ELECTRONIC HEALTH RECORDS: EVALUATION OF USABILITY BY THE NURSING TEAM*

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ABSTRACT: This work aimed to evaluate the usability and the difficulties met by 99 nursing professionals using electronic health records. It is exploratory quantitative research, based on data collected in July – November 2013. The results show that 71% of the auxiliary nurses/nursing technicians and 70% of the nurses had not received specific training; 56% of the team, who stated that they had not received training experienced difficulty in using the system. Among the characteristics of usability of the electronic health record evaluated, suitability to the task stood out positively, while suitability to learning stood out negatively. The system evaluated, therefore, in spite of the advances arising from it, is still presented as complex to the user who has not received training, in spite of its having a consistent and interactive interface.
DESCRIPTORS: Nursing; Computerized medical record systems; Evaluation.

PRONTUÁRIO ELETRÔNICO DO PACIENTE: AVALIAÇÃO DE USABILIDADE PELA EQUIPE DE ENFERMAGEM

RESUMO: O objetivo deste trabalho foi avaliar a usabilidade e as dificuldades encontradas por 99 profissionais de enfermagem no manuseio de prontuário eletrônico do paciente. Pesquisa exploratória quantitativa a partir da coleta de dados no período de julho a novembro de 2013. Os resultados demostram que 71% dos auxiliares/técnicos e 70% dos enfermeiros não receberam treinamento específico; sendo que 56% da equipe, que respondeu não ter Received treinamento, apresenta dificuldade no uso. Dentre as características avaliadas de usabilidade do prontuário eletrônico do paciente destacam-se positivamente a adequação à tarefa e negativamente à adequação ao aprendizado. Portanto, o sistema avaliado, apesar dos avanços advindos, ainda se apresenta complexo para o usuário que não recebeu treinamento, apesar de possuir interface consistente e interativa.
DESCRITORES: Enfermagem; Sistemas computadorizados de registros médicos; Avaliação.

PRONTUARIO ELECTRÓNICO DEL PACIENTE: EVALUACIÓN DE USABILIDAD POR EL EQUIPO DE ENFERMERÍA

RESUMEN: El objetivo de este trabajo fue evaluar la usabilidad y las dificultades halladas por 99 profesionales de enfermería en el manoseo de prontuario electrónico del paciente. Investigación exploratoria cuantitativa hecha por medio de la obtención de datos en el periodo de julio a noviembre de 2013. Los resultados apuntan que 71% de los auxiliares/técnicos y 70% de los enfermeros no tuvieron entrenamiento específico; siendo que 56% del equipo, que contestó no tener entrenamiento, presenta dificultad en el uso. Entre las características evaluadas de usabilidad del prontuario electrónico del paciente se destacan positivamente la adecuación a la tarea y, negativamente, la adecuación al aprendizaje. Por lo tanto, el sistema evaluado, a pesar de los avances, todavía se presenta complejo para el usuario que no tuvo entrenamiento, a pesar de poseir interfaz consistente e interactiva.
DESCRIPTORES: Enfermería; Sistemas computadorizados de registros médicos; Evaluación.

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INTRODUCTION

The electronic information and records systems appeared in hospitals and health networks in the mid-1960s, aiming to facilitate the care records, developing into a systematization not only of managerial data, but also those referent to care for the patients[1].

The electronic health record (EHR) records data on health and illness which are essential for communication between the multidisciplinary team and the patient, guaranteeing not only the history of the process, but also the safety and the management of the health organizations[2]. This being the case, the EHR must be understood as "the electronic structure for maintaining information on the health status and care received by an individual over his entire life"[3:213].

Nursing is an essential part in the development and operationalization of the EHR, due to its active participation in the patients' health records based on specific functions[4].

The EHR constitutes an alternative used by nursing for recording its care activities, this being included in the Law of Exercising of Professional Nursing – COFEN[5]. The eighth article indicates the requirement to use computing resources for planning actions, in accordance with the competences of each professional nursing group, as well as the necessary preparation for the use of this resource.

Computing resources have been used as an alternative in supporting the development of the Nursing Process (NP), making it possible to integrate this in a logical structure of data, formation and knowledge for systematized decision-making in care[6].

