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ASSESSMENT OF ELECTRONIC RECORDS OF NURSING DIAGNOSES AND INTERVENTIONS IN INTENSIVE CARE

AVALIAÇÃO DOS REGISTROS ELETRÔNICOS DE DIAGNÓSTICOS E INTERVENÇÕES DE ENFERMAGEM NA TERAPIA INTENSIVA

EVALUACIÓN DE REGISTROS ELECTRÓNICOS DE DIAGNÓSTICOS E INTERVENCIONES DE ENFERMERÍA EN CUIDADOS INTENSIVOS

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ABSTRACT

Introduction: The study aimed evaluate the quality of records of diagnoses and nursing interventions in electronic medical records of Intensive Care Units.

Methods: Retrospective cross-sectional study that evaluated nursing records in electronic medical records of adult patients admitted to six Intensive Care Units of different specialties in a hospital complex in southern Brazil. Data collection to assess the quality of records took place between April and July 2018, with the application of the Quality of Diagnosis, Interventions, and Outcomes instrument. The outcomes were analyzed using the Statistical Package for Social Science version 18, through descriptive statistics.

Results: 147 electronic medical records were evaluated, and the total average score of the units was evidenced according to the instrument domains. The nursing domain diagnosis as a process scored 3.49 + 1.72; the Nursing Diagnosis as a product obtained 15.50 + 1.22, and the Interventions and Nursing domain, 5.06 + 0.94.

Conclusion: The evaluation of records of nursing diagnoses and interventions in intensive care units showed the lowest average in the nursing field diagnosis as a process, which evaluates records of nursing history data. The qualification of this initial stage of the nursing process is essential for diagnostic accuracy and interventions.

Keywords: Electronic Health Records; Intensive Care Unit; Nursing Audit; Nursing Diagnosis; Nursing Process.

RESUMO

Introdução: O trabalho tem como objetivo avaliar a qualidade dos registros de diagnósticos e intervenções de enfermagem em prontuário eletrônico de Unidades de Terapia Intensiva.

Métodos: Estudo transversal retrospectivo que avaliou registros de enfermagem em prontuários eletrônicos de pacientes adultos, internados em seis Unidades de Terapia Intensiva de diferentes especialidades de um complexo hospitalar da região sul do Brasil. A coleta de dados para a avaliação da qualidade dos registros ocorreu entre abril e julho de 2018, com a aplicação do instrumento *Quality of Diagnosis, Interventions and Outcomes*. Os dados foram analisados com o *software Statistical Package for the Social Science* versão 18, utilizando-se estatística descritiva.

Resultados: Foram avaliados 147 prontuários eletrônicos e evidenciada a pontuação média total das unidades, conforme os domínios do instrumento. O domínio Diagnóstico de enfermagem como processo pontuou 3,49 + 1,72; o Diagnóstico de enfermagem como produto obte-

ve 15,50 + 1,22 e, o domínio intervenções e enfermagem, 5,06 + 0,94.

Conclusão: A avaliação dos registros de diagnósticos e intervenções de enfermagem nas unidades de terapia intensiva demonstrou a menor média no domínio diagnóstico de enfermagem como processo, que avalia os registros dos dados do histórico de enfermagem. A qualificação desta etapa inicial do processo de enfermagem é fundamental para a acurácia dos diagnósticos e das intervenções.

Palavras-chave: Auditoria de Enfermagem; Diagnóstico de Enfermagem; Processo de Enfermagem; Registros Eletrônicos em Saúde; Unidade de Terapia Intensiva.

RESUMEN

Introducción: El objetivo de este estudio fue evaluar la calidad de los registos de diagnósticos e intervenciones de enfermería en las historias clínicas electrónicas de las Unidades de Cuidados Intensivos.

