Original Article

NEW ELECTRONIC PROTOCOL FOR HOME ENTERAL NUTRITION THERAPY

Criação de protocolo eletrônico para terapia nutricional enteral domiciliar

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ABSTRACT - *Background:* Informatics can help the development of home enteral nutrition therapy (HENT). By using an electronic protocol with an electronic database it is possible to organize, structure and manage, information. ***Aim:*** To develop an electronic protocol for data collection on treatment of patients with home enteral nutrition. ***Method:*** After a review in theoretical material about home enteral nutrition therapy, 1793 data collection items were selected and grouped into nine categories: patient identification, nutritional assessment, dietetics prescription, indications for enteral nutrition, access to enteral nutrition options, composition of enteral nutrition, administration system, complications, and readmission. Was used the Electronic Integrated Computerized Procotols System (SINPE©) to organize that knowledge and the database that attends this research was named Informatized Master Protocol of HENT. The last step was the creation of a specific protocol to collect data by using informations from this database. ***Results***: After installing the program, the system recognizes the user by identifying a pre-defined security authorization and also provides a screen to select a master protocol which the user can access. Items that arrange the specific protocol are contained in the Master Protocol and the information for this protocol are displayed. ***Conclusion:*** It was possible to create an electronic protocol for HENT patients care with safety data based on research in enteral nutrition support.

RESUMO - *Racional:* A utilização de protocolo com base eletrônica de dados contribui para tornar disponível um grande volume de informações organizadas e estruturadas. A informática pode contribuir no desenvolvimento do conhecimento da Terapia Nutricional Enteral Domiciliar (TNED) por intermédio da pesquisa. ***Objetivo:*** Elaborar um protocolo eletrônico para o atendimento de pacientes em TNED. ***Método:*** Após a revisão sobre a TNED em material teórico, foram levantados 1793 subitens e agrupados em nove itens principais: Identificação, Avaliação nutricional, Prescrição dietética, Indicações de nutrição enteral, Vias de acesso para nutrição enteral, Composição da nutrição enteral, Sistema de administração, Complicações e Reinternamentos. Definiu-se com o nome Protocolo Mestre Informatizado de TNED e foi utilizado o Sistema Integrado de Protocolos Eletrônicos (SINPE©) para sua efetivação. A última etapa foi a criação de um protocolo específico a partir do protocolo mestre. Depois de instalado o programa o sistema reconhece o usuário com a identificação de segurança definida pelo tipo de autorização e disponibiliza a tela para seleção do protocolo mestre que o usuário poderá acessar. Os itens que compõe o protocolo específico estão contidos no Protocolo Mestre e as informações referentes a este protocolos são visualizados. ***Conclusão***: Foi possível criar um protocolo eletrônico para o atendimento de pacientes em TNED com dados seguros que contribuem para a pesquisa nesta área.

INTRODUCTION

The development of the digital computers started in the United States and Europe among the Second World War. Its non-military use began in the first years of the fifties. At that same time Medical Informatics was born and computers were integrated to Medicine. Across the development of the interdisciplinary model of treatment – which patient can be attended by different specialties in diverse sectors of the same hospital,

or even in different institutions – it propitiated the integration of different professionals from life and health sciences in an informatized way. Thus, the term medical informatics was created, then progressing to the present biomedical informatics[32].

The computer usage in dietary has its first registers in the decade of 1960. In 1962, the Tulane University was pioneer by researching the usage of computerized technology in the service of food administration[31]. Between 1958 and 1983, more than 400 published references were related to computer usage in food services[11]. Several original articles in nutrition and computation report cost reduction and food waste and data redundancy in the nutrition departments[12]. Those systems personalized care plans or specific worksheets for the practical facility[17,25]. There is limited documentation about them. The advent of Windows operational system (Microsoft Corp, Redmond, WA) in 1990 gave opportunity to develop more specific nutrition software, which allowed data exchange. Nowadays, software companies still update programs that have been successfully used in a great variety of nutrition fields[16].

The integration between nutritional therapy and informatics has also been developing. The emergent call for reducing calculation error in parenteral and enteral solutions, as well as the facility and prescription time reduction, have stimulated the development of several softwares able to improve the efficiency of nutritional therapy teams[4,15,24].

