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Evaluation of the electronic record of nursing diagnoses and interventions in a computerized system

Avaliação do registro eletrônico de diagnósticos e intervenções de enfermagem em sistema informatizado

Evaluación del registro electrónico de diagnósticos e intervenciones de enfermería en un sistema informatizado

Carolina Siqueira Amaral[I], Sabine de Azevedo[II], Wagner Longaray de Caldas[III], Emiliane Nogueira de Souza[IV]

Abstract: Objective: to assess the opinion of nurses in regard to the electronic recording of nursing diagnoses and interventions in an information system in the hospital context. **Method:** cross-sectional study, carried out with nurses using data collected *in loco* through a questionnaire. Descriptive statistics were used for data collection. **Results:** 87 nurses were included. From these, 52.9% were satisfied with the electronic records of the Nursing Process (NP), 47.1% believe that registering is easy, 58.6% have some difficulty to identify and select the Nursing Diagnoses (ND), and 60.9% self-evaluate their knowledge about using the NANDA-I taxonomy as regular. The selection, modification, scheduling, or cancellation of interventions were indicated as the most difficult tasks. **Conclusion:** most nurses are satisfied with the electronic records of the NP. They indicate the selection of the ND as the most difficult stage and evaluate their own knowledge about the taxonomy as medium. The participants mentioned difficulties in the stage of nursing interventions. **Descriptors:** Electronic health records; Nursing process; Nursing diagnosis; Patient care planning; Nursing informatics

Resumo: Objetivo: verificar a opinião de enfermeiros acerca do registro eletrônico de diagnósticos e de intervenções de enfermagem em um sistema informatizado no âmbito hospitalar. **Método:** estudo transversal, realizado com enfermeiros, com dados coletados *in loco* mediante questionário. Estatística descritiva foi utilizada para análise de dados. **Resultados:** foram incluídos 87 enfermeiros, dos quais 52,9% estão satisfeitos com o registro eletrônico do Processo de Enfermagem (PE), 47,1% consideram o registro fácil, 58,6% identificam e selecionam os Diagnósticos de Enfermagem (DE) com alguma dificuldade e 60,9% autoavaliam-se com conhecimento regular sobre o uso da taxonomia NANDA-I. A seleção, modificação ou cancelamento e o aprazamento de intervenções foram as dificuldades apontadas. **Conclusão:** a maioria dos enfermeiros está satisfeita com o registro eletrônico do PE, apontam a identificação e seleção de DE como a etapa de maior dificuldade e avaliam-se com conhecimento médio acerca da taxonomia. Foram citadas dificuldades na etapa de intervenções de enfermagem.

[I] Nurse from the Hospital São Francisco from the Santa Casa de Misericórdia de Porto Alegre, RS, Brazil. MS in Nursing at UFCSPA. E-mail: caroamaral@hotmail.com, Orcid: https://orcid.org/0000-0002-5470-7461

II Nurse, MS in Nursing, Universidade Federal de Ciências da Saúde de Porto Alegre (UFCSPA), Porto Alegre, RS, Brazil. E-mail: sabine.azevedo@ufcspa.edu.br, Orcid: https://orcid.org/0000-0002-2559-0735

III Nurse at the Hospital São Francisco from the Santa Casa de Misericórdia de Porto Alegre, RS, Brazil. E-mail: wagcaldas@gmail.com, Orcid: https://orcid.org/0000-0002-0049-3277

IV Nurse, PhD in Health Sciences: Cardiology, at UFRGS. Professor at the Nursing Department at the Universidade Federal de Ciências da Saúde de Porto Alegre (UFCSPA), Porto Alegre, RS, Brazil. E-mail: emilianes@ufcspa.edu.br, Orcid: http://orcid.org/0000-0002-3873-4304

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Descritores: Registros eletrônicos em saúde; Processo de enfermagem; Diagnóstico de enfermagem; Planejamento de assistência ao paciente; Informática em enfermagem