Métodos: Se trata de un estudio transversal retrospectivo que evaluó los registros de enfermería en las historias clínicas electrónicas de pacientes adultos ingresados en seis unidades de cuidados intensivos de diferentes especialidades en un complejo hospitalario de la región sur de Brasil. La recolección de datos para evaluar la calidad de los registros se realizó entre abril y julio de 2018, utilizando el instrumento Calidad de Diagnósticos, Intervenciones y Resultados. Los datos se analizaron utilizando el *software Statistical Package for the Social Science* versión 18, utilizando estadística descriptiva.

Resultados: Se analizaron 147 historias clínicas electrónicas y se mostró la puntuación media total de las unidades, según los dominios del instrumento. El dominio Diagnóstico de Enfermería como Proceso puntuó 3,49 + 1,72; el Diagnóstico de Enfermería como Producto puntuó 15,50 + 1,22 y el dominio Intervenciones de Enfermería puntuó 5,06 + 0,94.

Conclusión: La evaluación del registo de los diagnósticos e intervenciones de enfermería en las unidades de cuidados intensivos presentó la media más baja en el dominio del diagnóstico de enfermería como proceso, que evalúa el registo de los datos de la historia de enfermería. La calificación de esta etapa inicial del proceso de enfermería es fundamental para la precisión de los diagnósticos e intervenciones.

Descriptores: Auditoría de Enfermería; Diagnóstico de Enfermería; Historia Clínica Electrónica; Proceso de Enfermería; Unidad de Cuidados Intensivos.

INTRODUCTION

The records made by nursing professionals make up patients' medical records, making it a duty to record all information related to the care process with accuracy, objectivity, legibility and chronological order, in order to support nursing care and multidisciplinary team planning[1]. In large hospital centers in Brazil and around the world, nursing records are carried out in computerized systems. Although they present different structures and interfaces, they have been used to optimize the time spent on health records, through user-friendly attributes for navigation, which are constantly improving[2].

Among the benefits of computerized health records, the convenience for data analysis and decision-making stands out.

In Brazil, the Federal Nursing Council (COFEN) systematically regulates the management of care by nurses, in order to guarantee effective implementation of nursing records in all care environments[3]. Through five stages of nursing process (NP)[4], data related to individuals are collected, real or potential diagnoses are assigned, results to be achieved are defined in the sense of planning, which must be implemented and subsequently assessed. However, recording all stages of NP has been a major challenge, both in terms of record quality and content, structure and process, whether in physical or computerized records[5].

Due to the dynamic needs of health systems around the world, for computerization of records, nurses have increasingly used standardized language systems (SLP), which structure concepts about nursing diagnoses, interventions and outcomes. Furthermore, they use standardized language, assisting clinical reasoning, care management, interprofessional communication and decision-making by nurses[6].

Nursing records made in computerized systems provide data for research and care indicators, which under analysis lead to the identification of weaknesses, trends, workload, among other aspects, which can lead to the search for improvements and greater care security, in addition to being used for legal purposes as well as for internal and external audits[7].

Although there are different SLP, nursing records using the North American Nursing Diagnosis Association – I (NANDA-I) have been the subject of studies in several countries. SLP use in electronic nursing documentation in 32 Austrian hospitals showed electronic record use by 76% of nurses, noting that 63% of these records are carried out with SLP for nursing diagnoses, with 29% using NANDA-I taxonomy and an incipient use of Nursing Interventions Classification (NIC) and Nursing Outcomes Classification (NOC) languages[8].

Another study analyzed nursing records of neonatal and adult patients in Intensive Care Units (ICUs), and identified that high priority NDs belonged to the safety and protection and elimination and exchange domains, both from NANDA-I[9].

In hospitals in Brazil, NANDA-I, NIC and NOC SLP are the most used for nursing diagnoses (ND), nursing interventions (NI) and nursing outcomes, respectively, and widely studied in the country.

Standardization of electronic nursing records using the NANDA-I taxonomy in an ICU of a Brazilian hospital made it possible to identify the most common NDs for making focused, resolute and effective clinical nursing decisions for patients under intensive care[10].

Even though SLP use is present in electronic nursing records and quality assessment of these records[11-12], there is a gap in the national and international scientific literature on studies assessing electronic nursing records using SLP in ICUs.