The use of protocols is a common practice in many institutions. They can be developed on paper or by using IT resources. In health care settings it is used to assure a standard and to unify the procedures and information for patients attending. It must be able to store, control and analyze the data, and to facilitate follow-up, besides its contribution for an effective and safer decision-making[6,14,29]. Electronic protocols are useful to reduce errors in data collection, to minimize garbage generation and its relative costs, and also help with multicentric[2] research.

The Integrated System of Electronic Protocols (SINPE©)[22] was developed to aim at the solution of some typical deficiencies found in researches, such as lack of terms standard; data of research that were not used in any other one; difficulties in making multicentric and multidisciplinary[19] research. It allows automatic, instantaneous and fast information. The clinical data structured storage assists its usage. It allows more reliability to the prospective clinical database joining it with the possibility of retrieve and mining information. It also aims the production of reliable high quality scientific studies at lower time[21].

Home assistance is practical and retraces the before Christ era. Although, it was only in the middle of the XIX century that the first systematization of the activities related to nursing service came up. In 1790 the Home Care was set up by social assistants and other professionals at Boston Hospital. This assistance model remains until nowadays and has visits of the multiprofessional teams[3].

In Brazil, the development of home assistance started in the beginning of the XX century, in 1919, with the creation of the Visiting Nurse's Service, in Rio de Janeiro[3]. Home Nutritional Therapy (HNT), as a health attending condition, started to stand out in the 80s. Since then, the tendency of proceeding at home level is rising, involving hospital care, HNT, home enteral nutrition therapy (HENT) and parenteral nutrition therapy.

It is important to place the patients' registers in HNT, so this information allows to coordinate the sanitary resources and to improve the assistance[23]. Though daily practice has been increasing, data and information are still not known. Thus the necessity of creating updated resources to manipulate and process information is justified.

The aim of this study is to elaborate an electronic protocol to attend patients in home enteral nutritional therapy.

METHOD

The construction of the electronic protocol in HENT had been divided in three major steps.

On the first stage, a literature review about home enteral nutritional therapy was done. After that, 1793 data collection items were selected and grouped into nine categories (Figure 1). Thereby, it was possible to create theoretical database of home enteral nutritional therapy.

Protocol categories	Protocol data collecting items
Patient identification	236
Nutritional Evaluation	1340
Dietary prescription	34
Enteral nutrition indications	60
Enteral nutrition for types of access	9
Composition of enteral nutrition	70
Administration System	10
Complications	18
Readmission	6

FIGURE 1 – Main items of the master protocol

The second stage was about transferring theoretical base to the general electronic protocol form, which contains all the data from the base. This protocol was named Home Enteral Nutritional Therapy Informatized Master Protocol. It was included in the Electronic Protocol of Integrated System (SINPE©), that already exists, and was programed in C# (C-Sharp) language and developed by using Microsoft® dotNET platform and Access® database system; this approach allows the distribution of data by magnetic ways (CD-ROM or pen-drive), but the system used also offers

Internet connection to MS-SQL Server databases.

The master protocol is based on a knowledge tree, with metadata placed in a hierarchical model, which were divided in items and sub items, and distributed among different categories, which define the organization of the theoretical base subject. As shown in Figure 2, the positive sign (+) on the left of the item, means that it has sons (sub items) and can be expanded.
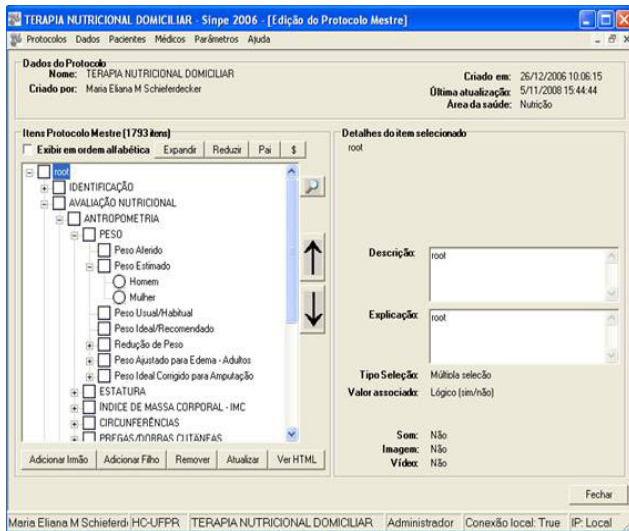

FIGURE 2 – Hierarchical protocol of home nutritional attending

The third and last stage was the creation of a specific protocol from the master protocol. It allows the selection of the items that are relevant for the research aimed to be accomplished. To create the items of the specific protocols, a command of directed arrows to the right was used. After selecting the interesting items and sub items contained in the master protocol, once clicked the right arrow direction, it leads the selection of the items to the board on the right, which arranges the specific protocol (Figure 3). In present study all items were used, but this approach, to organize data collecting items into a master (knowledge) and many specific (research) protocols, allows a new study can be performed with different amounts of specific items.