The integration of the NP into the EHR constitutes one of the benefits arising from the informatization of nursing care, selecting and inserting the patient's data, in accordance with the function structure implemented in the software, providing suggestions for diagnoses, making it possible to evidence the interventions to be implemented by the nursing staff, resulting in prescriptions for the care[7].

The evaluation of the quality of the Information System (IS) is defined as the quality in use, a vision of the condition of the product, used in specific environments in context, measuring the extent to which the users can achieve their objectives[8].

One of these strategies for evaluating the quality of software products and IS is usability. For Cybis, usability is defined as the quality, which characterizes the use of these programs and applications, while for Nielsen, it refers to the speed with which the users learned to use something, their efficiency in using it, their remembering the commands, and whether they like to use a particular resource[9-10].

In the evaluation of the usability, users are observed and interviewed, feedback thus being obtained regarding the product in question. For this, tests and questionnaires may be adopted with the direct or indirect participation of these users[11-12], which determine the capacity and involvement of the people who make use of computational tools, making it possible to determine the use in a timely manner and with high levels of satisfaction[13].

In the light of this context, the question raised by this study is: "Is it possible, based on an evaluation of the electronic health records by the nursing professionals, to identify usability problems?".

This study, therefore, aims to evaluate the quality based on usability criteria and the nursing professionals' difficulties in using the electronic health records.

METHOD

This study is characterized as descriptive, exploratory, and with a quantitative approach, with the study object here being the specific EHR module for use by the nursing team, integrated into the Tasy® software. This module has various functions, with the "Systematization of Nursing Care (SAE)" and "Patient's Progression/ Anamnesis" being selected, due to being of common access and mandatory for all the classes of nursing professionals.

The study, approved by the Research Ethics Committee under number 290.833/2013, was undertaken in a hospital in the South region of Brazil, in the period July – November 2013.

During the period in which the research was undertaken, 361 nursing professionals were working in the hospital, considering the three

classes. In order to operationalize the study, the sample size was calculated, considering the population of professionals at the time of the evaluation (finite population) and an initial calculation of 50% for the percentage of interest, a confidence level of 95%, and the maximum margin of error of 9%, which was defined by at least 99 professionals, these being 20 nurses and 79 nursing technicians and auxiliary nurses.

As the inclusion criteria, a simple random selection was adopted, randomly selecting 99 professionals from the care units, with the objective of presenting the same probability among those who had worked in the institution for more than one year at the time the study was undertaken. In situations where staff declined to participate, a further selection was undertaken. The random selection is justified as it avoids any bias during the data collection stage.

In the operationalization of the data collection, two instruments were constructed, and initially evaluated in a pilot test involving 10 professionals. The instruments were: [a] characterization of the profile and experience in computing made up of seven variables (number of hours per week using the computer, having undertaken a basic course in computing, editing skills, the most frequent place for using the computer, the tool used most, and the difficulties in using the EHR and the Internet) and [b] a usability test made up of 10 variables (suitability for the task, self-description, controllability, conformity with the user's expectations, tolerance of errors, suitability to individualization and suitability to learning, quantification of the interruption of the environment, time taken for undertaking the test, support for completing the test, and level of tension).

All the instruments followed the model of the ISONORM 9241/10 and its principles of dialogue which evaluate the quality of the software and consider questions regarding usability in the perspective of the user, as well as its ergonomic characteristics, these being: a) suitability to the task when the system assists the user in an effective and efficient conclusion of the task; b) self-description is when each step of the dialogue is immediately understandable through the system's response or is explained, upon request, to the user; c) controllability is when the user can initiate and control the direction and pace of the interaction until the objective has been achieved; d) conformity with the user's expectations when the system is consistent and corresponds to the user's characteristics; e) tolerance for error is when the result expected can be obtained with little or no corrective action from the user; f) suitability to individualization is when the system is capable of individualization and the interface can be modified to adapt to the task's needs, and individual preferences and skills of the user; g) suitability to the learning is when the system supports and guides the user in learning to use it[14].

The test was undertaken individually with each participant in the workplace, when each participant completed the tasks in accordance with the simulated situation, with the aim of evaluating the product's usability.

