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Temporally Prescription of Care: a Challenge to Advance in Nursing Sciences

Editorial

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Within the Nursing field, it is common that when talking about prescription an association is established among drug administration, prescribed dosage, frequency and route of administration and it is also normal for this to be the case; a drug without dosage, frequency and route of administration is not of much use, given that little could be decided about its effects, safety in administration, and response of the body to substances prescribed to solve health problems. Following this common thread, when we nurses hear about prescription, we quickly associate this term with drugs, opening a collective debate between what can be prescribed and what cannot. However, we often forget our real competence in prescribing, which is undoubtedly care.

Prescribing care is complex, especially if it is done well and a correct prescription if it does not

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include temporality or, what amounts to the same; how often should care be performed for it to be effective? It cannot be considered a prescription of care because a cause-effect relationship cannot be established between the prescribed care and the result obtained for the person. The temporary prescription of care has three elements: (i) Statement of the problem to be treated, the diagnosis of which is obtained after assessing the person object of care. This element derives from nursing's own competencies and its responsibility for healthy or sick individuals;[1] (ii) Timing of application of the prescribed care that allows the expected effect to be measured/evaluated. This element is related with the quality of care and with patient safety that will permit quantifying the cost and effectiveness of the care;[2] and (iii) Care order issued by a nursing professional to resolve identified problems. This element is linked to leadership and responsibility in care, as well as decision making with legal support.[1]

With these three elements, the quality of care can be evaluated, or in other words, its effect on people. If any of the three is missing, we cannot evaluate the quality of care and, hence, a gap will remain in the care required by patients, which is the care they must receive upon the onset of a health problem regarding the system of care administered during a nursing work shift. The difference between the care required and the care administered defines the number of nurses needed in a care unit. Without using the three prescription elements, we know little about patient safety, exercise of own competencies, and nursing decision making. With the three elements cited and using the "temporally prescription of care" we solve important aspects of care, NCP. If, additionally, we include this concept in the nursing care process (NCP) as work method, we convert the NCP into a useful quality care tool to calculate nursing ratios and decision making about patient care, which are clinical safety elements.

One might think that attributing all these benefits to temporally prescription is an exaggeration; however, it is not. I will try to explain it briefly. As an example, we will place ourselves in a hospitalization ward of an acute care hospital; that is with surgical and non-surgical processes, and patients with a mean stay between 7 and 9 days. The nurse responsible for the patient and, therefore, for the effects of hospitalization, performs the daily assessment of the patient from admission to discharge throughout the care process and conducts said evaluation with a method that will permit evaluating the quality of care to solve health problems identified during hospitalization.

Each day, the nurse will prescribe the care required by the patient assessed according to the problems identified, for which it is advisable to use language understood by the entire health staff because health care is not provided alone, but rather within a health team. It is advisable to use internationally recognized language to define problems and issue care orders, given that understanding orders will facilitate their execution and enhance the activities carried out within the evolution of the patients. (Element 1)

The next step is temporality; here, we introduce a care quality term that is time in the form of how often must we perform an activity prescribed for each patient. (Element 2)

Actually, if we have no evidence of the effect of mobility, feeding, hygiene, or rest as preventive elements of adverse effects that occur during hospitalization, it is quite difficult to compare the expected result with the prescribed indication (recall the medication example) and this care, related with autonomy and comfort, intervenes directly upon adverse effects of hospitalization, such as infections, falls, or onset of ulcers, which are the responsibility of medical and nursing professionals according with the World Health Organization.[3]

Finally, we will issue the care order that must be administered for each patient (Element 3) so

that its effectiveness can be evaluated and that, when those responsible for management require criteria for assigning staff, costs, quality of care, they can find this agile, truthful, and accessible information. To measure the effectiveness of care, we must ask and answer the following questions:

Why is care conducted? Because a nurse prescribes it after assessing a patient's situation during hospitalization regarding care needs.

How is it conducted? In accordance with the use of manual guide protocols that are updated, accessible and which bear valid evidence.

How often must this care be carried out? (temporality) and what result is expected.[4]

How is the patient's evolution monitored? Regarding monitoring and, merely as an example, if 24 hours after prescribing care, we fail to evaluate its effectiveness, we will not know anything about the result of the prescription or its quality.[4]

Prescribing an activity does not necessarily mean directly executing it. If an activity related to hygiene or feeding, devices or clothing is prescribed, it is not necessary for highly trained nurses to assume such directly, as long as the staff has qualified support personnel. It is about assessing the staff's competence and issuing a care order that, thereafter, we will verify as performed in addition to providing documentary evidence of the execution of the task. A nursing responsibility involves verifying the effectiveness of the activities conducted and which were ordered, to advance the prescription, modifying if necessary, the temporality of the prescribed care and eliminating or adding other care activities.

Issuing orders is a function of any profession responsible for patients and, in this case, medical professionals are responsible for the admission and discharge of patients in hospitalization units and nurses are responsible during hospitalization to make sure no adverse effects occur and that people admitted to a hospital are safe, besides to complying with the treatment prescribed by medical professionals.

When we administer a medication or perform an invasive procedure derived from disease diagnosis and treatment, maximum safety must be guaranteed and when care is prescribed autonomously, it must also be done with the maximum knowledge and the greatest evidence available. All this without fear of giving orders and with the professional attitude of knowing how to receive them.

The prescription of basic, advanced, and technical care on a temporal basis in medical-surgical hospitalization units currently represents a gap in care plans; nursing students are acquiring the competence of responsibility for basic care that is typical of nursing from the hands of a professional group that does not have decision-making power over care; thereby, generating a somewhat confusing situation in the knowledge and application of basic care.[4]

In the European Union, the legal support for competencies related to care is included both in the state orders regulating Nursing curricula and in the community directive on regulated professions, which includes, along with Nursing, the professions of Midwifery, Dentistry, Medicine, Pharmacy and Veterinary Medicine. In said directive,[1] The competencies conferred by the title of Nurse responsible for general care are: (i) Competence to independently diagnose necessary nursing care using theoretical and clinical knowledge, and to schedule, organize, and manage nursing care when treating patients based on the knowledge and skills acquired during training; (ii) Competence to effectively collaborate with other parties from the health sector, including participation in the practical training of health staff about the base of knowledge and skills acquired; (iii) Competence to hold individuals, families, and groups responsible for healthy lifestyle habits and

health care based on the knowledge and skills acquired; (iv) Competence to, independently, take immediate measures to maintain life and apply measures in crisis and catastrophic situations; (v) Competence to, independently, grant advice and instructions and provide support to those who need care and to their loved ones; (vi) Competence to, independently, guarantee the quality of nursing care and evaluate such; (vii) Competence to establish full professional communication and cooperate with members from other health-sector professions; and, (viii) Competence to analyze the quality of care and improve their own professional practice as nurses responsible for general care.

In the community directive, clear competencies may be observed, which support the clinical decision-making of nurses and not solely in the field of hospitalization but also in primary health care.[5] It seems obvious that making decisions about care and prescribe temporally the activities necessary to guarantee quality of care is a component that strengthens its own portfolio of services, from which related lines of research emerge that allow identifying the ideal temporality required for the application of care.

Research questions, like how often should a hospitalized person be moved, involve delving further into nursing knowledge that lacks evidence, ensuring the quality of care related in this case to mobilization, improving people's comfort, and advancing Nursing Sciences within our social space, which is maintaining which is maintaining the autonomy of people when they get sick, preventing disease, and accompanying them when life ends.

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Original article

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Prior knowledge of students: essential aspects that a nursing expert professor identifies, interprets, and organizes to foster learning

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Prior knowledge of students: essential aspects that a nursing expert professor identifies, interprets, and organizes to foster learning

Abstract

Objective. To analyze the essential aspects that the nursing expert professor identifies, interprets, and organizes during classroom dialogic processes with students to foster their learning. **Methods.** Qualitative study, part of a multicenter study, which used ethnography of communication specifically from a micro-ethnographic approach. An expert professor from the Faculty of Nursing at a public university in Medellín, Colombia, was selected for the study. The fieldwork was done in three stages: 1)non-participant observations in two in-person classes of the Morphophysiology course recorded on video from two different perspectives (one focusing on the professor and another on the students); 2)think-aloud interviews with the professor and five students (three from the first class and two from the second) who spontaneously started more than two communicative interactions with the professor during the classes; and 3)parallel transcriptions, organized in didactic sequences (videos). The analysis was supported by the unit Student-Professor (identification-evaluation-answer) Student [S-P(i-e-a)S´], and by continuous comparisons of the data. **Results.** Four categories were identified: 1) Identification of essential aspects: importance of prior knowledge, 2) Interpretation: connection between essential aspects and students' mental processes, 3) Organization of the answer: connection between prior knowledge and new knowledge, and: 4) Synchronization with the learning needs of the students, which were grouped in a meta-category: Prior knowledge of the students: essential aspects for learning. **Conclusion.** Students' experiential prior knowledge constitutes the essential aspects identified, interpreted, and organized by the expert professor to achieve significant learning.

Descriptors: nursing education, nursing student, learning, nursing faculty.