Resumen: **Objetivo:** verificar la opinión de enfermeros sobre el registro electrónico de diagnósticos e intervenciones de enfermería en un sistema informatizado en el ámbito hospitalario. **Método:** Estudio trasversal, realizado con enfermeros y con datos colectados *in loco* por medio de un cuestionario. Se utilizó a la estadística descriptiva en el análisis de los datos. **Resultados:** 87 enfermeros fueron inclusos. 52,9% de ellos están satisfechos con el registro electrónico del Proceso de Enfermería (PE), 47,1% creen que el registro es fácil, 58.6% tienen alguna dificultad en la identificación y elección de los Diagnósticos de Enfermería (DE), y 60,9% evalúan su conocimiento sobre el uso de la taxonomía NANDA-I como regular. La elección, modificación o cancelación, y la selección de datas para intervenciones fueron las dificultades encontradas. **Conclusión:** la mayoría de los enfermeros están satisfechos con el registro electrónico del PE, indican que su etapa más difícil es la identificación y selección de DE, y, según su autoevaluación tienen conocimiento medio con respecto a la taxonomía. Citaron dificultades en el estadio de intervenciones de enfermería.
Descriptores: Registros electrónicos de salud; Proceso de enfermería; Diagnóstico de enfermería; Planificación de atención al paciente; Informática aplicada a la enfermería

Introduction

The Systematization of Nursing Care (SAE) is a work method and a reasoning system that gives nurses the opportunity to recognize the context in which they must act, the conditions of the individual/community, the knowledge, ability, and attitudes to provide care, the existing resources, the cultural perspective, and the expected results.[1] To do so, the Nursing Process (NP) is a methodological instrument for the nurses to describe and offer the necessary care to patients, seeking to induce the reestablishment of their health condition, in the context of the SAE. The NP is the application of knowledge in caring. It guides the nurse through actions that are interrelated through the stages of data collection, nursing diagnosis, planning, implementation, and evaluation. These must be carried out in all environments, public or private, where there is professional nursing care.[2]

Each health institution organizes the records of the stages of the NP according to its resources, personnel size, and care processes. With the advance of information technology in the health sector, different forms of electronic health records have been discussed, developed, and implemented. Hospitals have used information systems for the management of data, including the electronic records of the patient, which includes the information related to the NP. The way or

sequence in which the data is input, associated to aspects of system usability, may influence the time spent, as well as the quantity and quality of the information recorded.[3]

These records may come in free texts or standardized formats, such as checklists, which can use some specific taxonomy or not. In the case of Nursing Diagnoses (ND), the taxonomy from NANDA-I has been the most used in Brazil.[4] In this context, the interventions can be associated with the ND to attend to the needs of care of the patients.

Using technological resources to register the care activities can optimize the time of those involved, thus contributing for a safer care practice and favoring communication between the professionals who work in the services.[5] Nurses must use information and communication technologies (ICTs) to establish the computerized NP in the environment where they provide care, since this process integrates, organizes, and guarantees the continuity of the information within the nursing team, allowing for evaluations of its efficacy and effectiveness and changing it according to the results presented by the patient. These actions generate data for decision making, relating it to direct and indirect care to the patient and to the needs of continued education, research, and nursing management.[6,7]

This integration between ICTs and the NP can have positive effects for nursing. These include the monitoring of the quality of health; the improvement of direct care, results and patient satisfaction; the improvement of the environments for practice; the access at any place and time to the clinical data of the patients; the reduction of the time spent with documentation and clinical records; the development of electronic alert systems to maintain patient safety; among others.[7,9] For this to become a reality, nurses must be adequately trained about the process of making records and the system itself, aiming to improve constantly and to attend the demand of the users, while having channels available to provide feedback. This leads to the following research question: what is the opinion of direct care nurses about the process of recording electronically the stages of the NP on an information system? It is essential to understand whether the nurses are satisfied with the way

in which the records are made and what are the factors that are preventing them from truly exercising their attributions related to the records of the care provided. As a result, the objective of this study was to assess the opinion of nurses in regard to the electronic recording of nursing diagnoses and interventions in an information system in the hospital context.

Method

Study design, setting, and participants

This is a cross-sectional study, carried out in a hospital complex in the South of Brazil, which includes seven hospital units and attends users from the Single Health System and from the supplementary health network. It is also a teaching hospital for institutions of graduation in nursing and other courses in the health field. This study included nurses who had been working for, at least, six months in the institution, in sectors where the stages of the NP, the NDs, and the nursing interventions are registered in the information system. The study excluded resident nurses and nursing professors from health institution who teach their residents in the institution. All workers from the hospitalization and intensive care units received training about the electronic records of the NP, and after they entered in the institution, they carry it out daily in their workplaces.