This study aims to assess ND record quality and interventions in electronic medical records of patients in ICUs.

MATERIAL AND METHODS

This is a cross-sectional, retrospective study, in line with the observational study design of the EQUATOR instrument[13], carried out in a hospital complex in southern Brazil where there are different hospital units, with ICUs for adults focusing on clinical cardiology, with 12 beds, surgical, with 10 beds, oncology, with 10 beds, neurological, with 10 beds, pulmonary, with 14 beds, intensive care in transplants, with 10 beds, and general ICU, with 24 beds. Patients' electronic medical record is computerized and the records related to NP, made from a clinical reasoning tree, whose data entry begins with evidence (signs or symptoms), identified after the initial collection of patient data (nursing history). Subsequently, ND are suggested and, after confirmation, NI are presented. The SLP used for ND is NANDA-I and the NI, guided by NIC, implemented in the institution's computerized registration system in 2017. There is no nursing record related to the results stage.

The study sample was intentional, non-probabilistic, with the inclusion of twenty records per ICU, with the choice of records occurring consecutively as long as they met the inclusion criteria and were equitable in relation to professionals working in the sector, including records made by nurses of all shifts (morning, afternoon, night 1 and night 2). Inclusion criteria for selecting medical records were being an adult patient over 18 years of age, admitted to one of the ICUs for at least 24 hours, with at least a complete nursing record (nursing

history upon admission, diagnoses, nursing prescription with interventions and nursing evolution) in the 48 hours after admission to the ICU. Electronic records made by nursing students or residents were excluded. The record of choice for analysis of each medical record was the first complete nursing record after admission to the ICU. To identify the electronic medical records for data collection, a list with the identification number of medical records of patients admitted to adult ICUs in the six hospitals of the hospital complex in the third quarter of 2017 was requested from the health institution's information technology sector. Data collection took place between April and July 2018.

Data collection was carried out using the Quality of Diagnosis, Interventions and Outcomes (Q-DIO), validated in Brazil, consisting of four domains[14]. The first domain is ND as a process (0-22 points), which assesses relevant nursing phenomena and patients' needs, problems and resources. In this subscale, complete, partial, or even missing information is assessed, such as the current situation that led to hospital admission, concerns, anxieties and coping related to hospital admission, patients' expectations and desires, social, gender, spiritual situation and physiological aspects. Completing this subscale requires reading the nursing history and admission progress, aiming to complete all items in the first subscale listed from one to eleven. The second domain is ND as a product (0-16 points), consisting of eight items, which analyzes information about ND, whether or not they were prepared in detail in accordance with NANDA-I. The third domain is NI (0-6 points), with three items that relate to the nursing prescription for the respective diagnoses[14]. The fourth and final domain assesses nursing outcomes (0-14 points), not assessed in this study, as the institution does not record it. The Q-DIO was applied and completed by a researcher trained to apply the instrument.

The Brazilian version of Q-DIO presents the possibilities of Likert-type responses consisting of 3 points: undocumented (0); partially documented (1); and complete documentation (2). The instrument's total score consists of twenty-nine items assessing nursing record quality, with a maximum score of 58 points[14]. In this study, the ND domains such as product and process and NI were completed, totaling 44 points, when the maximum score was reached. To assess the internal consistency of the instrument with three domains, Cronbach's alpha (0.691) was assessed, which was considered acceptable. For statistical analysis, a database was created in a Microsoft Office® Excel spreadsheet, in which data were transcribed for subsequent analysis in Statistical Package for the Social Science version 18. Variables were presented with absolute and relative frequencies, mean and standard deviation, or median and interquartile range. The Mann-Whitney comparison test and chi-square test were used.

All ethical and legal standards for the development of research with human beings were considered[15], with the project being registered with CAEE (*Certificado de Apresentação para Apreciação Ética* – Certificate of Presentation for Ethical Consideration) 85664217.1.0000.5335 and approved by the Research Ethics Committee under Opinion 2.600.376.