Saberes previos de los estudiantes: aspectos esenciales que un docente experto en enfermería identifica, interpreta y organiza para favorecer el aprendizaje

Resumen

Objetivo. Analizar los aspectos esenciales que el docente experto en enfermería identifica, interpreta y organiza durante los procesos dialógicos con los estudiantes en el aula para favorecer su aprendizaje. **Métodos.** Estudio cualitativo, parte de un estudio multicéntrico, que utilizó la etnografía de la comunicación desde un abordaje micro-etnográfico. Se seleccionó un docente experto de una Facultad de Enfermería de una universidad pública de Medellín, Colombia. El trabajo de campo se desarrolló en tres momentos: 1) observaciones no participantes en dos clases presenciales del curso de morfofisiología grabadas en video en dos planos (uno enfocando al profesor, y el otro, a los estudiantes); 2) entrevistas Think-Aloud Protocol (método de pensamiento en voz alta) al docente y a cinco estudiantes (tres de la primera clase y dos de la segunda) que iniciaron espontáneamente más de dos interacciones con el docente durante las clases; y 3) transcripciones paralelas, organizadas

en secuencias didácticas (videos). El análisis se apoyó en la unidad [E-P(i-e-r) E´] (Estudiante-Profesor (identificación-evaluación-respuesta) Estudiante´) y en comparaciones constantes de los datos. **Resultados.** Emergieron cuatro categorías: 1) Identificación de aspectos esenciales: importancia de los saberes previos, 2) Interpretación: articulación de los aspectos esenciales y los procesos mentales del estudiantado, 3) Organización de la respuesta: conexión entre saberes previos y el nuevo conocimiento, y: 4) Sintonización con las necesidades de aprendizaje del estudiantado; las que fueron agrupadas en una meta-categoría: Saberes previos del estudiante: aspectos esenciales para el aprendizaje. **Conclusión.** Los saberes previos experienciales de los estudiantes se constituyen en los aspectos esenciales identificados, interpretados y organizados por el profesor experto, para el logro de aprendizajes significativos.

Descriptores: educación en enfermería, estudiantes de enfermería, aprendizaje, docentes de enfermería.

Conhecimento prévio dos alunos: aspectos essenciais que um professor especialista em enfermagem identifica, interpreta e organiza para promover a aprendizagem

Resumo

Objetivo. Analisar os aspectos essenciais que o professor especialista em enfermagem identifica, interpreta e organiza durante os processos dialógicos com os alunos em sala de aula para promover sua aprendizagem. **Métodos.** Estudo qualitativo, parte de um estudo multicêntrico, que utilizou a etnografia da comunicação a partir de uma abordagem microetnográfica. Foi selecionada uma professora especialista da Faculdade de Enfermagem de uma universidade pública de Medellín, Colômbia. O trabalho de campo foi desenvolvido em três momentos: 1) observações não participantes em duas aulas presenciais do curso de morfofisiologia gravadas em vídeo em dois planos (um focado no professor, e outro, nos alunos); 2) Entrevistas do Protocolo Think-Aloud com a professora e cinco alunos (três da primeira turma e dois da segunda) que iniciaram espontaneamente mais de duas interações com a professora durante as aulas; e 3) transcrições paralelas, organizadas em sequências didáticas (vídeos). A análise baseou-se na unidade [E-P(i-e-r)E´] (Aluno-Professor (identificação-avaliação-resposta) Aluno´) e em comparações constantes dos dados. **Resultados.** Emergiram quatro categorias: 1) Identificação dos aspectos essenciais: importância do conhecimento prévio, 2) Interpretação: articulação dos aspectos essenciais e dos processos mentais do aluno, 3) Organização da resposta: conexão entre conhecimentos prévios e novos conhecimentos, e: 4) Sintonia com as necessidades de aprendizagem do corpo discente; que foram agrupados em uma metacategoria: Conhecimentos prévios do aluno: aspectos essenciais para a aprendizagem. **Conclusão.** O conhecimento experiencial prévio dos alunos constitui os aspectos essenciais identificados, interpretados e organizados pelo professor especialista, para a obtenção de uma aprendizagem significativa.

Descritores: educação em enfermagem, estudantes de enfermagem, aprendizagem, docentes de enfermagem.

Introduction

The development of teaching expertise is a central topic of current discussion in nursing education. It has been shown that, for nursing teaching practice, clinical experience[1] or postgraduate training in education (masters or doctoral degrees) are not enough by themselves,[1,2] since general didactics does not cover the specificities necessary to teach the concepts inherent to each discipline.[2] The role of the nursing professor implies not only having professional practice competence, which is what provides knowledge on the subject, but also developing knowledge and skills regarding the specific ways nursing is taught, learned, and evaluated;[1] since, as any other discipline, it requires specific knowledge that responds to its own pedagogical needs. This is the Pedagogical Content Knowledge (PCK), which, according to Shulman[3] represents "the blending of content and pedagogy into an understanding of how particular topics, problems, or issues are organized, represented, and adapted to the diverse interests and abilities of learners." PCK analysis allows establishing the relationship that exists between scientific, pedagogical and didactic knowledge in the teaching of any discipline,[4] and it is easily identifiable in an expert professor,[3] who stands out for having extensive knowledge about the topics, about the strategies for teaching them, and about the students and their prior knowledge,[4] to transform them into pedagogical representations and actions.[3]

In recent years, PCK has been studied in education sciences[4-6] and in higher education,[2,7-10] to understand the construction of expert teaching knowledge[4,6-8] and the most appropriate PCK models in specific fields.[2,4,5,7] Although some of these studies[6,9,10] have considered pedagogical practice in relation to learners, more empirical evidence is still needed, particularly in nursing, in order to understand the aspects of PCK that contribute to learning in the context of the pedagogical interaction between professors and learners.[10] Given the above and recognizing the intellectual, relational, and emotional nature of PCK,[11] the need to deepen the knowledge in real time of the dialogic-reflexive processes, between the disciplinary and pedagogical knowledge of the professor in nursing education and between these and the student's learning, was identified. Dialogic processes, in this case, refer to those moments when the learner starts the communicative process with a question and the professor answers, thus opening a dialogue on the topic during the class.

Accordingly, the objective of this study was to analyze the essential aspects that the nursing expert professor identifies, interprets, and organizes during the dialogic process with the students in the classroom to foster their learning. Analyzing the essential aspects of nursing learning in PCK, in the context of the different linguistic approaches of the expert professor and the students and how they are connected, allows delving into the didactic principles that

take place in that specific learning setting.[2] These principles could support the content relevant to nursing teaching[1] and the identification of the elements involved in learning its object of study[4] as situated, contextualized, meaningful knowledge relevant to the learning students' care needs.

Methods

A qualitative research study using communication ethnography with a micro-ethnographic approach based on micro-sociolinguistics[12] was conducted as part of a multicenter study entitled "Disciplinary knowledge, pedagogical knowledge and situated learning: origin and mutual influences in university teaching" [*Saberes disciplinares, saberes pedagógicos y aprendizaje situado: génesis e influencias mutuas en la enseñanza universitaria*]. In this study, different universities from Spain, Chile, Brazil, and Colombia (Medellín and Bogotá) collaborated. The principal investigator of the multicenter study, who led and supported the entire project, was a university professor, a nurse, BE in Education and PhD in Philosophy and Education Sciences. Approximately eight meetings (both online and in-person) were held with the research team at the beginning of the project for training and methodology standardization.

This paper presents the results of a research study carried out between 2018 and 2019 at the Faculty of Nursing of a public university in Medellín, Colombia. The multidisciplinary team in charge of collecting and analyzing the data at all stages of the project consisted of three nurses, two with a master's degree and one with a PhD; a social communicator with a master's degree; and a dietitian nutritionist with a PhD. All the researchers were university professors trained in qualitative research and with experience in research studies in education.

The expert professor, the subject of the research, was selected in the Faculty of Nursing by means of three mechanisms: (i) *Individual anonymous face-to-face survey* given in class to 63 students in the last year of the undergraduate nursing program, in which they were asked to identify, with arguments, the three best professors during their learning process who, in addition, had used participatory strategies in the classroom. Students identified the 43 best professors. (ii) *Individual anonymous Google form survey* given to 24 professors from the Faculty of Nursing, in which they were asked to name three colleagues known as the best professors and argue their selection. The professors identified 28 colleagues. (iii) Prioritization of the 13 best professors identified by students and professors and selection of the Morphophysiology course professor, who was named the most, 31 times. The academic community chose this professor because of his broad knowledge of nursing practice, his ability to teach students by means of playful and creative didactic resources, in an environment of calm and trust, and because of his encouragement of students' interest, motivation, and learning. The selection criteria for the students who participated in the fieldwork were to be a student of the Faculty of Nursing and to be enrolled in the Morphophysiology course taught by the selected professor.

The fieldwork was done in three stages:

First stage

To identify the interactions between the professor and the students, the researchers made non-participant observations in two in-person classes of the Morphophysiology course taught by the expert professor on the topic of cardiology to two groups of almost 30 students. Each observation lasted approximately two hours, and both were recorded by an audiovisual specialist from two different perspectives: one focusing on the professor and another one on the students. The observation of each class was carried out by three researchers located in different parts of the classroom seeking to identify the students who had more verbal interactions with the professor starting with a

question; these students' data were collected to contact them later for an interview.

Using the class recordings from two perspectives, contrasted on the same screen, the moments in which the 28 interactions between professors and students took place were identified. These interactions were named *episodes* with the sequence Student-Professor (S-P) because they were spontaneously initiated by the student. Each episode was organized into a three-part video: classroom context prior to the S-P interaction, student question, and answer from the professor. Of the 28 interactions, 23 episodes with S-P interaction were selected (13 from the first class and 10 from the second), because those in which the same student starred in more than two interactions were prioritized, and the 5 episodes in which the student only had one S-P sequence were discarded.

Second stage

Think-aloud interviews[13] were conducted with the professor and the five students (three from the first class and two from the second) who starred in the 23 selected episodes, in which they verbally expressed what they were thinking during the S-P interaction while they were watching the episode in which they were protagonists.[12] The interviews were conducted in a classroom within the institution and were also videotaped. In some of the interviews two undergraduate students and one graduate student linked to the study were present as research trainees, as well as the audiovisual assistant who recorded and edited the videos.

Of the 23 episodes, fourteen think-aloud interviews were conducted with the professor subject of the study, since the desired saturation level was achieved. The interviews averaged 25 minutes and were done in two sessions of three hours each. They were conducted two days after each class. While the researchers showed the videos to the professor, they asked him questions such as: What was the first thing you thought when you heard the student's question? Did you understand the student's question? What elements of the question did you pay the most attention to? What criteria did you use to organize the ideas and elaborate the answer? And what did you intend with the answer?

Regarding the students, fourteen think-aloud interviews were also conducted (7 from each class) with the same episodes used with the professor. Student interviews lasted an average of 15 minutes and were conducted three days after each class. In this case, while the researchers showed them the videos, they answered questions such as: What did you want to ask? Did the professor understand what you wanted to ask? Was the professor's answer in line with your question? And did the professor's answer have any impact on your learning?

