Development and validation of software for teaching nursing diagnoses applied to preterm newborns

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Abstract:

This study, part of an ongoing doctoral dissertation, aims to develop an educational software about clinical reasoning to work out nursing diagnoses (ND) of preterm newborns and to validate the content and appearance of this software with experts from informatics, audiovisual and nursing areas. The pedagogical framework of problem posing and Bernardo’s software development methodology were used, divided in four stages: survey of medical records of preterm newborns hospitalized at a neonatal intermediate care unit (NICU) for defining most frequent ND; content validation of the clinical cases to be included in the software; production of the education software; validation of software’s appearance by experts in informatics, audiovisual and nursing. In the first stage, review of 122 medical records of premature newborns assisted at the NICU during 2007 was done. From these results, most frequent diagnoses were selected to be included in the software that will be developed in the next stage. Currently the validation of clinical reasoning to work out nursing diagnoses to be included in the software is being carried out. Validation is being done by a working group of 5 neonatal nursing and/or nursing diagnoses experts. In the third stage the software is being built in Internet environment as we believe it is a communication mean that allows group and people worldwide information exchange. Software validation will be done regarding its appearance by three informatics experts, three audiovisual technicians and twelve nurses (professors and care nurses).

Key words: Computer-assisted Education, Internet, Nursing Diagnoses, Infant Premature, Clinical Reasoning.

1 INTRODUCTION

In neonatal nursing student care for a newborn, that’s strange and fragile and perform clinical nursing assessment. When it comes to premature difficulties are greater, because the trend in developmental care is whose philosophy includes variety of activities to control the environment and individualize the care based on observation of their behavior that hampers the learning of the student, because this need to manipulate the prematuro1.
Thus teaching of semiology, the clinical manifestations of preterm and the development of clinical reasoning for the construction of and hence the nursing process in all its stages becomes difficult in activities in the field is needed for new strategies education\(^1\).

We prepare a proposal as educational software for teaching clinical reasoning applied to the development of nursing diagnoses relevant to the care of newborn preterm infants in neonatal intermediate care unit.

Among references found in the literature to prepare the way of thinking for the formulation of the nursing diagnosis used in this study the reasoning of Risner\(^2\) and taxonomy of North American Nursing Diagnosis Association\(^3\).

We believe that the facilitation of learning of the nursing process in the stage of development of clinical reasoning to nursing diagnosis, the development of software, can help improve the teaching of nursing and assistance to newborns and pre-term his family.

2 OBJECTIVE

Develop an educational software about clinical reasoning to work out nursing diagnoses (ND) of preterm newborns and to validate the content and appearance of this software with experts from informatics, audiovisual and nursing areas.

3 METHODS

The development of software consist of three stages. In the first step we performed a survey of medical records of premature infants hospitalized in neonatal intermediate care unit (NICU) to define the most frequent of the unit. The second phase consisted of collection of real clinical cases of premature infants hospitalized in the NICU, after consent from parents or guardians; adequacy of clinical cases to provide the construction of some of and validation of cases with group of nursing experts in neonatal nursing or nursing diagnosis. The third step is the creation of the software itself.

First stage

The charts used were those of preterm infants hospitalized in the NICU of a tertiary hospital of Ribeirão Preto, reference reference to the tertiary perinatal care in the XIII Regional Health Division of São Paulo state. Have neonatal intensive care unit with 20 beds and intermediate care unit with 24 beds, in addition to the housing assembly.

We chose this unit as a place for data collection as environment where students perform during the stage of neonatal nursing discipline.

The nursing diagnoses were most prevalent in the NICU: Sleep deprivation (83.1%), Risk of Infection (76.3%), Interrupted Family Processes (75.4%), Pain (65.3%), Risk Impaired Skin Integrity (61%), Delay In Growth And Development (52.5%), Risk Of Aspiration (46.6%), Stopped Breastfeeding (65.3%), Temperature Inefficient (61%), Oral Mucosa Impaired (52.5%); Risk Link Parent / Child Changed (46.6%), Risk Of Imbalance In Body Temperature (45.8%), Ineffective Breathing Pattern (44.1%), Standard Inefficient Power The Baby (42.4%), Impaired Spontaneous Ventilation (39%), Protection Ineffective (35.6%), Decreased Intracranial Adaptive Capacity (16.1%), Impaired Skin Integrity (6.8%); Ineffective Clearance of The Airways (2.5%), Constipation (1.7%), Unbalanced Nutrition (0.8%).

Second stage
In setting the stage D.E. that will be part of the software, addressing basic human needs.