The evaluation of the pilot test's results, as well as of the study itself, occurred through reading the responses, definition of the relevant responses with contribution from different components of the context and application of the Likert scale of agreement, with closed responses made available on a weighting scale which varied from 2 to -2, going from "completely agree" (weight 2); "agree" (weight 1); "maybe" (weight 0); "disagree" (weight -1) and "completely disagree" (weight -2), and thus obtaining maximum values for each question between -40 and 40 points (nurses class) and -158 and 158 points (nursing technicians and auxiliary nurses class).

The study's results were systematized in an electronic spreadsheet, and processed using the SPSS statistical package, version 13.0. The results were analyzed with a conventional level of significance of $p < \text{or} = 0.05$.

RESULTS

Based on the results, 52% (n=41) of the auxiliary nurses and nursing technicians were aged between 40 and 59 years old, and 70% (n=14) of the nurses were aged between 20 and 39 years old. It was also observed that 60% (n=47) of the auxiliary nurses and nursing technicians, and 65% (n=13) of the nurses had undertaken basic courses in computing, although 71% (n=56) of the auxiliary nurses and the nursing technicians, and 35% (n=7) of the nurses, stated that they had difficulties in using text editing tools.

In relation to the training for using the EHR,

it was noted that 71% (n=56) of the auxiliary nurses and nursing technicians, and 70% (n=14) of the nurses stated that they had not received this training. It is worth emphasizing that 56% (n=39) of those who stated that they had not received training had difficulties in using the EHR (p=0.015). In relation to the educational level, those who had been educated only to senior high school level (complete) 63% (n=20) stated that they had difficulties; in contrast, 69% (n=22) of those who had higher education stated that they did not have difficulties (p=0.043).

Among those who answered that they had difficulties in using the EHR, 41% (n=41) asked for support while undertaking the test, while of those who stated that they did not have difficulty, 32% (n=31) also requested support (p= 0.003). It is worth highlighting that, in all, 73% (n=72) of the professionals participating in the study requested support (Table 1).

Table 1 – Results of the professional profile and difficulties in using the EHR. Cascavel-PR, 2013

Variables	**Nurses**		**Nursing technicians/auxiliary nurses**
Age range	70% (20 to 39 years old)		52% (40 to 59 years old)
Basic course in computing	65%		60%
Difficulties in editing text	35%		71%
Had not had training	70%		71%
Difficulties in using the EHR	**Yes**	**No**	**Level of significance**
Not had training	56%	44%	p=0,015
Higher education	-	69%	p=0,043
Senior High School	63%	-	p=0,043
Support for the usability test	41%	32%	p=0,003

Regarding the evaluation of usability undertaken by the nurses, it is possible to identify positive sums in the Likert scale of agreement, from 26 and 28 points (maximum positive sum is of 40 points) for the evaluation items of suitability to the task and conformity with the expectations of the user, and negative sums of -13 and -15 points (maximum negative sum is of -40 points) for controllability and suitability to learning, respectively. In the evaluation of usability undertaken by the auxiliary nurses/nursing technicians, positive results were found of 106 and 107 points (maximum positive sum is of 158 points) for suitability to the task and tolerance to error, and negative results of -35 and -57 points (maximum negative sum is of -158 points) for conformity with the user's expectations and suitability to learning (Table 2).

Table 2 – Results of the evaluation of usability by professional class. Cascavel-PR, 2013

ISONORM 9241 Principles	**Questões**	**Class**				
		Nurse		**Nursing Technician/Auxiliary Nurse**		**Negative Accounts**
		Likert scale [-40/40]	**Agree %**	**Likert scale [-158/158]**	**Agree %**	
Suitability to the task	Q1 Q7	26	95%	106	94%	-
Tolerance to error	Q3	-	-	107	96%	-
Conformity with the expectations	Q3 Q13	28	90%	-35	56%	E52: I don't know, because we didn't get training.
Suitability for learning	Q9 Q15	- 15	60%	-57	72%	E13: I have difficulty, it's difficult.
Controllability	Q11	-13	70%	-	-	E10: I think there is a lack of training.

Therefore, the EHR was evaluated positively by both the classes in relation to suitability to the task, and negatively in relation to suitability for learning.

The evaluation regarding possible differences between the professionals from different departments did not present significance.

DISCUSSION

From the results obtained, it was possible to evaluate the usability of the EHR based on the variables selected and related to the nursing team.