Third stage

By means of the parallel transcription technique,[12] the videos of the episodes were edited by adding the think-aloud interviews to have a differentiated point of view of the same S-P interaction, both from the expert professor and the students' perspective. This new arrangement was called didactic sequence (DS) and was put together as follows: 1)the classroom context prior to the S-P interaction up to when the student asked the question; 2)the perspectives on the student's question, recorded in the think-aloud interview, first the one from the professor and then the student's; 3)the classroom context when the professor answers the question; and 4)the recollections in the think-aloud interview on the answer the professor gave in class, first the professor's and then the student's. For proper identification, the DSs were coded with the topic of the students' question as follows: DS1: Valsalva maneuver; DS2: Refractoriness; DS3: Inotropism; DS4: Auricular valves; DS5: Sodium–potassium pump 1; DS6: lead D2 shows P wave; DS7: Internodal tracts; DS8: His bundle; DS9: Atrioventricular; DS10: Repolarization; DS11: ST segment; DS12: Sodium–potassium pump 2; DS13: PR interval;

and DS14: TP wave. In the results, the following distinction between the voices of the participants was made: (DS#/P) for the professor and (DS#/S) for the students.

Through the visualization of the didactic sequences, a first level of analysis was done through the identification of the connection between the professor's meanings and those of the students. The 14 DSs were entirely transcribed by the researchers, as they required a careful selection and analysis to be organized in a matrix with the *Unit of Analysis S-P (i-e-a)-S´*, the elements of which are the following:[12]

Student (S): Type of student question.

Professor (P)

- Identification (i): How the professor perceives the student's intervention for the identification of relevant aspects.
- Evaluation (e): Interpretation of the question for the identification of essential aspects for learning.
- Answer (a): Organization, elaboration, and identification of the type of answers.

Student (S´): Identification of the type of student reactions to the professor's answer.

Afterwards, an analysis of the matrices was carried out by means of continuous comparisons in which similarities and differences in the data were contrasted to identify categories. This analysis was made during 2020 and 2021 in 20 monthly meetings of the research team from the public university of Medellín, and in 10 meetings with the principal investigator of the multicenter study. In these meetings the results were organized and refined. Likewise, the analysis was complemented in two socializations made in two international academic events organized within the framework of the multicenter study, one in Bogotá and the other in Medellín.

This study was approved by the Research Ethics Committee of the Faculty of Nursing from the Universidad de Antioquia (Colombia). This nursing education institution granted endorsement for the study and the expert professor, with whom researchers had already been in contact, signed the informed consent. The professor also made it possible to get in contact with the two groups of students. For the recording of the classes, oral consent from the students was obtained, using also audiovisual recording, after presenting the objectives of the research. None of the participants refused to take part in the study. During the entirety of the research, willing participation was guaranteed, and efforts were made to maintain trust and respect for the participants. There were no conflicts of interest.

Results

The expert professor who participated in the study is a 38-year-old male, who is a professional nurse, and who holds a graduate certificate in Basic Biomedical Sciences, a master's degree in Critical Care and Emergencies and a master's in Nursing. When the study was carried out, the professor had 11 years of professional experience as a nurse (during which he had some sporadic teaching experience) and 5 years as a full-time professor. The five interviewed students—four male and one female between 18 and 26 years old—were in the second academic semester of the Nursing Undergraduate Program.

Four emerging categories and a meta-category were identified:

First category. Identification of essential aspects: importance of prior knowledge

The results show that, in order to link his meanings with those of the students during classroom interactions, the expert professor identified the essential aspects for learning through the students' prior knowledge, since, as he stated on

several occasions, each of the questions from the students *involves prior knowledge* (DS8/P), either from previous moments in the course *of what we have been working on during the semester* (DS10/P); or from their personal or family experiences, as *they [the students] have already seen it in their daily lives* (DS1/P); or from their work experiences when *they [the students] have seen it, have lived it, or have experienced it working as nursing assistants* (DS14/P).

The search for this prior knowledge was recognized in the professor's first recollection during the think-aloud interviews, when he stated that, when faced with the student's question, *the first thing I thought about was… 'Why is the student asking me this?'* (DS1/P) *or why did the student talk to me about pauses, if I haven't even showed them the electrocardiogram?* (DS7/P). This unspoken concern opened an introspective path about the origin of the question, by comparing its elements with the main aspects of the topic in which it was asked, in order to understand that the student, by asking the question, brought up a concept, idea or topic, which, although it was similar or related to the subject under discussion, was new and different:

Where did the student get the concept of hypertension? So much so that I have never talked about hypertension. Maybe the student got it from prior experience or from other courses (DS3/P).

Therefore, the essential aspects on which the professor focused his attention were those new or differential concepts, sometimes confused or mistaken, represented in expressions, words or gestures, and their importance lies in the fact that they allowed him to identify the prior knowledge of the students in a given context: either the same class, another class from the same course, or the student's personal, family or work experiences.

Second category. Interpretation: connection between essential aspects and students' mental processes

The contextualization of prior knowledge facilitated *the interpretation* of these essential aspects to dive into the student's mental process when stating the question. To this was added the knowledge the professor had of the students and their learning styles, because, as he said: *I have discovered that the students are very experiential* (DS13/P). Thus, the professor connected the essential aspects with the student's mental processes to get to the experiential origin of the question, as can be seen in the following examples:

Example 1: DS2-Refractoriness
Student question: *During a heart attack is refractoriness very high or something like that?* (DS2/S). During the think-aloud interviews, the professor said that what he emphasized the most was the *interplay of words in common… As a professor, who has already had experience with them, who knows how they behave, how they talk, who knows some of their life experiences, what can I take? So, I give them an interplay of words from a theoretical perspective, which I illustrate with examples, and they give me back another interplay of words, which in some cases are common and in others are not. That is why they take me to doubting. That is why I need to stop to understand if what they are taking me back to is the concept* (DS2/P).

According to the professor, thinking of this *interplay of words* as the essential aspect led him to analyze quickly and immediately that the student was using two different words as synonyms, but that, *in essence, are the same*, not because they are similar words, but because he identified in them… *the ability to associate a learned concept and bring it here, even with a variant of the word, from 'refractory period' to 'refractoriness'. Two different concepts, in different cells, but that he [the student] associated* (DS2/P).

According to the professor, identifying the correct association between *refractory period* and *refractoriness*, that is, the interplay of words used by the student, was possible thanks to the

identification of the origin of the question, since this was one of the concepts that had been addressed in a prior moment of the course by the same professor: *I think what mattered the most there was the prior knowledge about 'refractory period', different from what I was explaining which was 'refractoriness', but they associated it properly [...] that is, I had already talked to them about it and the already knew it* (DS2/P).

Example 2: DS4- Auricular valves
Student question: So, *do auricular valves close due to stimulus and ventricular valves due to pressure?* (DS4/S)

For the professor, the essential aspect of the question, the one that most attracted his attention, is the *so* in two ways: *what is initially more relevant to me is the emphasis he places on the question, and the second most relevant thing is the structure of the question* (DS4/P). About the first aspect, he emphasized *the strength with which he asked me,* in other words, *the strength of the question* (DS4/P); and about the second, the *so,* which according to him, represented a connection (continuity) between the professor's prior explanation in class and what the student wanted to ask: *I have to interpret it as 'Hey, if you are telling me this, so, does this have to be like this, or ... can it be like this?'* (DS4/P). In other words, according to the professor, the *so* indicates an act of reflection on what he (the student) wants to ask, versus what the professor is teaching or saying (DS4/P). This analysis of the context of the classroom is what allowed him to arrive to the student's mental process, [who] *makes an important association between what was learned before and what is now being learned. Before, we were discussing pressure; now I was not talking about pressure, but about blood flow and impulse; so, what he did was an association between the two* (DS4/P).

The interpretation of essential aspects through the recognition of the student's mental processing was useful to the professor to confirm his understanding of the question and, above all, the student's understanding of the topic.

Third category. Organization of the answer: connection between prior knowledge and new knowledge

After interpreting the student's intervention, the professor organized the answer, starting from the essential aspects to *confirm* (DS2/P) and *ratify* (DS3/P) the connection between prior knowledge and new knowledge. This is how the construction of the answer began through dialogic processes in which the professor stimulated the student's participation taking center stage. On the one hand, the professor identified that the student understood the topic *completely* (DS6/P), because, according to him: *That is the first thing I say: 'This one understood what a vector of depolarization is'; internally I think about it* (DS6/P); and from this he asked counterquestions to motivate student's participation in the construction of the answer, because *my excitement is reflected in returning the question to him, because he is basically giving me the elements of the answer* (DS6/P).

In this way, the professor broadened the expectation regarding the student and motivated him to complete his participation, internally anticipating the answer: *I kind of want him to tell me: 'Because that's how it depolarizes'. I'm thinking about the answer I want to hear, because I already elaborated it: 'Man, the thing is, if you ask me such a brilliant question, you can answer it yourself: Why do you think is that?'* (DS6/P).

On the other hand, when the professor identified some confusion in the understanding of the topic because *the student explained the concept inadequately to me* (DS5/P), he constructed the answer based on the communicative intention of providing the necessary elements for the student to recover the prior knowledge, reminding him that *this does not work that way, we have already said it many times: 'the sodium-potassium pump returns to homeostasis'* (DS5/P); and, furthermore, he says: *I have to go back and explain it again, so he*

[the student] himself would realize his mistake. That he himself would understand that there is a mistake (DS5/P). To elaborate on the answers, on some occasions, he resorted to the memory of classmates to validate the understanding of prior knowledge by asking them: *Do you remember what the peak potential was in a normal cell? Not in this cardiac cell we are seeing, and they all say: 'Oh, it's that much!'. So, I assume they do know it. There is already a prior concept (*DS10/P).

