	361	332	29	Intermediate	92.0

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DISCUSSION

The greatest challenge of this study was to identify the instrument users, due to the absence of a map with the hospital institutions that use PCSs. Few articles have been published about the theme, using one instrument or another, which served as a base for contacting the users. Other nurses and researchers were reached through referrals. Although this process took a long time, the sample was still reduced (n=24). Thus, the results found may not fully represent the opinion about the classification instrument.

The investigated users were satisfied with the intrinsic characteristics of the classification instrument (objectivity, application time, extension, practical applicability in their everyday routine). However, authors[17] who analyze the possibility of implementing PCSs in Intensive Care Units see the utilization of Perroca's instrument with restrictions, considering it long and difficult to fill out, making it difficult to perform quick decision making at this unit.

The study subjects mentioned a tendency of the instrument to underestimate the patient's healthcare category. At the same time, they agree that the yielded data are reliable and can be used for management decision making, which seems contradictory. This apparent contradiction may mean that the nurses acknowledge the validity of the instrument for patient categorization according to healthcare complexity, although they sometimes do not agree with the resulting categorization. A Swedish study[18] also shows that the nurses are not totally satisfied with the capacity of the instruments used in that country to provide an adequate evaluation of the patient's healthcare category. The values found were medians varying from 2 to 3, similar to those found in the present study.

The possibility that the instrument does not provide an adequate evaluation of the patient's healthcare category was one of the factors that motivated the execution of this study. In the construction of the instrument[8], the method used for the standardization of the scores was the class interval, i.e. the total amplitude of 52 (maximum score minus the minimum score) distributed into four categories (classes) with 12-point intervals each. Therefore, the difference among healthcare categories remained constant. The international classification instruments, although presenting similar structures and contents[8-9], have different intervals among the categories.

The Discriminant Analysis result showed that the healthcare category with the lowest percentage of correct classification was semi-intensive, i.e. 89.8% when compared with intensive care and 89.1% when compared with intermediate care. Therefore, the lower the reclassification error rates, the more coherent the healthcare categories. High percentages of scores in threshold zones were detected in the incorrect classifications – 45.8¨% for intensive/semi-intensive and 48.3% for semi-intensive/intermediate. If we also consider the so-called attention zones, those percentages rise

to 79.2% and 69%, respectively. Therefore, the score standardization needs to be reviewed for the new structure of the instrument.

The comparison of the proposed instrument (culturally adapted) with an international instrument[13] showed k_w 0.60 (0.50-0.71; RI 95%), i.e. a moderate level of agreement in the different healthcare categories. Agreement was found between the instruments in the healthcare categories of 51 out of 85 evaluated patients. The minimal and semi-intensive healthcare categories showed the highest levels of agreement, and intensive care the lowest. In the 34 mismatches, 26 patients were observed to be in lower categories when evaluated by the proposed instrument, and eight in higher categories, when compared with the international instrument.

These findings corroborate the perception that the instrument may **possibly** not depict the patient's complexity as perceived **by some** of the nurses. However, in addition to the choice of method to standardize the score, another aspect may be interfering in the adequate evaluation of the patient's healthcare category. Originally built to determine the patient's complexity in relation to the nursing practices, the instrument contains only activities performed with the patients or their families, and does not address other activities performed by the nurse that demand time, such as management activities, healthcare coordination, supervision and training the team and students. This means that, in its current format, the nursing team's workload is measured only partially. Thus, in order to mirror the real workload more accurately, it is necessary to include other factors that also interfere in its measurement.

Another aspect worth noting relates to the inclusion of a companion. It is important for the family member/companion to participate and contribute to the recovery of the patient, since they will continue the treatment at home. However, they cannot be forced to take responsibility for healthcare. The responsibility will always lie with the nurse. It is undeniable that their presence influences nursing healthcare time, since they need orientation and supervision by the nurses. The issue raised is to determine to what extent their presence affects the nursing time. The considerations above lead to the reflection that building a workload measuring instrument for the nursing team still needs complementary studies to identify the factors that most strongly interfere in its determination.

It is mentioned in literature[19] that the internal consistency should present Cronbach's alpha coefficients (> 0.80) and item-item correlation (> 0.30 and <0.70). Values under 0.30 are considered irrelevant and those above 0.70, redundant. In this analysis, the values found in the Skin integrity indicator varied from 0.18 to 0.25, showing that this item could be excluded. In clinical practice, prevention and treatment of skin injuries require much of the nursing team's time, which makes it impossible to be excluded. This aspect of care could then be included in another compatible indicator.

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The Principal Components Analysis (PCA) was used to reduce the instrument's dimensionality, i.e. to identify, the most relevant healthcare indicators (variables) among the 13 used, which characterize each of the healthcare categories. The findings showed a significant dispersion among the factors in different healthcare categories. It was expected that one or another healthcare indicator would direct the intra-class classification. However, even after sorting the obtained values in each category, the result obtained was a group of healthcare indicators. The Therapy indicator presented the highest discriminatory capacity in the category of minimal care; Body Care for intermediate care and Health Education and Skin Integrity in the semi-intensive and intensive healthcare categories. The Body Care indicator had been previously reported in literature[9,20] as the most important aspect to apprehend the change of care of the instrument as a whole.

CONCLUSION

The investigated users were satisfied with the proposed classification instrument, except for a certain tendency to underestimate the patient's healthcare category. They suggest that it would be more appropriate if the instrument were not limited to patient classification, but also capable of measuring other factors that influence the nursing team's workload. Undoubtedly, the search for accurate workload measurements remains a great challenge. Other studies need to be performed for the identification of those factors that most affect its measurement.

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