Regarding the age of the professionals studied, there was a predominance of young subjects in the nursing class, bearing in mind the characteristic of a new generation of individuals who had begun their professional lives in the Information Age[15].

It is noteworthy that the entire nursing team used the EHR, although for inserting data, they use distinct functions in accordance with the class to which they belonged.

The factors which influenced the use of the EHR without difficulty were training and educational level, as the majority of the professionals who had only been educated to senior high school level and who had not received training stated that they had difficulties in using the EHR.

Regarding having undertaken a basic computing course, the results reflect the position of the nurses in the context of a computerized world, as well as the search for improvement. However, professionals stated that they have difficulty in handling basic tools, such as the text editor, a fact which may impair the performance of professional activities, considering the context of growing dependence on information technology.

This fact is important, as the computing resources can promote the improvement of the quality of the nursing care, considering the reduction of time necessary for making the records, as well as encouraging the development of critical thinking and of investigative reasoning on the part of nurses, promoting clinical discussion within the multidisciplinary team and the search for scientific evidence[16].

Thus, the appropriation of technological resources allows nurses to spend more time in direct patient care, optimizing the work process. In this way, the nurses must be alert to developing abilities and skills for the use of computing technologies[17].

In relation to difficulties using the EHR, the results reinforce a concern, as this resource is being inserted daily in the routine of the health services, and many nurses do not yet feel secure in using it, requiring assistance for accessing basic and routine commands of the EHR. This situation may not contribute to the patient care activities or to the search for quality and efficacy in healthcare.

In this study, the need for assistance in order to work using computing resources came from the absence of systematic training, as approximately 70% of the professionals interviewed stated that they had not had training, evidencing a weakness. One study points to "the close relationship between training for using the EHR and its use without difficulties by the nurses"[15:73]. In another study, it was observed that the nurses lacked sufficient knowledge for using the EHR and applying the NP, which may hinder the insertion of data on the care and the quality of the care[18].

In spite of the concern that the modeling of the EHR should be as suited as possible to its use, if the professionals have not been trained, flaws can occur in the multi-professional communication, and impair the care for the patient. The non-training impedes one of the advantages of adopting EHR from being achieved, that is, greater and better communication between the members of the health team, resulting in improvement in the quality of the care provided, and making it possible to generate knowledge and constant innovation[1].

Therefore, the EHR, in order to be considered an efficient technological resource, must meet the requirements and be the object of training. In addition to this, it must be intuitive, facilitating its use, also facilitating training, which must be gradual, in accordance with the implementation of the system[19-20].

In the evaluation of usability, the EHR presented positive points regarding the suitability to the task, conformity with the user's expectations, and tolerance to error, and negative points relating to the controllability and suitability for learning.

These results indicate that the efficient use of the EHR is also related to the satisfaction with and

acceptation of the system, as well as to the time necessary for recording the data. The presence of alert events is directly related to improving patient care, guiding the following of logical reasoning based on the systematization of the clinical evaluation and of the NP[20-21].

It is important to emphasize that language adopted in the nursing IS is essential for the understanding and description of the care provided; this must be classified, supporting the decision-making for the actions to be taken in relation to the patient in a global way[22].

In relation to the items, which resulted in negative evaluation, the nursing technicians emphasized suitability to the task, controllability and conformity with the user's expectations, as they did not have sufficient ability to go ahead with the proposed tasks, requiring assistance from the researcher.

The user's need to seek basic knowledge in information technology and to receive appropriate training in order to be able to use the EHR system studied efficiently is clear.

FINAL CONSIDERATIONS

This work evaluated the profile of the nursing professionals, the usability, and the difficulty, which these professionals have in using the EHR.

These difficulties are related to lack of knowledge for using the EHR system and specific commands for suitability to the task, which facilitate its use.

The system's complexity, as well as the lack of basic knowledge in computing, may also contribute to increasing the difficulty in using the system.

In discussing regarding the EHR, one must highlight that its implantation and its use involve not only the replacement of paper by electronic means, but changes in old habits and routines and the acquisition of new knowledge, which may be hindered by an attitude of resistance on the part of the users.

The results of this study may serve as support for other public or private hospitals, which use the EHR, which are interested in replicating the study in order to guarantee the quality of the data and care for the patients. Furthermore, it may contribute to studies related to the evaluation of quality and training of users of EHR.

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