Regarding the construction of the answer, it is important to note that one element that should be highlighted about the participant professor's expertise was his ability to lead students to make a deep mental connection between their prior knowledge and the elements of new knowledge, since as he stated: […] *I can make a faster connection than the students. That is why I talk about the students who keep thinking for a while, as if they were still analyzing the concepts. And that is what happened in this case: being able to make that association, that interplay of words between prior knowledge and what is taught now. It seems to me that this is the point of meaning and what leads them to understanding* (DS2/P). For this reason, even if *the answer is made brief, short, concise, and to the point, I always try to explain and go further: to exemplify again* (DS3/P), in an attempt to reconnect the students with the origin of the question.

The answers of the professor, their organization, and the strategies to develop them indicate a system that connects prior knowledge with new student-centered knowledge.

Fourth category. Synchronization with the learning needs of students

From the answers given by the professor, it is evident that there is an important synchronization between what the student wanted to ask and the professor's answer, as the following testimony makes explicit: *he has that ability to answer to the point, where it is, without complicating and entangling things; and he answers your questions with assertiveness* (DS14/S). According to what the students said, the professor understood the question *one hundred percent, he got it very well and he knew how to answer it* (DS8/S). At the same time, they expressed that, in most cases, the professor's answer was adjusted to their learning needs, not only because he assessed the understanding of the topic, since *he first told me that I was right about my input* (DS3/S); but also because he led the student to consolidate the relationship between prior knowledge and new concepts, because, as the student said: *he then made me associate the topics already learned with what we were learning at the time* (DS3/S). This coupling occurred even when the student appeared confused in the comprehension of the topic. In relation to this, one of them said: *The professor detected the small mistake, because he toys with you* (DS4/S), and also said that this is why the professor asked a counterquestion, which was even answered by the classmates: *I think that, in that moment, the classmates whispered: 'No, due to pressure'* (DS4/S).

Meta-category. Prior knowledge of the student: essential aspects for learning

The cross-sectional analysis of the four categories showed that the identification of prior knowledge from the contextualization of the differential aspects of the student's question, its interpretation starting from mental processes, and the organization of the student-centered answer, were essential devices for learning. Regarding the interaction of the expert professor during the class, the students said that they acquired, clarified, and ratified new knowledge because the professor *makes us reinforce the prior knowledge we have and allows an association of knowledge. That is, what we already know with what we are learning now* (DS3/S). According to what one student pointed out, this learning helped him *to grow as a nurse and to be prepared to take care of my patients in the best possible way* (DS8/S).

In addition, the professor verified the learning of students in two ways: the first was related to the conceptual clarity expressed by the students in the construction of their answers, since *I think it was very clear to them that they were two completely different phenomena; especially because I make the clarification between what would be trying to blow into a syringe to raise intrathoracic and intraabdominal pressures, as opposed to what is simply re-inhaling a gas in a bag* (DS1/P). The second refers to the verification of learning from nonverbal language, as in the case of a student who evidenced the acquisition of new knowledge with her *approving gesture, head nodding and confirmation that she understood* (DS9/P).

Discussion

The analysis of the PCK in this research has made it possible to find some essential aspects, among which the necessary exploration of prior knowledge stands out, with which a nursing expert professor established a route for connecting his meanings with those of the student, in favor of learning in a dialogic context. This ratified the assumption that has been proposed in education regarding the importance of starting from prior knowledge in order to achieve significant learning.[14] The results show that the inquiries about prior knowledge made by the nursing expert professor were transversal during all interactions in the classroom and resulted from paying attention during the dialogues with the students to delve into their origin, and even to encourage their emergence in those cases in which they were not made explicit, with the purpose of building an answer articulated and contextualized with the discussed topic. With this, it can be inferred that the expert professor in this study used in his pedagogical practice what Ferreira *et al.* [15] call *cognitive mediation*, with which he optimizes learning opportunities in the classroom, consolidating the connection between the prior knowledge of the student and the new knowledge.

The exploration of this prior knowledge was possible in the practice of the nursing expert professor because it took place within the framework of dialogic processes, in which the students played an active role with constant interventions. These allowed the professor to identify, in the mental process of the students, the capacities to associate, relate, integrate, and connect this prior knowledge with the contents of the class, while at the same time they guided the pedagogical action, using the same mental processes of the students for the stimulation of reflective thinking and understanding of the topic.

This indicates that the nursing expert professor placed the analysis of the students' conceptions in the complex constructivist dimension referred to by Martínez[16] since he interpreted the prior ideas and mental processes of students as relevant constructions given by their interaction with the world, and used them for the students to reorganize their own system of ideas. The above complements what was expressed by Domínguez *et al.*[17] in that, in order to achieve significant learning, it is not enough for the students to assume a committed and responsible role in their learning process, but it is necessary for the professor to propose strategies of active cognition to stimulate the processing, organization, and consolidation of knowledge; so that the teaching-learning process does not focus only on remembering content, but on leading students to reflect dynamically and to construct their own knowledge propositionally.

When characterizing PCK in experimental sciences professors (Biology, Chemistry and Physics) Agudelo *et al.* [7] reported that each case of PCK is unique, because in employing the problem-solving method, each professor used unique structures according to their own disciplinary field, experience, and educational background for the interpretation of prior knowledge. In this regard, they reported that some of the participating professors privileged prior ideas related to disciplinary knowledge and thinking skills; others

related them to mathematical operations; and still others to specific knowledge and to the nature of teaching.[7]

Similarly, the PCK of the nursing expert professor is also a unique case. The difference with the results of Agudelo *et al*.[7] is that the particular method of this professor was developed through a complex process whose central axis was the students' experience, since he did not inquire about prior knowledge as abstract conceptions isolated from the subject, but placed them in the context in which they originated, such as the same class, another class or some personal, family, or work experiences of the students. That is, he articulated the prior knowledge of the students to their situated action[18] because when he searched for the origin of prior knowledge he did not relate it only to disciplinary knowledge, cognitive skills, and specific knowledge, but contextualized it in the daily life of the students and thus built answers linked to their own experiences.

The expert professor of this study started from the prior knowledge of the students during the classes and delved into the origin of that knowledge, to interpret it in the light of the students' experiences and to articulate it to the knowledge he had about them, that is, their learning styles, interests, and needs. The knowledge of the students is a distinctive characteristic in the practice of the nursing expert professor and contrary to what is reported by other studies on novice professors. In this regard, Conceição *et al.*[5] found that, lacking expertise, science education professors did not give importance to prior conceptions based on students' knowledge and, therefore, did not include their background and previous experiences in their teaching strategies. In addition, the results revealed that the professor of this study got the students to articulate their prior knowledge with the new concepts, through the permanent interaction between the knowledge he had about the students and his expertise on the topic of cardiology. Both of these components were already recognized in the PCK as content knowledge and student knowledge,[6] which in this research were observed through the professor's permanent assessment of the students' understanding of the topic, based on the types of questions most commonly asked by them and their gestures, detecting and correcting their mistakes during the class.

In this research, the interaction between content knowledge and student knowledge was also the teacher's ability to interpret learning difficulties based on the silence and some body language; in his ability to give a short or long answer, according to the characteristics and interest of each student; and in his skill to encourage each student to elaborate their own conceptual constructions, even when he had already anticipated it introspectively. When comparing the above results with those reported by Oztay *et al.*[6] it can be deduced that both student knowledge and content knowledge are essential components of PCK, which ratify the expertise of the professor who participated in this study. Using a strategy similar to think-aloud interviews, called video-stimulated recall interviewing, Oztay *et al.*[6] concluded that having knowledge on a topic does not guarantee using it. Thus, the chemistry professors who participated in their study, although having detected while teaching the students' possible misconceptions and some of their difficulties in understanding the topic, reported that, due to their lack of teaching experience, they had encountered difficulties in recognizing and correcting them, specifically within the class. The difference with the nursing expert professor is that the chemistry professors did not inquire about the reasons underlying the students' prior ideas, in order to deconstruct the misconceptions.[6]

The results presented here, in agreement with the PCK, also showed that the nursing expert professor uses appropriate pedagogical strategies to transform disciplinary or specific knowledge, in this case about cardiology, into knowledge that is understandable, relevant, contextualized and situated in the practice of the nursing student,

which was manifested in the deployment of specific strategies for the development of the classes, since he frequently used metaphors, anecdotes and examples from daily life in a playful manner in the elaboration of the answers. These strategies, according to the analysis, were useful to motivate students, increase their participation and improve their understanding of the concepts by placing these strategies in contexts that were familiar to them. Previous studies on PCK reached similar conclusions. Some reported that philosophy professors frequently resorted to everyday examples to capture students' attention.[2] Others found that chemistry professors tried to connect scientific knowledge with the students' daily lives, eliciting classroom discussions, presentations, animations and analogies to keep them active.[6] Almonacid *et al.*[8] identified that physical education professors tried to motivate students through playful strategies and participatory, individualizing, creative, and socializing teaching styles, convinced that motivation during classes leads to quality learning.

This ability of the professor to transform his disciplinary knowledge about cardiology into a knowledge apprehensible by the students was also demonstrated by the use of dialogic strategies to stimulate the student to elaborate the appropriate answer, showing them that they can believe in their abilities. This was evident when he used questions and counterquestions to validate learning, leading the student to verify the deductions and associations that he himself made. Similar results were shown by Cruz *et al.*,[2] when they stated that the purpose of permanent dialogues and relevant questions was to develop dialogic, critical, and interpretative skills.

The expert professor also used dialogic strategies when he identified confusion or mistakes in the students' questions and invited them to make contrastive and validation exercises between their prior knowledge and the new knowledge to construct adequate conceptualizations. This is similar to what was found by Timo,[19] who reports that, before exercises with erroneous results, the student looks for the faults in their mental schemes, in a comparative exercise of their correct or incorrect approximations that, consequently, forces them to their mental schemes revise again according to the correct solutions.

Thus, it is valuable in this study that even for the expert professor, the students' mistakes were assumed to be opportunities for learning in an environment of trust. In this regard, Palominos *et al.*[20] showed that the naturalization of errors is an aspect that enables learning. Therefore, their acceptance is not only a way to advance in the acquisition of new knowledge, but also helps to minimize negative emotions towards mistakes, achieving greater comfort and security in the learning process.