RESULTS

After installing the program through a SINPE© CD-ROM, to use it is simple: choose the connection type (local, by MS-Access or remote/ Internet by MS-SQL Server); identify user (id + password) and Institution; choose the Master Protocol. The system recognizes the user with the security identification defined by the type of authorization (owner, simple user) and then leaves a screen available for the master protocol selection so the user can access the database (Figure 4).
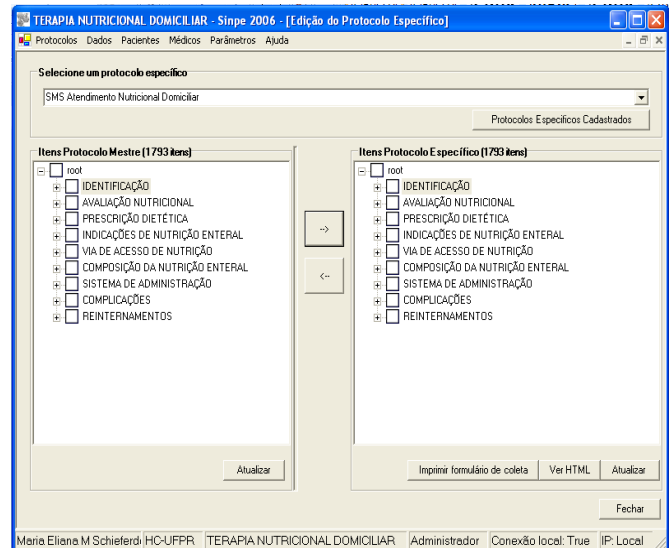

FIGURE 3 –Specific protocols of home nutritional attending from Health Municipal Secretary of Curitiba, PR, Brazil
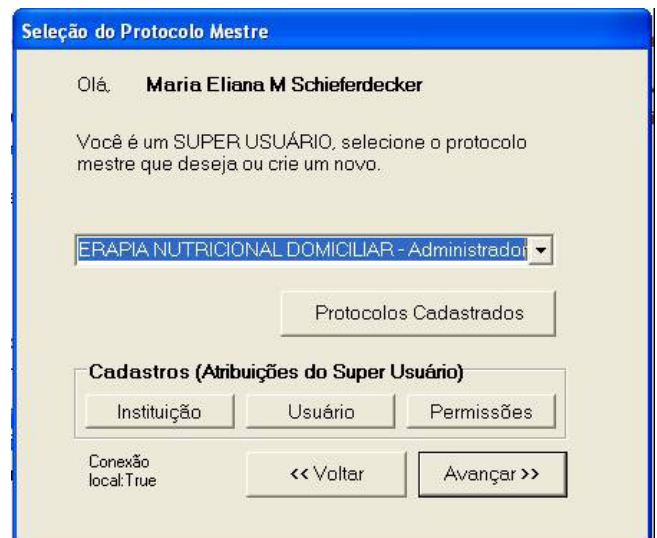

FIGURE 4 – Selection of the master protocol

In the tool bar, on the superior part of the main screen, there is a menu with the following tasks: to make protocols, data enter, manage patients, manage doctors, manage parameters and obtain some help. By selecting the option "Protocols", the administrator user will have access to the protocols, master and specifics.

When the specific protocol is selected, the categories that arrange it are presented. By clicking the "+" sign next to the chosen category, there will be an expansion of this item and the sub items will open, as shown in Figure 5.
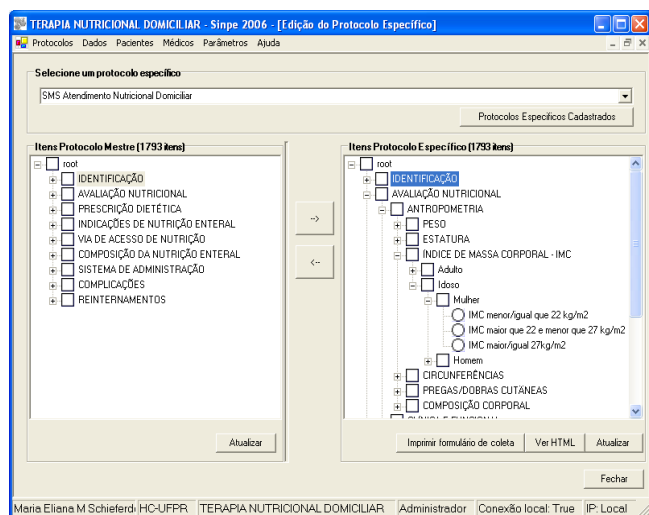
FIGURE 5 – Edition of the specific protocol