RESULTS

A total of 147 electronic medical records of patients admitted to adult ICUs were assessed. The ICU with the highest number of medical records analyzed was the cardiology ICU, as it has clinical and surgical segmentation, as shown in Table 1↗.

Table 2↗ shows the expression of Q-DIO domains in relation to the medical records assessed. The highest score in the ND domain as a process was evidenced in the cardiology ICU (4.17 + 2.72). In the ND as a product domain, the best score was from the general ICU (15.71 + 0.64). Regarding the NI domain, the records made by nurses from the cardiology ICU presented, on average, the best score (5.37 + 0.86). There was no statistically significant difference between the records when compared to ICUs.

Regarding ND as a process, a stage in which nursing history is assessed, a lack of data was observed such as the reason for hospital admission of patients, in addition to current illness, social aspects, vital signs and conduct. In the ND domain as a product in which ND selection and its relationship with signs and symptoms described in nursing evolution is assessed, a minimum of 2 and a maximum of 5 NDs were identified for each patient.

The records analyzed from the neurological and oncological ICUs were those that presented the lowest percentages of records with signs and symptoms in accordance with the ND (Figure 1↗).

Figure 2↗ shows the ICUs and the respective percentages of records with nursing prescriptions in line with the ND listed for patients, with emphasis on the general ICU with the highest percentage of electronic records of NI in accordance with ND.

DISCUSSION

This study assessed electronic nursing record quality in ICUs of different specialties. Nursing records in electronic medical records are relevant in communication between different professionals involved in the care process, in addition to providing legal support to nursing professionals. It also promotes continuity of care, as it subsidizes interventions aimed at achieving certain results. In ICUs, patients present numerous clinical manifestations that vary in degrees of complexity, diagnostic accuracy becomes relevant as it provides safety and quality of care, contributing to decisive, focused and effective decisions in patient care[10-16].

When analyzing ND as a process, the data that guide the assessment of this domain in Q-DIO are collected from nursing history, which is in computerized system with most questions with answers in the form of a checklist. In this study, the records assessed present scores below those expected in ND as a process, as the maximum score for this domain in Q-DIO is 22 points and the mean score of the analyzed records reached 3.49 (± 1.72). This result may be due to the lack of completion of data related to patients' social, emotional and spiritual status, hobbies, and leisure activities, which were also less recorded items in the medical records analyzed. A study that assessed nursing history quality carried out by intensive care nurses in 234 medical records identified 57.7% of medical records with nursing history and, of these, only 26% were complete and, for the most part, did not contain data related to psychosocial aspects[16]. Another study assessed NI carried out upon patient admission to the ICU and identified prioritization of interventions to address patients' physiological and safety dysfunctions, and a low number related to psychosocial needs[17]. Such findings reinforce the prioritization of recording data related to the pathophysiological aspects of patients in the ICU.

Nursing history as the first step of NP is essential to identify patients' general needs, the accuracy of ND upon admission, development of individualized care and continuity of patient care. It is important to mention that some patients are admitted to the ICU in serious condition, coming from sectors such as emergency or surgical wards and, sometimes, it can cause a delay or absence of a complete nursing history in the first 24 hours of hospital admission. Another aspect to highlight is that critically ill patients, when demanding complex care, require adequate professional staffing so that nursing care systematization and NP execution occur safely and continuously. In this context, it is not uncommon for excessive workload in intensive care to be associated with staffing not in line with legislation, or with minimum numbers, employee turnover, high workload[18].