The management information system made available by the institution is the Philips Tasy®. This system is divided in modules that attend to all sectors. A computerized form of the NP is in the interface of the Tasy® system, called SAE, since 2017. It includes history, NDs, interventions (also generating prescriptions), and nursing progress, all based on the NANDA-I taxonomy.[10] The stages of ND, interventions, and progress must be updated at least once a day for each patient, according with the norms in effect.[2]

The information system of the institution requires information to be input in the following order: once the patient is selected according to bed/sector and name or history/attention number,

the record is started using a logical tree that represents the organic systems. These contain possible answers (signs and symptoms) presented by the patient (defining characteristics) that must be selected for a window with ND to open. After this, one or more NDs and its/their etiology (related factor) are selected, so a nursing prescription can be generated later, point in which a window with all interventions associated with the ND indicated opens. The interventions that attend to the care needs of the patient must be selected. The nursing progress can be carried out before or after this stage, in the form of free text, in the order of S (subjective), O (objective), A (assessment), and C (conduct).

Population and sample

At the time of the research, the number of nurses was of, approximately, 720. The sample was calculated according with this population and considering an 8.2% margin of error and a 90% confidence level it was necessary to include 87 participants. They were selected by convenience during daily visits (in the morning and afternoon) of the researcher to the sectors during the time of the study. A minimal number of two participants per sector was defined for the sample.

Variables

For this stage, a specific questionnaire was elaborated by the researchers. It included variables related to sociodemographic data, such as sex, age, educational level, time working in the profession, and workplace. To assess the opinion of the nurses, there were questions about general satisfaction, the complexity of the electronic records in regard to the NDs and to interventions, and the self-evaluation of the nurses about the taxonomy being used. All these questions had Likert-type responses. There were also questions about the most difficult stages in regard to managing the data, including the ND and nursing intervention records. The questionnaire was applied *in loco* to the nurses who participated in the study, from March to April 2019.

Data analysis

To analyze the data, a database was elaborated in an Excel spreadsheet. There, the data were transcribed and exported for analysis, which was carried out with the use of the software Statistical Package for the Social Sciences (SPSS) for Windows, version 18, using descriptive statistics. The categorical variables were presented using absolute (n) and relative (%) frequencies. The continuous variables, on the other hand, were presented through means and standard deviation or medians in interquartile ranges.

Ethical aspects

According with Resolution 466/2012 from the National Council of Health, the research project was approved by the Research Ethics Committee of the institution under Opinion No. 2.600.376 (04/16/2018). The Free and Informed Consent Form was written and delivered to the participants before the questionnaire was applied.

Results

The study included 87 nurses, most of whom were female (82.8%) and worked in a clinical hospitalization unit (56.3%). The data is presented in Table 1.

Table 1 - Sociodemographic profile and work of the nurses. Porto Alegre, RS, Brazil, 2019. (n=87)

Variables	n (%)
Age*	35 ±7.38
Female	72 (82.8)
Post-graduation	
Specialist	60 (69.0)
Residency	7 (8.0)
Master's	7 (8.0)
No post-graduation	13 (15.0)
Time working in the institution†	2 (0.75-5)
Workplace	
Hospitalization unit	49 (56.3)
Intensive care unit	31 (35.6)

Other	7 (8.0)

*Data presented as mean ± standard deviation; † Data presented as median (percentile 25-75).

Regarding the satisfaction of the nurse in the process of recording the NP stages in the SAE interface of the information system, 46 of them (52.9%) were satisfied with the process of making the records (Image 1).