Due to all of the above, the practice of the expert professor of this study acquired a profound pedagogical meaning, since he used innovative and relevant didactic strategies in favor of learning, which is explained by the findings of Jaramillo,[21] in the analysis of modern pedagogical tendencies. This author affirms that the students do not learn a copy of what they observe around them, but that the professor's mediation with innovative, creative and integrating strategies helps them to reelaborate their own knowledge. Consequently, the expert professor's ability to recognize the student as a subject protagonist of their own learning is exposed, that is, he uses a pedagogical practice centered on them and crossed by their knowledge, in the context of negotiated interactions, for an authentic learning that, attached to their mental structures, is built from their social reality and their interaction with the world.[22]

Conclusion. The prior knowledge of the students is the essential aspect identified, interpreted, and organized by the expert professor to achieve significant learning in them. Prior knowledge is, therefore, the device with which the professor articulates two characteristics of PCK, namely,

content knowledge, that is, the topic of the class, the subject matter, and student knowledge, in order to achieve a higher level of thinking. As described above, when the professor considers the prior knowledge of the student, explores it, organizes it to recognize the students' level of understanding and, through didactic strategies, allows them to connect it with new knowledge, a clear teaching posture centered on the student and concerned with the student's learning is evident. Such learning corresponds to an educational paradigm that places the student at the center of the educational process, recognizing each student as a unique being, with his or her capabilities, needs, knowledge, interests, experiences, as well as learning styles and paces achieving that learning.

Furthermore, prior knowledge is an essential element that sets the path for an experiential pedagogical practice that goes beyond theoretical and abstract concepts. The expert professor shows the ability to transform the students' prior cognitive knowledge into experiential knowledge, as he focuses his action on the mental processes and real experiences of the students, since he places them in the context in which they originate, in order to understand them and build an answer that adapts to their learning needs. In this case, their experience plays a fundamental educational role during the pedagogical interaction in the classroom, by connecting the prior knowledge of the students with their disciplinary knowledge.

Limitations of the study. Since this is a qualitative study, its results cannot be generalized, since it shows the specific pedagogical experience of a nursing expert professor; in addition, due to the method of selection of the students who participated, we only have the learning perspective of those who interact directly in the classroom. We suggest that future research should study the effects of PCK on students who have little participation in the classroom. Nevertheless, the results allow a reflective analysis of the contributions that PCK makes to the pedagogy of the discipline and is presented as a path for the initial development of nursing education in Colombia.

Recommendations. The main recommendation arising from this study is to generate more training spaces for novel professors, in which they purposefully initiate the construction of PCK and rely on teacher training to establish a bridge between their disciplinary knowledge and pedagogical knowledge. It is also recommended that more qualitative and quantitative studies are conducted on the knowledge of nursing expert professors in the areas related to care as an object of knowledge of this discipline.

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Original article

The wet nurses of the Hospital Real of Santiago de Compostela between 1803 and 1808

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The wet nurses of the Hospital Real of Santiago de Compostela between 1803 and 1808

Abstract

Objective. To analyze the duties of wet nurses at the Hospital Real in Santiago de Compostela (Spain). The secondary objectives were to compare the mortality rate and distribution by parish of the foundlings under the care of the Royal House between 1803 and 1808; and to determine the origin of the Galician foundlings who participated in the Royal Philanthropic Expedition of the Smallpox Vaccine in 1803. **Methods.** Historiographic study that analyzed sorted and not sorted in series indirect positional and quantitative historical sources. **Results.** The duties of wet nurses during the studied period were to provide basic care and cultural instruction. The mortality rate of foundlings fluctuated during that period and their distribution by parish (functional unit of healthcare services at that time) was similar in those years, with a predominance in the provinces of A Coruña

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and Pontevedra. A total of 5 Galician foundlings from the House analyzed were part of the smallpox vaccine expedition, their names were Juan Antonio, Jacinto, Gerónimo María, Francisco Florencio and Juan Francisco. **Conclusion.** During the observed period the wet nurses of the Hospital Real of Santiago de Compostela were in charge of pediatric care. Wet nurses were vital in the role of keeping the foundlings alive and can be considered as one of the forerunners of the pediatric nurse profession at that time.

Descriptors: maternal nutrition; breast feeding; infant mortality; child rearing; hospitals; smallpox vaccine; expeditions; child, orphaned.

Las nodrizas del Hospital Real de Santiago de Compostela entre 1803 y 1808

Resumen

Objetivo. analizar las funciones que realizaban las amas de leche en el Hospital Real de Santiago de Compostela (España). Los objetivos secundarios han sido: comparar la mortalidad y distribución por parroquias de los niños expósitos a cargo de la Real Casa entre 1803 y 1808, determinar la procedencia de los niños expósitos gallegos que participaron en la Real Expedición Filantrópica de la Vacuna de la viruela en 1803. **Métodos.** Estudio historiográfico que analizó fuentes históricas posicionales indirectas y cuantitativas seriadas y no seriadas. **Resultados.** las funciones de las nodrizas durante el período de estudio eran proporcionar los cuidados básicos e instrucción cultural; la mortalidad de los expósitos sufrió oscilaciones a lo largo del período analizado. La distribución por parroquias (unidad funcional de las áreas de salud en la época) fue similar en estos años, con predominancia de las provincias de A Coruña y Pontevedra. Un total de 5 niños expósitos gallegos de la Casa analizada han participado en la expedición filantrópica de la viruela, sus nombres fueron: Juan Antonio, Jacinto, Gerónimo María, Francisco Florencio y Juan Francisco. **Conclusión.** Durante el período de observación, las amas de leche del Hospital Real de Santiago de Compostela realizaban cuidados pediátricos. Las nodrizas cumplieron un rol fundamental para el mantenimiento con vida de los

niños expósitos y pueden ser consideradas como una de las figuras precursoras de la profesión enfermera pediátrica en la época.

Descriptores: nutrición materna; lactancia materna; mortalidad infantil; crianza del niño; hospitales; vacuna contra viruela; expediciones; niños huérfanos.

As amas de leite do Hospital Real de Santiago de Compostela entre 1803 e 1808

Resumo

Objetivo. Analisar as funções desempenhadas pelas nutrizes no Hospital Real de Santiago de Compostela (Espanha). Os objetivos secundários foram: comparar a mortalidade e distribuição por freguesia dos enjeitados responsáveis pela Casa Real entre 1803 e 1808, determinar a origem dos enjeitados galegos que participaram na Real Expedição Filantrópica da Vacina contra a Varíola em 1803. **Métodos.** Estudo historiográfico que analisou fontes históricas posicionais indiretas e quantitativas seriadas e não seriadas. **Resultados.** As funções das amas de leite durante o período do estudo eram fornecer cuidados básicos e instrução cultural; A mortalidade dos enjeitados oscilou ao longo do período analisado. A distribuição por freguesias (unidade funcional das áreas de saúde da época) foi semelhante nestes anos, com predominância das províncias da Corunha e Pontevedra. Na expedição filantrópica contra a varíola participaram um total de 5 crianças galegas da Casa analisada, os seus nomes eram: Juan Antônio, Jacinto, Gerônimo María, Francisco Florencio e Juan Francisco. **Conclusão.** Durante o período de observação, as nutrizes do Hospital Real de Santiago de Compostela prestaram cuidados pediátricos. As amas de leite desempenharam um papel fundamental na manutenção da vida dos enjeitados e podem ser consideradas uma das figuras precursoras da profissão de enfermagem pediátrica da época.

Descritores: nutrição materna; aleitamento materno; mortalidade infantil; educação infantil; hospitais: vacina antivariólica; expedições; crianças órfãs.

Introduction

Nursing has experienced numerous changes and regulations until it became the profession it is today. In this sense, several occupations have been decisive in its shaping. Among these, it is worth highlighting wet nurses or nutrix, also known as *nodrizas,* nourice, "nourrice" or "nutrice", a term which comes from the Latin *nutricia* (payments and salaries given to wet nurses for their work and occupation), which could be defined as women who breastfed an infant that was not their biological child.[1]

The figure of wet nurses appeared for the first time in the Classical Period, although already during the Middle Ages there had been widespread use of wet nurses to raise the successors of royalty. In order to be hired, they had to meet certain requirements: be young, married, have given birth to two or more children and pass a medical examination to evaluate breasts (appearance, quantity of milk, and shape of the nipples) and to check for venereal diseases. The employing family requested the corresponding certificate of morality issued by the parish priest of the village, who was in charge of monitoring the care of the minor, issuing to the reference foundling hospital, if necessary, a certificate confirming the death or illness of the child.[2] The Renaissance stood out for being the historical moment when the greatest number of hired wet nurses was reached, "professionalizing" this service.[1]

In the beginning, the care of foundlings was carried out within the charitable hospitals in a specific room used for that purpose. The hospitals founded during this period included the Hospital de Santa Cruz of Barcelona (1450), the Hospital Real of Santiago de Compostela (1509), the Hospital San Juan de Dios of Granada (1553), and the Inclusa of Madrid (1572). It would not be until 1750 when the Hospitals of Foundlings were created, considered as those destined for the care of newborns who were abandoned, exposed, or entrusted to a charitable establishment. There, the personnel dedicated to breastfeeding and caring for the newborns were selected.[1]

Sometimes the parents, when leaving their child at the foundling home, left a note with the name of the baby and even the surname they wished the child to keep. This happened in the case of those citizens who, due to economic reasons, could not take care of their children but had the hope of being able to reclaim them in the near future. In the case of not having a surname, the following were given to the children: *de Inclusa* (of Foundling Home), *de todos los santos* (of All Saints), *expósito* (Foundling), among others.[3,4]

After the French Revolution in 1789, the Contemporary Era began, in which women entered the labor market, forcing many mothers to leave their children

in the care of a hired wet nurse, or to abandon them in an orphanage.[4] In the second half of the eighteenth century and at the beginning of the nineteenth century, the infant mortality rate was high, and the cause of disease was linked to scientific-theoretical reasoning, both from a physical-mechanical and a social perspective. The discovery of microorganisms and vaccines allowed life expectancy to increase and the prevention of infant mortality began to gain importance.[4]