From the survey of records held in the previous stage were defined of which were included in clinical cases: Standard Inefficient Power of Babies, Risk of Volume of Liquids Poor, Exchange of Gases Impaired, Disabled Knowledge, Provision for Improved Parenting, Paternity/Impaired Parenting, Stopped Breastfeeding, ineffective breastfeeding, Breastfeeding Effective, Risk linking parents and children affected, Risk To Fatherhood / Parenting Impaired, Risk Behavior of Cluttered Baby, Baby Behavior of Cluttered, Willingness to Increase Behavioral Competence of Babies, Risk of infection, Inefficient Protection, Impaired Skin Integrity, Risk for Impaired Skin Integrity, Impaired Tissue Integrity, risk of aspiration of Inefficient Airway Clearance, Risk of imbalance in body temperature, thermoregulation Inefficient, Delay in Growth and Development, Risk Growth disproportionate, Risk of delays in the development and acute pain.

Third Stage
The third step is the construction of software.
Accordingly, we chose the use of Computer-assisted Instruction to develop software for the purpose of teaching the clinical reasoning to development of nursing diagnoses in the internet environment.

For software development, will use the model proposed by Bernardo which features four stages of development: defining the scope, planning, production and implementation, which facilitates the construction didactically.

Definition of scope
The research, brainstorming the scope and definition are to outline the main objective of the project, organize your content, users define the entities. Establish the purpose of the project, the target audience and theme, the development of an educational software should be prioritario.

The subject of the application addressed in the early software will search its contents based on classic literature references in neonatology, articles published in national and international journals and publications of the Ministry of Health, in addition to our experience. This content will be used by elements of hypertext, media (video or animation sequences), pictures, sound effects and text content only.

Planning
The design goal is to create the full prototype of the project and prepare your schedule execution.

Production
The production is to build the multimedia design and test its operation.

The system consists of a main module of software, divided into six sub-modules of study, one of which is intended for interactive exercises.

It is estimated that to complete navigation between the modules of study, simulations, videos and other resources, necessary load-time equivalent to 4 hours of study.

Specifications
The set of applications consists of a main program and two assistants: a separate application for years and one for the initial system load. The applications are compiled into the executable standard Windows 32 bits. The set of applications is distributed and stored on removable media in standard DVD-R engine and has automatic startup, with copying files to hard drive or assist the installation procedure.
The system also maintains compilation to web format, with possible implementation by the browser compatible with Internet Explorer 8 and Mozilla Fire Fox 2.0.

Development Tools Used

The interactive system is designed for Microsoft Windows environment with software authoring tool for Macromedia Authorware Professional version 7:01.

This tool allows the development of the whole structure of the interactive system and the management of stored data, obtained using the system by students.

To design the interface of data were defined graphics editing tools in the Macromedia Studio 8 package.

To capture and editing of material on video was chosen by Nero Premium 7.0 software that allows conversion of videos to MPEG format with a size standard of 320X280.

For editing of texts outside the software and composition of the initial layout of the project were the tools used in the package of applications Microsoft Office 2007 Professional version.

To convert the files in the PDF format, set up the software Adobe Acrobat Professional version 7.0, with use of protected content.

The system will access the web version with automatic installation of Authorware Web Player plugin, compatible with the browsers Internet Explorer and Mozilla family. The mechanism of the system developed routine waiver of installation.

System Requirements Multimedia

Implementing the software is recommended with a microcomputer compatible with Pentium IV processor or higher, 256 MB of RAM, minimum 20 MB of free hard disk space, device, DVD-R player, operating system Windows XP or Vista, browser for internet and software for reading files in PDF format.

Implementation

The implementation aims to provide the design and use multimedia to oversee its funcionamento.

Validation

Software validation will be done regarding its appearance by three informatics experts, audiovisual technicians and three nurses twelve (care nurses and teachers). At the end of all items and topics / subjects evaluated there will be space for comments and suggestions. The instruments will also include the summative method, known as Likert-type scale and have the following items: quality of the interface - use of space, the screen format, visual appearance and the navigation buttons, time of response - starting the program, use of memory, exchanging screens, links, feedback from simulations, and navigation buttons to exit the program and aesthetic and audio quality - the videos, pictures, the pictures, sound, the animations, phrases and texts.

Will be considered validated if 80% of the evaluators assign concept very good or good in each item of appearance and content assessed

Will not be covered all stages of the implementation phase in this project, because the post-implementation review with the students and the distribution will be developed in further studies

The project was submitted to and approved by the Review Board at the Clinic Hospital of University of São Paulo at Ribeirão Preto.

4 RESULTS

The development of this teaching tool will enable an innovative education on nursing diagnosis applied to newborn pre-term, from the use of the data and methodologies to promote active teaching-learning process and individualize the learning process.
We believe that we are developing with this technology capable of use in training and continuing education of human resources in health, particularly in Neonatal Nursing. Upon validation of the software can provide for the educational institutions and assistance via Internet or CD-room, an instrumental with the multimedia resources and interactive simulations for easy interaction between users and the system, expanding access to a large number of information (texts, graphics, sound and images) that encourages learning about the nursing diagnosis.

Thus, we expect the use of software in large scale on free platform, it can also promote the digital inclusion of the target audience in need of computer resources directed to training and continuing education in nursing.

References:


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