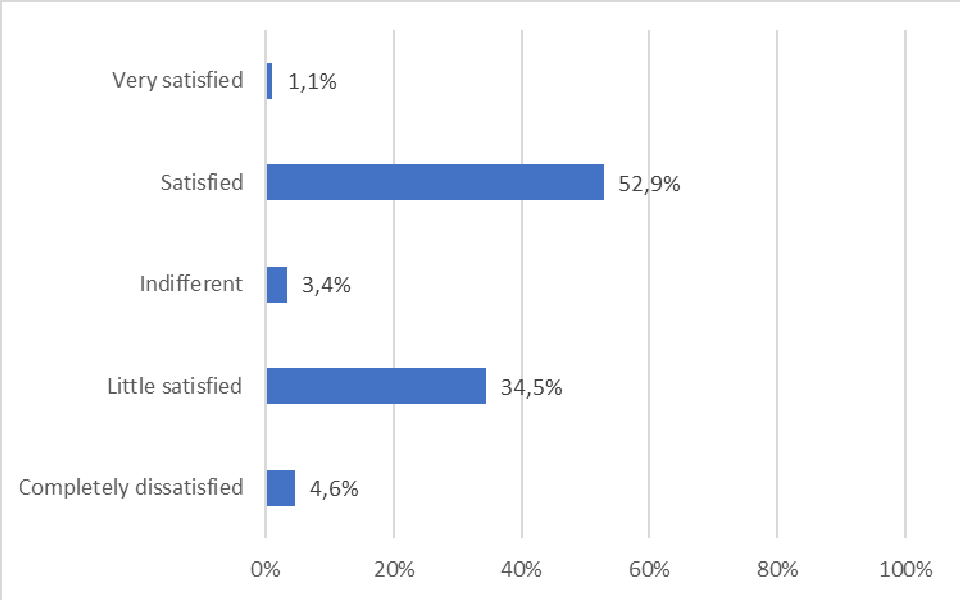

Figure 1 - Satisfaction of the nurses with the register of nursing records on the information system.

Regarding the complexity of recording the NP on the information system, Figure 2 shows that most nurses believe that the process is easy (41 - 47.1%) (Figure 2).

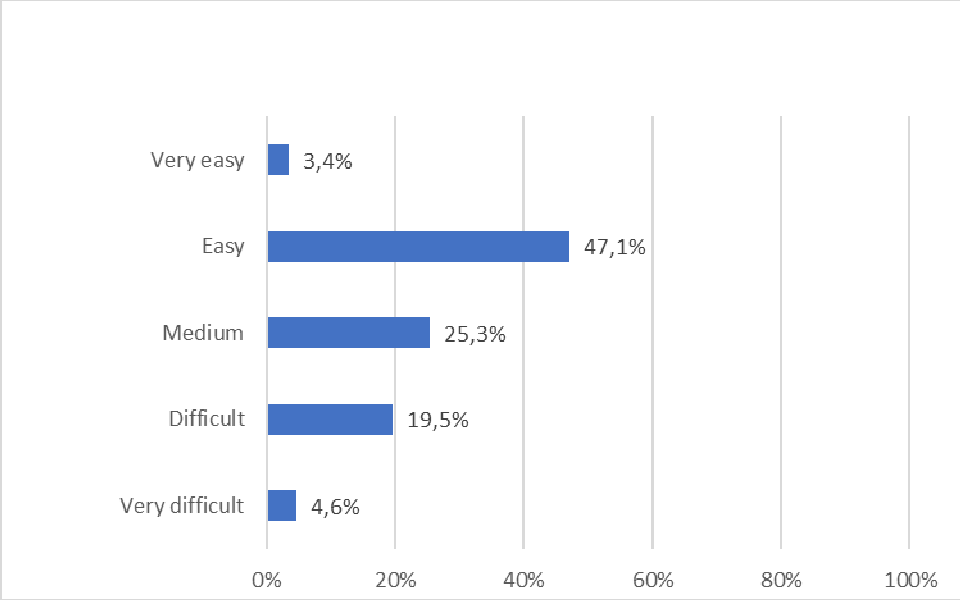

Figure 2 - Complexity of making NP records on the information system according to the nurses.

Regarding their knowledge of the NANDA-I taxonomy, 53 (60.9%) self-evaluated their knowledge as regular, while 17 (19.5%) said their knowledge was good, 12 (13.8%) that it was low, 4 (4.6%) that it was very good, and 1 (1.1%) stated not to know or remember knowing it.

Regarding the process of selecting NDs on the system, 29 (33.4%) nurses believe that identifying the signs and symptoms on the tree is the most difficult stage, followed by the stage in which they have to select the NDs (22 - 25.3%). Data presented on Table 2.

Table 2 - Most difficult stages for recording the nursing diagnoses on the information system. Porto Alegre, RS, Brazil, 2019

Stages	n (%)
Identifying the signs and symptoms on the system	29 (33.4)
Selecting nursing diagnoses	22 (25.3)
Confirmation	15 (17.2)
Substitution or cancellation	19 (21.8)
Other	2 (2.3)

In regard to the recording of nursing interventions on the information system, 25 (28.7%)

nurses found that changing or cancelling interventions was the most difficult stage. Eight nurses (9.4%) stated that they had no difficulties in recording the interventions. Data presented on Table 3.