Thus, foundling homes hired wet nurses from different population centers to take care of part of the foundlings, since the sanitary conditions in the cities were not adequate due to the great demographic growth they had in such a short period of time. In addition, the institutions intended for the care of minors, due to the great demand and the few available resources, started using artificial breastfeeding, which was of animal origin.[5]

The Hospital Real of Santiago de Compostela was inaugurated by the Catholic Monarchs in 1509 with the purpose of receiving the sick and pilgrims. The establishment of the foundling home occurred in the same year, but it was in the eighteenth century when it became vitally important, as the number of children in the care of this Royal House tripled. In its beginnings, the home only had one older mistress. Later, in 1736, two other wet nurses were hired (Figure 1 and 2).[6,7]

To cover the great demand, the institution hired external wet nurses, who provided care in their own homes, mostly in rural areas. From 1833 onwards, the number of foundlings decreased, so the hospital's activity was almost entirely devoted to the care of the sick.[6]

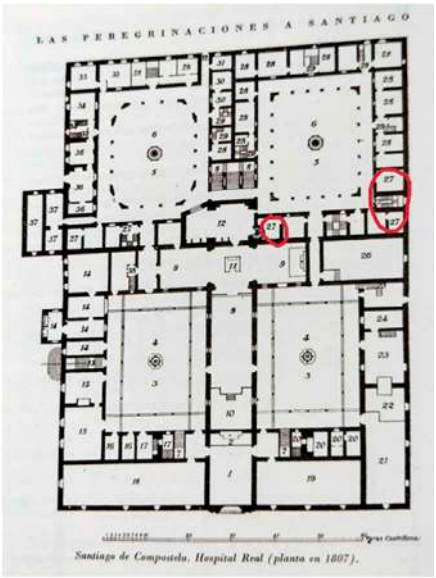


Figure 1. Map of the Hospital Real in 1807. The space that held the foundling home corresponds to number 27 in the image.[7]

Figure 2. Corner of San Mateo's Courtyard where the old foundling home is located. Original image.

At the beginning of the nineteenth century different campaigns were started, promoted by doctors and philosophers, aimed at raising public awareness of the need to provide good hygiene and care for infants, calling on mothers and targeting wet nurses, thus causing the employment of the latter to fall.[2] An example of an awareness campaign was the publication of Rousseau's *Emile, or On Education*, where the figure of wet nurses was denounced as "bad mothers", since it was claimed that charging for carrying out the activities of motherhood was immoral.[8] Concepción Arenal, in her book *La beneficencia, la filantropía y la caridad* (Welfare, philanthropy and charity), talked about the situation of foundling homes in those times. She denounced that foundlings were overcrowded in those institutions and that wet nurses often had several children in their care, thus making their upbringing difficult.[9]

At the end of the nineteenth century, the parish priest Theodor Fliedner and his wife Friederike Münster founded the Kaiserswerth Deaconess Institute, which became the first body to define the duties of nurses in Europe. It was there that Florence Nightingale was trained, who started the first nursing school.[7]

In Spain, in 1915, nursing was professionalized through the Royal Order of May 7, 1915, which established a program of studies to obtain the official degree. Nurses had access to general, practical and specific education. Among the institutions that offered it, the following stood out: the Santa Madrona School in Barcelona inaugurated in 1917, which prepared custodial and hospital nurses; the San José and Santa Adela Schools in Madrid, which opened in 1918 and were linked to the education of Red Cross nurses; the Nursing School for Auxiliary Medical Nurses of the Mancomunidad de Catalunya, in operation since 1919; the National School of Puericulture inaugurated in 1923, specialized in assistance to the infant population; and, finally, the Nursing School of the Casa Salud de Valdecilla, founded in 1929.[10] However, Spain did not have any school that taught the specialties of visiting nurse or psychiatric nurse, among others, therefore, those nurses who wanted to specialize in these subjects had to emigrate to other European countries.[1]

For the aforementioned reasons, the general objective of this study is to determine the duties of wet nurses in the Hospital Real de Santiago de Compostela between 1803 and 1808. As secondary objectives, we aim to compare the mortality rate of foundlings under the care of the Royal House between 1803 and 1808, to compare by parish the distribution of the foundlings under the care of the Royal House between 1803 and 1808, to evaluate the delivery of foundlings to the Hospital Real of Santiago de Compostela and to determine the origin of the Galician foundlings who participated in the Royal Philanthropic Expedition of the Smallpox Vaccine of 1803.

Methods

This study is framed within the history of nursing. To carry out this project, family and religion were selected as functional units and wet nurses as a functional element, within the functional framework of the Hospital Real of Santiago de Compostela, located in the Autonomous Community of Galicia, Spain. Initially, a preliminary search was done in the most important digital search engines to obtain the available information on the topic. Information was also collected in the Biblioteca Dixital de Galicia (Galician Digital Library) to find press releases using the term "wet nurse". After doing so, a review of historical sources was carried out, which included a selection of books on the Hospital Real.

As an indirect positional historical source, the current Hostal dos Reis Católicos (former Hospital Real) was visited in order to obtain information about the spaces where the care of the foundlings took place. In relation to both sorted and not sorted in series quantitative historical sources, various documents from the University Historical Archive of Santiago de Compostela were consulted, both in person and through the Minerva website. The

terms “Hospital Real”, “foundlings”, and “wet nurse” were chosen as search terms.

The inclusion criteria were as follows: documents that analyzed the duties of wet nurses; constitutions of the Hospital Real; registry books of payments between 1803 and 1808; registry books of entry of the foundlings in Galicia between 1803 and 1808; documents that analyzed the mortality of foundlings in Galicia between 1803 and 1808; and books of accounts and reason of expenses of the foundling home between 1803 and 1808. The exclusion criteria were as follows: certificates, provisions, letters, declarations, capitulations, licenses, petitions, interlocutories, reports; documents of the Brotherhood of the Apostle Santiago, registers of deeds; wills; town council books; books of the sick; lawsuits; land surveys; records, powers of attorney, leases; petitions; correspondence; general documents, notes, and prescriptions.

Results

Results of the search strategy

The local publications of Santiago de Compostela have been filtered from the website of the Biblioteca Dixital de Galicia, thus obtaining 1048 results. None of the press releases is within the time frame studied, but, because it is of interest for the purpose of this work, we have selected the advertisement published in the *Diario de Santiago* number 23, on November 3, 1848: “Wet nurse. Ramona de Vilas, neighbor of Sta. María de Gastrar, has milk of a month and a half, more information in the Fuente Sequelo, house of the notary Don Manuel Pardo” (*Nodriza. Ramona de Vilas, vecina de Sta. María de Gastrar tiene leche de mes y medio, darán razón en la Fuente Sequelo, casa del escribano Don Manuel Pardo*).[11]

In the Minerva website 207 results were obtained, among which those corresponding to the period between 1803 and 1808 were selected, thus obtaining 14 documents. After the exclusion criteria were applied, 9 documents were finally obtained: two corresponding to books of accounts of the foundling home expenses, one book on the payment of wet nurses, five books on the distribution of foundlings by parish, and one document on the constitutions for the regulation and government of the Hospital Real. On the other hand, a publication of interest for the project has been selected from outside the established time frame due to its importance for the development of the work.

The actual inventory of the Hospital Real was searched. Applying the exclusion criteria the following documents have been discarded: 75 documents related to the registry of deeds; 290 documents related to the Brotherhood of the Apostle Santiago; 43 wills; 63 council books; 602 books of the sick; 1156 documents of lawsuits; 710 land surveys; 2486 records, powers and leases; 76 petitions; 823 correspondences; 143 documents, notes and prescriptions; and finally 941 documents related to certificates, letters, capitulations, declarations, licenses, petitions and other documents specified in the exclusion criteria. In the case of foundling documents, 483 resources were available, of which 474 were excluded because they did not correspond to the period 1803-1808, and 10 documents were finally selected. Of these files, only one of them is exclusively in paper format (*Cuadernillos de paga de amas de cría* [Wet nurses’ booklets of pay]), the other 9 are the same as those obtained from the search in Minerva.

After analyzing the sorted and not sorted in series quantitative historical sources, the following results were obtained, which are summarized in Table 1.

Table 1. Summary table of the documents obtained from sorted and not sorted in series quantitative historical sources.