The items that arrange the specific protocol are in the master protocol and in the protocol whose information are visualized above the dialogue boxes. On the left there is the name and the quantity of items of the master protocol and on the right there is the indication of specific protocol and its respective number of items. In this approach the master protocol organize knowledge and the specific protocols are used to collect data items, leading to a knowledge management on clinical researches. Other items of the main menu were not studied in this stage of work.

DISCUSSION

The standardization in nutritional therapy is important for treatment and for the definition of the team member's performance. That became possible in Brazil after the publication of the SVS/MS Law number 337 in 1999, which was substituted by the Resolution 63 in 2000 from Health Ministry which holds the principle of the enteral nutritional therapy[9]. These principles command the necessity of having protocols in every nutritional therapy service. Besides the standardization that defines the professionals actions, it is possible to establish the indicators that control its quality.

In Adam's[1] review, he analyses the benefits that a protocol can bring for supplying nutritional support, the possibility to improve the quality of life is reinforced, so it guarantees good practices, allowing the patient to be treated in his specific problem with a focus on the answer, and also supplying database for audition, researches and elaboration of guidelines for health approach.

Certainly, the transition from paper to electronic protocols brings great advantages in the reduction of the physical space needed to archive the documents[14,20]; the number of people needed to archive; the costs in long term[26]; the facility for storage and later capture of the clinical data; more reliability in the collected data[14,27]; the storage of data; the production of studies in large series with reliable information. That way, the guideline's productions are substantiated[10,30].

Despite the development of the nutrition informatics was begun in the decade of 1960[8], the benefits that it provides are still low. A study of American Dietetic Association's (ADA's) realized in 2007, with an inquiry involving 55.063 e-mails and a percentage of answers equals 20,4%, showed that: the nutritionists use basic technology (e-mail and internet) and the concept of nutrition and informatics is still new and not well understood in the area. However, the expressive number of answers (11 000) indicated a great interest in informatics into nutrition[4,20].

One of the crucial points for the effectiveness of the electronic registers – the security of the stored data – has already been overcome. Nowadays there is a detailed standardization about this subject in Brazil, whose objective is protecting the confidentiality of the clinical data[7].

Regarding this subject, SINPE© has a special concern presented in many tools that allow confidentiality and protection of the inserted data. That is evidenced by the differentiation between users, types of granted permission to each one, as well as the impossibility to change the protocol, once the collection is done.

The control and standardization of the protocol data allow prospective and longitudinal studies[13]. The number of patient in HENT is increasing all over the world. Traditionally, the professionals attend these patients individually and the details of the nutritional management are kept in registers of the patient's medical file.

While elaborating the electronic protocol, 1793 data collecting items were created and grouped in nine categories. It was given more importance to all the indicators for nutritional evaluation, prescription and follow-up of HENT.

It has been found in the scientific literature an only study published in 2008 as abstract of the "23rd Annual Congress of the Czech Society for Clinical Nutrition and Intensive Metabolic Care" with the interest in collecting information about the patients who have received HENT and have developed a database. After verifying the current guidelines in administration and patient's follow-up, and the opinion of the nutritionists from the involved hospitals, a database was created by using Microsoft Access 2000™. The developed base had 10 diverse entrance windows. Reports of the social demographic situation, nutritional state, type of nutritional therapy, main diagnostic, main reason for the nutritional therapy and formula used by the patients have been engendered. In 2008, in Australia, the first database was created to obtain information about the patients who received HENT in a health service[28].

The informatization has shown a big reduction of the workload[8,18], which also supports in decision and

can improve the prescription and safety on patient's care.

CONCLUSION

It was possible to create an electronic protocol that organizes knowledge and offers secure data collection over patients in home enteral nutritional therapy, which will contribute for this area. The SINPE© system allows a reliable data collection, analysis and data mining, that will be used in a second stage of this research.

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