Table 3 - Most difficult stages for recording the nursing interventions on the information system. Porto Alegre, RS, Brazil, 2019

Stages	n (%)
Identification	9 (10.3)
Selection	15 (17.2)
Confirmation	7 (8.0)
Changing or cancellation	25 (28.7)
Scheduling	23 (26.4)

Discussion

This study presents an evaluation of the electronic records of the NP in a hospital environment, from the perspective of the nurse. Informatization is a necessity, considering the amount of data generated and the potential it has to improve speed and the storing and accessibility of the information. However, the process that involves it, that is, the way in which the stages of input, selection, and data confirmation are structured, as well as aspects related to the usability of the system and to the training of the professionals, can have an influence over the quality of information. In addition to that, there is also the competence of the worker in exercising clinical reasoning, which is a dynamic process that guides the practice of the nurses and the complex decision making that must be made about the clinical situation of the patient, considering their responses, which need data and knowledge to be interpreted.[6]

There is no doubt that informatizing the NP records brings countless benefits when compared to manual records made in printed forms. However, the professionals responsible must understand well the structure of data input, as well as the associations that can be made in the system, to generate the most complete and reliable record possible for the patient at a specific moment. The association between this knowledge, the working load and the competence of the

workers in the recording of work processes (which includes stages based on a taxonomy) can generate more or less satisfaction. Getting to know the factors that contribute for a better or worse perception about certain work processes contributes to continuously improve the environment of the organization.

When the nurses were asked about their level of satisfaction with the need to make electronic NP records, less than half gave a positive response. The others showed indifference or some degree of dissatisfaction. Although there is no consensus about the contentment in regard to nursing work in literature, it is believed that satisfaction can be expressed by the perception that a need was attended.[11] One study that attempted to evaluate the usability and the difficulties in the use of electronic records corroborates this data, since the electronic records are resources that are a daily part of the routine of health services and many nurses still feel insecure using it or need help to execute basic and routine commands.[12] The optimized use of electronic patient records are associated with the idea of attending a need and with the acceptance of the system, as well as with the time necessary to record the data.

Regarding the complexity of making a record on the information system, most nurses consider it to be easy. One fourth of the sample believe that making these records is difficult or very difficult. This data shows that it is necessary to give support for the workers to understand the system and to find the shortcomings in usability or define features that could be improved. These can be identified via contact with the nurses and with the information technology sector. There is a lack of continued education about the electronic records, informing users about their updates and improvements, as well as a lack of spaces for the workers to contribute and suggest improvement or report shortcomings.

The use of a standardized language system, such as NANDA-I, for the ND records, may increase the quality of the records. For that, the workers must understand the reasoning structure of its use, in addition to its conceptual framework. In this study, most nurses self-evaluated as having a

medium knowledge about the taxonomy. This aspect may have been influenced by earlier knowledge, which may have been acquired during the graduation or in the institution itself, when the electronic records started being used. For the workers who had no prior experience with taxonomies during their graduation, it is more difficult to develop the clinical reasoning associated with a standardized language, and thus, their knowledge is built with practice. Nurses who learned what NP taxonomies are for and how to use them during their formation were more familiar with the terms, but their use in information systems, which vary depending on the institution, can be a bit disconcerting.[13]

During graduation, it is adequate to make different forms of NP information records NP accessible to the students, enabling them to have critical thoughts about the structuring of the data.[14] Consolidating the execution and the records of the nursing process depends on several factors, among which previous knowledge about the objective and the use the professional makes of this knowledge stand out.[15] If the nurses do not understand the organization structure properly, the use of said structure may become an obstacle, requiring them to spend more time making records of questionable accuracy.