Document name	Year	Status and characteristics	Content
Quantitative historical sources sorted in series			
Hospital Real Expósitos,125. Libro de contas de gastos da Inclusa (Hospital Real, Foundlings,125. Book of accounts of the foundling home).	1807	Handwritten book on parchment with liquid ink. Number of pages: 37	The document contains information on: • Bread portions: 6 portions per wet nurse, of two pounds a day. Monthly expenditure averages 372 reales. • Wine servings: 6 servings per wet nurse, of half a cuartillo per day. Monthly expenditure averages 90 reales. • Workers' salaries: a total of 183,532 reales. • Others: oil, candles, and tallow expenditures • Total, foundling home expenditures: 189,251 reales.
Hospital Real Expósitos,126. Libro de contas de gastos da Inclusa (Hospital Real, Foundlings,126. Book of accounts of the foundling home).	1808	Handwritten book on parchment with liquid ink. Number of pages: 37	The document contains information on: • Bread portions: 6 portions per wet nurse, of two pounds a day. Monthly expenditure averages 372 reales. • Wine servings: 6 servings per wet nurse, of half a cuartillo per day. Monthly expenditure averages 90 reales. • Workers' salaries: a total of 183,532 reales. • Others: oil, candles, and tallow expenditures • Total, foundling home expenditures: 195,251 reales.
Hospital Real Expósitos,121. Libro de rexistro de entrega de nenos/as ás amas de cría (Hospital Real, Foundlings,121. Registry book of foundlings' delivery to the wet nurses).	1803-1804	Handwritten book on parchment with liquid ink. Number of pages: 498	Each of the documents contains information about the parish to which the wet nurse belonged, her name and the name of her husband, as well as the names of the children who died or were in her care.
Hospital Real Expósitos,122. Libro de rexistro de entrega de nenos/as ás amas de cría (Hospital Real, Foundlings,122. Registry book of foundlings' delivery to the wet nurses).	1804-1805	Handwritten book on parchment with liquid ink. Number of pages: 397	Each of the documents contains information about the parish to which the wet nurse belonged, her name and the name of her husband, as well as the names of the children who died or were in her care.
Hospital Real Expósitos,123. Libro de rexistro de entrega de nenos/as ás amas de cría (Hospital Real, Foundlings,123. Registry book of foundlings' delivery to the wet nurses).	1805-1806	Handwritten book on parchment with liquid ink. Number of pages: 470	Each of the documents contains information about the parish to which the wet nurse belonged, her name and the name of her husband, as well as the names of the children who died or were in her care.
Hospital Real Expósitos,124. Libro de rexistro de entrega de nenos/as ás amas de cría (Hospital Real, Foundlings,124. Registry book of foundlings' delivery to the wet nurses).	1806-1807	Handwritten book on parchment with liquid ink. Number of pages: 510	Each of the documents contains information about the parish to which the wet nurse belonged, her name and the name of her husband, as well as the names of the children who died or were in her care.
Hospital Real Expósitos,127. Libro de rexistro de entrega de nenos/as ás amas de cría (Hospital Real, Foundlings,127. Registry book of foundlings' delivery to the wet nurses).	1807-1808	Handwritten book on parchment with liquid ink. Very poorly preserved. Number of pages: 512	Each of the documents contains information about the parish to which the wet nurse belonged, her name and the name of her husband, as well as the names of the children who died or were in her care.

Table 1. Summary table of the documents obtained from sorted and not sorted in series quantitative historical sources. (Cont.)

Document name	Year	Status and characteristics	Content
Hospital Real Expósitos, 112. "Libro de pagas a las amas de cría" (Hospital Real, Foundlings, 112. "Registry book of payments to the wet nurses").	1796-1808	Handwritten book on parchment with liquid ink. Number of pages: 223-653	The book contains information on the salaries received by the wet nurses who took care of second-class foundlings, that is, those children older than 36 months (3 years old). From 1803 to 1805 the following annual payments are maintained: in the first year 63 reales were paid, in the second 57 reales and in the third 33 reales. From 1805 onwards, the first payment was increased to 89 reales, the second to 80 reales and the third to 91 reales. From 1807 onwards the third payment was 96 reales. There was a year in 1807-1808 in which a single payment of 179 reales was made. The salary accounts were made in July of each year. In the cases in which the foundling died, the wet nurse received the payments corresponding to the months she dedicated to the care of the child.
Hospital Real Expósitos, 119. "Cuadernillos de paga de amas de cría de expósitos de 1ª clase" (Hospital Real, Foundlings, 112. "Booklets of pay of first-class foundlings' wet nurses").	1802-1808	Several booklets held together by thread and a cover with the title: "*Cuaderno de paga de expósitos de primera clase, desde 1802 hasta 1808* (First-class foundlings' pay notebook from 1802 to 1808)." Each document is signed by the authorities of the Royal House of the time, among them, Antonia de la Concha (main mistress). It contains an index of parishes.	• **1801:** there was a misplaced document from this year which reflects the total expenditure on the salaries of the wet nurses: 56,036 reales. • **1802:** minimum wage 33, maximum 171. Mode: 85 reales. Total spent: 50,717 reales. • **1803:** minimum wage 28, maximum 175. Mode: 85 reales. Total spent: 45,978 reales. • **1804:** minimum wage 35, maximum 152. Mode: 86 reales. Total spent: 54,609 reales. • **1805**: minimum wage 20, maximum 97. Mode: 85 reales. Total spent: 34,934 reales. • **1806**: minimum wage 31, maximum 164. Mode: 121 reales. Total spent: 58,151 reales. • **1807**: minimum wage 37, maximum 372. Mode: 251 reales. Total spent: 137,284 reales. • **1808:** minimum wage 15, maximum 340. Mode: 238 reales. Total spent: 153,203 reales.
Quantitative historical sources not sorted in series			
Constituciones para el régimen y gobierno del Hospital Real de la ciudad de Santiago y administración, cuenta y razón de sus bienes y rentas (Constitutions for the regulation and government of the Hospital Real of the city of Santiago and its management, account and reason of its goods and revenues).	1804	Set of typewritten documents on white paper. Numbered page by page. With the seal of the Hospital Real. Number of pages: 236	The document provided information on how the Hospital Real was to be organized and managed. It specified the ideal number of each type of worker, how the hierarchy was to be established, and how the Boards were to be appointed, among other matters. Regarding the care of foundlings, it mandated that baptism was to be given immediately once the child had entered the foundling home.
Cartilla o método que se observará en la Inclusa del gran Hospital Nacional de Santiago para con sus expósitos. Dispuesta por la Junta Interina del mismo (Booklet or method to be observed in the foundling home of the great National Hospital of Santiago for its foundlings. Disposed by the Acting Board of the hospital).	1821	Set of typewritten documents on white paper. Numbered page by page. With the seal of the Hospital Real. Number of pages: 16	The document provided information on how the wet nurses and nursemaids were to carry out their work (feeding, providing warmth, and cleaning the infants). It also established the distribution of the foundlings and how the rooms that housed them were to be set up.

Regarding the information obtained from the indirect positional historical source, eight experts in the field were contacted, one of whom did not reply, two of them recommended reading articles that have not been included in the paper because they do not study the historical period in question, two recommended contacting other experts in the field, and two other experts recommended reading the book "*El hospital Real de Santiago de Compostela y la hospitalidad en el camino de peregrinación*" (The Hospital Real of Santiago de Compostela and hospitality on the pilgrimage way) and the congress lecture "Amas, enfermeras, mozas y lavanderas. Los niveles de vida de las trabajadoras del Hospital Real de Santiago (1800-1930) (Mistresses, nurses, maids and laundresses. The living standards of the female workers at the Hospital Real of Santiago [1800-1930])", both of which have been included as bibliographic references for the writing of this paper. Finally, Isidoro Rodríguez Pérez, professor of Nursing History at the University of Santiago de Compostela, at the Lugo campus, agreed to do a complete personal interview in which he emphasizes that at that time there were foundling homes in the cities of the Autonomous Community of Galicia, where children up to four to five years old were sent to the care of a paid wet nurse, which coincided with the regency of Isabel Zendal of the foundling home in A Coruña. Lastly, he emphasizes that, as the literature reports, infant mortality in general was high, although it is very difficult to determine the causes associated with malpractice or with the diseases that affected that era.

Results

For the main objective, "to determine the duties of wet nurses in the Hospital Real de Santiago de Compostela between 1803 and 1808", it has been analyzed that the main task of the wet nurse was to keep alive the foundling or foundlings in her charge. To this end, she breastfed the child, provided basic care (hygiene, sleep, etc.), and in most cases was also responsible for the subsequent education, since the surviving children were often fostered by their wet nurses. Therefore, these women were not only in charge of perpetuating the life of the child, but also of the social and cultural aspects of the child's life.[12,13] The duties of the wet nurses in the hospital were classified into four: warmth, cleanliness, food, and sleep.[12] They had to look after the children and this included watching over the turnstile located in one of the hospital's windows where the parents left the children. Therefore, they were the infant's first contact with the institution.[4,14] The turnstile had to have bells that alerted the wet nurse on duty of the arrival of a new foundling. At this first moment, they had to caress and undress him, note the condition in which the child arrived and if they brought with them a baptismal certificate. In the case of children who were in a very serious condition, they were to notify the manager so that baptism could be performed.[12,14]

The warmth had to be maintained, preferably with a brazier in each of the rooms that housed the children; there could be neither fumes nor toxins. To provide warmth to the newcomer, a bath in warm water was given and the infant was placed in a cradle with clean clothes.[4,12] As for the food, it depended on the needs and age of each foundling; for those who were very critically or seriously ill, a wet nurse was assigned to them; on the other hand, for those who were robust, cow's or goat's milk was prescribed, which was watered down if required by the doctor. From seven months of age onwards, the nurses were required to prepare more substantial porridges such as rice soups, bread soaked in milk or barley creams with egg yolk. From the age of one year or fifteen months, depending on the child's needs, whole foods were introduced.[12]

For better care, the foundlings were classified into three groups: healthy, sick, and suspicious. The foundling nursemaid was in charge of the healthy ones (a widow who did the same job as the wet nurses, but administered artificial lactation with feeding bottles, which were individual and had to

be washed after each use), and the suspicious and sick ones were assigned a wet nurse or a nursemaid depending on the needs of each child. The rooms where care was provided were white, clean, and warm. Each of the cradles was numbered and had a board on which the feedings that had been provided were noted. For every 6 cradles there was a wet nurse or a nursemaid who looked after them.[12]

On the other hand, wet nurses who took care of the children in their own homes were in charge of transporting them from the capital to the town where they were going to live with the child, which was arduous, since they did not have the means nor adequate roads to do so. These women provided not only the aforementioned care, but also gave the child the opportunity to live in a family, since they lived together with their husbands and children.[6]

For the secondary objective "To compare the mortality rate of foundlings in the care of the Royal House between 1803 and 1808", this study presents the data in Table 2. The data shows that the mortality rate of foundlings varies according to the period, with the lowest in 1806-1807 and the highest in 1807-1808. As for those who died before registering, they represent between 9% and 19.23% of the total mortality rate.[15-20]

Table 2. Royal House's foundlings' mortality rate between 1803-1808

Year	Total Foundlings	No. of Dead Foundlings	No. of Live Foundlings
May 1803 – April 1804	545	351 (64.4%) Deceased before being registered: 54 (10%)	194 (33.6%)
May 1804 - April 1805	514	286 (55.7%) Deceased before being registered: 55 (19.23%) Deceased before leaving the foundling home: 197	228 (44.3%)
May 1805 – April 1806	606	383 (63.2%) Deceased before being registered: 64 (17%) Deceased before leaving the foundling home: 202	223 (36.8%)
May 1806 – April 1807	670	362 (54%) Deceased before being registered: 33 (9%) Deceased before leaving the foundling home: 174	308 (46%)
May 1807 – April 1808	640	477 (74%) Deceased before being registered: 43 (9%) Deceased before leaving the foundling home: 196	163 (26%)