Resolution of the Collegiate Board of Directors (RDC) 26/2012 of Brazilian National Health Regulatory Agency (ANVISA – Agência Nacional de Vigilância Sanitária)[19] established the minimum requirements for the operation of ICUs, with one nurse for every ten beds and one nursing technician for every two patients. COFEN in its Resolution 543/2017[20], in order to ensure nursing care quality, updated and defined parameters for nursing sizing, which relates the proportion of professionals per patient and nursing hours provided in care, depending on patients' degree of dependence. A study that aimed to size the nursing staff in an adult ICU, with an occupancy rate of 97.2%, in accordance with the aforementioned Resolution[18], and compare it with the real size staff, identified that there was a significant shortage of nurses (33.7% less). Undersizing can contribute to NP becoming fragile, fragmented and perceived by nurses as a bureaucratic routine that reduces time spent at the bedside and contributes to a mechanized model of ND and NI. It is known that the relationship between the number of patients for each nursing professional is associated with more comprehensive clinical assessments and better sensitivity of results to nursing care[19].

In the NI domain, the mean score of the records analyzed was 5.06 (± 0.94) and, among the ICUs, NI records in medical records of patients in the cardiology ICU presented the best score in the NI domain, reaching 5.37 (± 0.86) out of a total of 6 points. In this Q-DIO domain, interventions are assessed whether they are clearly recorded, whether they have an effect on the etiology and whether they are recorded correctly (what was carried out, how, how often and by whom).

The electronic record of ND and NI in the computerized system of the same institution where the data for this study were collected was the subject of another study carried out[21], showing that 49% of nurses expressed some degree of difficulty when they need to modify or cancel an NI. However, in this study, the application of Q-DIO showed a mean score close to the maximum value, indicating that intervention records were correctly carried out, which suggests that the difficulties encountered previously seem to be related to the complexity of the computerized system.

Another study that assessed nurses' knowledge and their attitude towards advanced NP, ND, NI, nursing outcome quality and patient characteristics through Q-DIO showed a strong relationship in the quality of these records based on NANDA, NIC and NOC, i.e., the more precise the ND, the more effective the NI and the better the patients' outcome[22]. It also highlights the relationship between nurses' knowledge regarding using standardized language, advanced NP and ND quality and accuracy[22].

ND analysis as a product showed the highest score in the study in the Q-DIO domains, since ND are based on the NANDA-I taxonomy. When nursing developments were analyzed with subjective and objective data, to verify whether the NDs presented defining characteristics

(signs and symptoms) compatible with the recorded data, variability was identified between the ICUs, with the cardiological ICU having the highest proportion of signs and symptoms in line with the listed ND and the neurological ICU having the lowest. A study that analyzed NANDA-I taxonomy use through software showed that 83.7% of NDs were in accordance with patients' initial assessment records and the NANDA-I classification[23]. However, the same study showed variability when assessing the correct identification of results and NI, with 58% of nursing outcomes and 32% of NI correctly recorded[23].

These data demonstrate that for quality records, knowledge and familiarity with standardized language are essential for preparing an accurate ND and, consequently, defining the results to be obtained and necessary actions.

The total mean for the NI domain was closer to the maximum score. The computerized system for records at the institution uses NIC taxonomy and care actions are clearly described (what, how, frequency), checked and signed electronically. It is known that data structuring methods used for nursing records can have different impacts on records, and SLP use increases NI prescriptions and results[24].

However, weaknesses were found when analyzing the relationship between NI and the etiologies of ND. Some nursing prescriptions contained actions that were not related to ND, but to care routines. A study on NP application by nurses in the hospital environment demonstrated that although many nurses understand NP as a scientific methodology to systematize care, they still have difficulties in carrying it out in an integrated manner, making it mandatory and procedural[24]. It is also mentioned nurses' negligence in not updating care plan, in which NI is not always in accordance with ND, or these are out of date.

The agreement between nursing prescriptions and patients' care needs, recorded in medical records, was analyzed in a study that investigated the correlation between the professional profile of nurses and the agreement of nursing prescriptions and showed that 75% of prescriptions met the mapped care needs[26]. However, upon hospital admission and discharge, 35% and 32.3% of nursing prescriptions, respectively, did not present items related to needs[26]. The authors attribute such nonconformities to copies of prescriptions from the previous day, care needs that were partially met or not updated, and prescription items addressing care routines. To carry out certain care actions, inputs are necessary, which must be requested via nursing prescription to justify their use. However, it is necessary to review the most appropriate actions for ND and associated materials and, for this, adjustments are necessary in the computerized nursing records system.