Regarding the process of ND identification and selection, most nurses indicated the identification of signs and symptoms as the most difficult stage, followed by the selection of NDs. Among the factors that contribute to this, there are different ways to input, select, and confirm the data on the information system was mentioned. The modelling tools used to develop specific software for the informatization of SAE represent the way in which the system will execute its function. They are also a guide to understand the flow of information and direct the construction, to improve the quality of product and of the process. It is necessary to consider an information flow that facilitates the use and understanding of the system and the communication of the team and test it with the users themselves.[16]

Researches developed to examine the use of electronic records have found some problems in

the relationship between man and machine, highlighting the input of data into the system, the lack of man/machine feedback in this stage, the systems that do not adapt to the hardware, browsing problems, the excess of information on the screen or the presence of information that is irrelevant to the practice, thus overloading the documentation and triggering resistance to the use of the system.[1718] In addition to the issues that are pertinent to the information system, there are other possible factors that make SAE more difficult, including the lack of knowledge, the lack of training provided by the health institution, role confusion, lack of credibility of the nursing prescriptions, not to mention the lack of well-defined organizational priorities.[5]

It is important to mention that continued education actions at work are necessary, in addition to encouragement for the professional to seek to update their knowledge in the field. Examples of actions that can develop the clinical reasoning associated with the use of taxonomies include: the discussions of clinical cases, in which one or more nurses present the case and discuss about the priority ND, and the nursing interventions. Different resources are used in clinical case sessions. One example is the presentation of the case itself, followed by a survey via application in which everyone can take part using their phones, and to discuss the result at the end.

In regard to the records of the nursing interventions that will generate the prescription, most nurses indicate some type of difficulty. Among these are the stages of selection, scheduling, and changing or cancelling of the health care actions. These difficulties can lead to unnecessary or duplicated actions, or even to actions that are incoherent with regard to the needs of the patients, considering the time available to the nurse who is making the records and their understanding of the structure of the system and of the relevance of a quality record. Considering that the nurses record the health care provided daily, it is believed that they can provide the solution to these issues.[20] One possibility is the creation of groups, formed by workers from the frontlines of the institution, to give support to the IT sector, in order to reassess the information processes.

Although literature reports positive results of the use of technological tools in the health

care processes, the results of this study agrees with data that indicate that the formation of nurses must address information systems and standardized language systems to record the professional care and the educational strategies in the service, targeted at nurses and providing them with a better understanding of technological tools.[21] From an operational point of view, there is much room for improvement, considering that the computerized NP brings agility to the search for information about patients through its clear and organized records, contributing for an integrative communication among the workers.[21]

It is known that when an action of care is not registered, it is like it did not happen. Furthermore, adequate records reflect the quality of the assistance provided. It also stands out that the use of technologies in the environment of hospitals seeks to generate a constant communication about the care offered, [22], promoting the integration of the conduct carried out by the team to facilitate their constant implementation.[23]

Another aspect that may influence the quality of the records is the sizing of the personnel, since the workload can generate superficial records, whose focus is on spending as much time as possible in this task. This factor may have influenced the results of the study (limitations), since the participants accepted to participate in the research during their work hours. Other factors related to the process of the electronic records of NDs may have been omitted due to the short time spent filling in the questionnaire. The organization of the work environment, the personal relations and the stance of management contribute for the variety of factors that influence professional behavior and perception.

Conclusion

Most nurses are satisfied with making electronic NP records on an information system and believes that doing so is easy. However, they indicate that identifying and selecting the signs and symptoms in the system is the most difficult stage of its use, followed by the stage of ND definition.

Most nurses self-assessed their knowledge about the NANDA-I taxonomy as regular. The most difficult stages in the register of nursing interventions were changing or cancelling and scheduling. This shines a light on the need for continuous education strategies and to give support to the electronic recording of the different stages of the NP in the institution, as well as maps potential improvements to the system.

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Corresponding author:

Sabine de Azevedo
E-mail: sabine.azevedo@ufcspa.edu.br
Endereço: Rua Miraguaí, 505 / Apto 214D / Santa Cruz do Sul – RS CEP: 96835-230

Authorship contribution

1 – Carolina Siqueira Amaral
Conception of the study/research, data interpretation and/or analysis, final revision with critical and intellectual participation in the manuscript.

2 – Sabine de Azevedo
Data interpretation and/or analysis, final revision with critical and intellectual participation in the manuscript.

3 – Wagner Longaray de Caldas
Data collection, interpretation and/or analysis, final revision with critical and intellectual participation in the manuscript.

4 – Emiliane Nogueira de Souza
Conception of the study/research, data interpretation and/or analysis, final revision with critical and intellectual participation in the manuscript.

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