Considering the findings of this study, professionals' continuing education stands out as a fundamental strategy to ensure NP execution quality and its computerized recording. Health institutions face major challenges related to developing strategies for the education and

development of their professionals, and even more so for the nursing team, responsible for providing direct care to patients.

Nursing record quality assessment with Q-DIO was carried out before and after an educational action for 270 nurses[27], focused on using NANDA, NIC and NOC, and identified an improvement in record quality after the educational action. Before the action, the quality of nurses' records was, on average, 59.47% and after that it presented a mean of 72.87%. It is inferred that recording using SLP, associated with diverse continuing education strategies, related to clinical reasoning and recording NP steps are important factors for the quality of nurses' recording.

But operational inefficiencies and data coding errors may be present and cause harm to record quality. A study[28] that assessed the functional performance and technical quality of an NP electronic documentation system showed, in performance efficiency analysis, that users wanted software that was faster in response time and data processing. The system should allow nurses to perform daily tasks in a minimum number of steps, avoiding unnecessary rework and facilitating data retrieval.

Implementing electronic health records at the bedside, combined with technological processes, assists nurses in quality, safety and centralization of care, spending more time on individualized patient care[29]. However, having knowledge about ND, but not having a tool that facilitates data insertion into the electronic record, does not guarantee that all data will be transcribed correctly, i.e., a record may present weaknesses in terms of accuracy. It is also necessary to consider the difficulties involved in using software in nurses' daily lives, through the computational competence and digital fluency of this contingent of workers[30].

CONCLUSION

Electronic record quality, referring to the ND and NI identified in the electronic medical records of patients in the ICUs that made up the study, showed the lowest mean score in the ND domain as a process, obtained from the analysis of the record of data collected from patients' nursing history.

The low score in the ND domain as a process was due to failure to collect patients' psychosocial, leisure and hobbies data, inferring that in assessed records there was greater attention to collecting data concerning patients' pathophysiological aspects, perhaps due to the severity of the cases, as the records analyzed correspond to patients' period of stay in the ICU.

The ND domains such as product and NI presented mean scores close to the maximum. Although the scores in these two domains show the quality of records analyzed, it is important to highlight the need to carry out institutional educational actions for nurses aimed at qualifying nursing history data collection to improve clinical reasoning and SLP applicability in nursing records.

Many activities with computerized hospital records systems result in data for patients' electronic medical record, so there is a need for continuous preparation and investment through continuing education actions, for instance, for using technologies, mainly with frontline professionals.

This study, in addition to generating support for nurses' continuing education at the institution, contributes to encouraging new studies that relate nursing record quality with nursing staff sizing as well as to carrying out activities related to SLP and improvements to nursing records in computerized systems.

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CA: Data collection, analysis and interpretation of study data; elaboration and critical review of the intellectual content of the study; approval of the final version of the study to be published; responsible for all stages of the study, ensuring the accuracy or completeness of any part of the study.
AL: Elaboration and revision of the bibliographic intellectual content; assistance with writing, technical editing, language editing; review and approval of the final version of the study to be published, ensuring the accuracy or completeness of any part of the study.
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Table 1 – Distribution of medical records by ICU according to specialty. Porto Alegre, RS, Brazil, 2018.

ICU*	n (%)
Clinical and surgical cardiology	40 (27.2)
General	21 (14.3)
Neurological	20 (13.6)
Oncological	22 (15.0)
Pulmonary	22 (15.0)
Transplant	22 (15.0)
Total	147 (100)

*ICU – Intensive Care Unit.

Table 2 – Score of Q-DIO domains. Porto Alegre, RS, Brazil, 2018.

ICU	Records n (%)	ND Process (0-22 points) (m+sd)	p*	ND Product (0-16 points) (m+sd)	p*	Nursing intervention (0-6 points) (m+sd)	p*
Cardiology	40 (27.21)	4.17 + 2.72	0.09	15.65 + 1.35	0.76	5.37 + 0.86	0.15
Oncological	22 (14.96)	3.04 + 0.99		15.36 + 1.00		4.95 + 0.99	
Pulmonary	22 (14.96)	3.40 + 1.25		15.36 + 1.94		5.09 + 1.06	
Transplant	22 (14.96)	3.40 + 1.53		15.54 + 0.96		4.72 + 1.07	
General	21 (14.28)	3.19 + 0.74		15.71 + 0.64		4.90 + 0.83	
Neurological	20 (13.60)	3.15 + 0.48		15.25 + 0.96		5.10 + 0.78	
Total	147 (100)	3.49 + 1.72		15.50 + 1.22		5.06 + 0.94	

*Mann-Whitney comparison test and chi-square test.

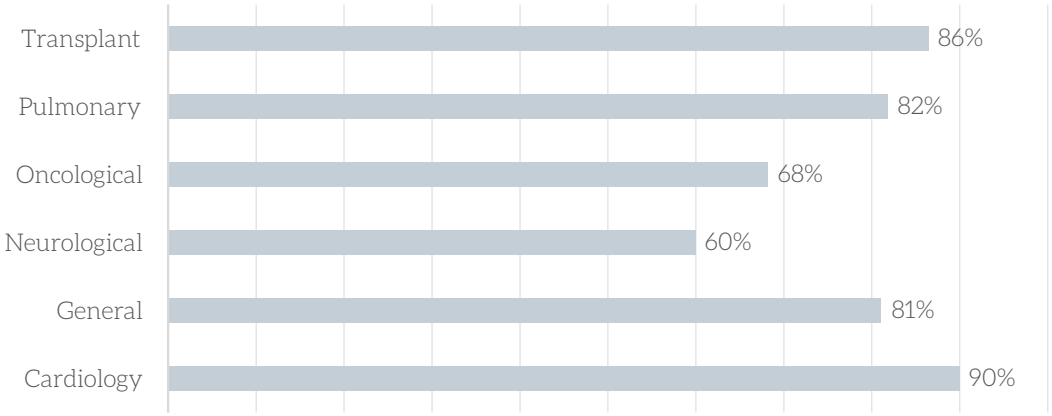

Figure 1 – Electronic nursing records with evidence in accordance with assigned nursing diagnoses. Porto Alegre, RS, Brazil, 2018.

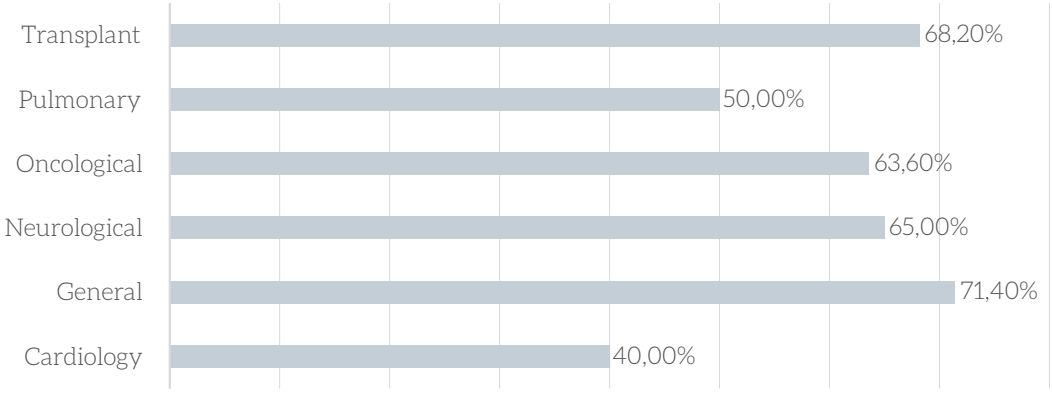

Figure 2 – Electronic records of interventions in accordance with assigned nursing diagnoses. Porto Alegre, RS, Brazil, 2018.