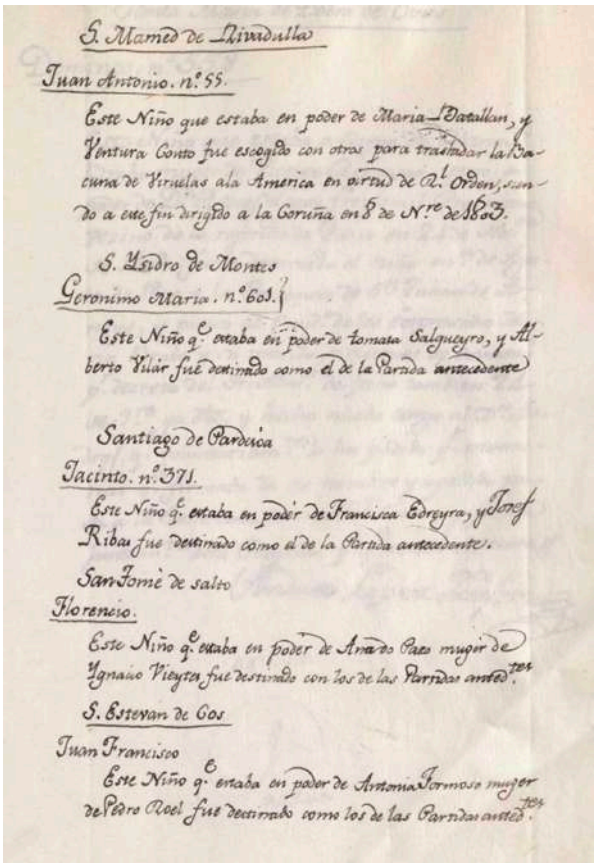
For the secondary objective "To compare the distribution by parish of the foundlings under the care of the Royal House between 1803 and 1808".[15-19] Next, the number of parishes included in the distribution and the point farthest from Santiago de Compostela, the main seat of the Royal House, is detailed by year. In 1803-1804 there were a total of 192 parishes and the farthest point corresponds to Burela, at a distance of 160 km; in 1804-1805 there were a total of 251 parishes and Viana do Bolo was the farthest point, at a distance of 220 km; in 1805-1806 there were a total of 236 parishes and the farthest point on the map corresponds to Viveiro (140 km); in 1806-1807 there were a total of 246 parishes and the farthest point was Foz (153 km) and finally in 1807-1808 there were 221 parishes and the farthest point was Viveiro (140 km).[15-20]

For the secondary objective, "To evaluate the delivery of foundlings in the Hospital Real of Santiago de Compostela", the following information was found during the visit to the current *Hostal*, in the plaque number 30 placed by the *Hostal*'s Museum. The plaque describes how the exchange of children was carried out: "In San Francisco Street there was a window with a bell and a turnstile like the one in cloistered convents. Someone would knock, wait until they heard '*Ave Maria Purisima* (Holy Mother of God)' and then deposit the newborn." The window in which the infants were placed has been photographed. Nowadays it is closed with bars and no longer has the turnstile that it had in former times (Figure 3).

Finally, for the secondary objective "To determine the origin of the Galician foundlings who participated in the Royal Philanthropic Expedition of the Smallpox Vaccine of 1803", the expedition was carried out in 1803 and promoted by several high officials of the Spanish healthcare and government of the time. It is worth mentioning the participation of Isabel Zendal, nurse and head of the foundling home of A Coruña, who was in charge of the care of the 21 foundlings who were inoculated with the smallpox vaccine across the Atlantic to Mexico.[21,22]

Figure 3. View of the window from San Francisco Street

Five of the carrier children belonged to the Royal House, among them, Juan Antonio, whose wet nurse was named María Batallan and her husband Ventura de Couto, from the parish of San Mamede de Rivadulla; Jacinto, who was under the care of Francisca Edreira and Josef Rivas from the parish of Santiago de Pardesoa; Gerónimo María, whose wet nurse was Tomasa Salgueiro and her husband Alberto Vilar, coming from San Isidro de Montes; Francisco Florencio under the care of Ignacio Vieites and Ana de Pazo, neighbors of San Tomé de Salto; and, finally, Juan Francisco, under the care of Antonia Formoso and Pedro Roel, from the parish of San Estevan de Cos (Figure 4).[15,21,22]



S. Mamed de Rivadulla

Juan Antonio. n.º 55.

Este Niño que estaba en poder de Maria Batallan, y Ventura Conto fue escogido con otros para trasladar la Vacuna de Viruelas ala America en virtud de R.l Orden, cuando a ese fin dirigido a la Coruña en 8 de N.re de 1803.

S. Isidro de Montes

Geronimo Maria. n.º 603.

Este Niño q.e estaba en poder de tomasa Salgueyro, y Alberto Vilar fue destinado como el de la Partida antecedente

Santiago de Pardesca

Jacinto. n.º 371.

Este Niño q.e estaba en poder de Francisca Correyra, y Josef Ribau fue destinado como el de la Partida antecedente.

San Jomé de salto

Florencio.

Este Niño q.e estaba en poder de Amaro Paz mujer de Ygnacio Vieytes fue destinado con los de las Partidas antec.tes

S. Estevan de Gos

Juan Francisco

Este Niño q.e estaba en poder de Antonia Formoso mujer de Pedro Noel fue destinado como los de las Partidas antec.tes

Figure 4. Document extracted from the Foundling Hospital Real (1803-1804). Information corresponding to the children who were selected to carry the vaccine to America in the Royal Philanthropic Expedition of the Smallpox Vaccine [15]

Also, during the visit to the *Hostal*'s Museum, a plaque commemorating the five children who participated in the Royal Expedition was found to the left of the window where the foundlings were deposited (Figure 5).

Figure 5. Plaque commemorating the children who participated in the Royal Philanthropic Vaccine Expedition

Discussion

The importance of this work lies in viewing history as a tool for understanding the origins of the nursing profession, since it is the first step in recognizing and studying nursing as we know it today.[1] Josep Fontana, in the prologue of the book *Los métodos de la Historia* (The Methods of History), written by Cardoso and Pérez Brignoli, emphasizes the importance of the knowledge of history in order to understand the present and future; "It would be good to begin to teach history as a system of research: as a set of methods whose main purpose is to help people to understand, through the deciphering of their past, the reasons that explain their present situation and the perspectives from which they must start in the elaboration of their future".[23]

The history of nursing is as old as humanity. Since ancient times there were one or several figures in charge of providing care to the population. Each of them played a specific role, so it is necessary to give each part of the system the importance it deserves.[1]

This paper focuses on the years 1803 to 1808. It was decided to study these years because it was a difficult time for this profession, as it was in this historical moment when the greatest boom in the hiring of wet nurses was reached and when, later, their work was questioned. Therefore, the purpose of this study is to have a broader vision of the pediatric care performed by wet nurses as one of the precursor figures of the pediatric nursing profession at the time.[1,2,5]

The duties performed by wet nurses at the Hospital Real of Santiago de Compostela are very similar to those carried out by wet nurses in different parts of the world. In the case of Portugal, in Oporto, there were different types of wet nurses; the *amas de dentro*: wet nurses who were inside the foundling home, who watched over the turnstile; the *amas de empréstito*, who were hired when there was an excess of foundlings; and, finally, the *amas de fora*: those who raised children in their homes until they were 7 years old. In England, in London, wet nurses were women without resources who carried out this work due to the good salaries they received. They raised between two and three children. France already had in 1769 a specific organization for the hiring of wet nurses and, in the case of Brazil, the wet nurse was a slave of the European descendants, she was separated from her biological child at birth and was forced to breastfeed her master's child. Along with hygiene, warmth and food, a social relationship was created not only between the wet nurse and the foundling, but also between the infant and the nurse's children. This bond was called milk kinship, which refers to the "adoption" of the foundling by the family, being included in the family dynamics as a child.[2] In all countries the same dynamic occurred; the wet nurse was a woman without resources or education, who performed this work in order to earn a living. She had to be under the protection of a man (husband, father and/or parish priest) and needed his permission to be able to perform this work.[2]
The average infant mortality of the foundlings from 1803 to 1808 extracted from the documents studied was 62.24%. In Galicia, between 1750 and 1810, the average infant mortality was 46.8%. It should be noted that this percentage includes the entire infant population at the time, whether they were foundlings or not.[23] Therefore, when comparing these percentages, all the variables that may be involved in the difference in mortality should be taken into account, such as lack of food, greater contact with other infants (which in turn implies a greater risk of contagion of exanthematous diseases), and the transfer from the foundling home to the parishes, among others.[4,24] On the other hand, when comparing this percentage with the mortality rate for the year 1829, the one for that year was 49.7%;[25] thus, it can be observed that after the publication of the document "Booklet or method to be observed in the foundling home of the great National Hospital of Santiago for its foundlings"[12]the situation in the Royal House improved.

The distribution of foundlings by parish between 1803 and 1808 was similar, with a greater tendency towards the areas closest to Santiago de Compostela, being present in the four provinces, but to a greater extent in A Coruña and Pontevedra. If we compare it with the distribution established for 1829, [25] it continues to be similar to that obtained at the beginning of the century.

The distribution of foundlings by parish in 1750. In the accompanying text, it is specified that the maximum distance between the parishes receiving foundlings and the Royal House was approximately 8 leagues (38 kilometers).[6]

The deposit of foundlings through the turnstile was a widespread practice in the foundling homes, which allowed the child to be deposited

without having to be seen. With this, the hospices themselves wanted to protect the minor, since, before the installation of the turnstile, they were often abandoned at the doors of convents, churches and foundling homes, causing the death of many of them by hypothermia during the night.[4,24] Two of the children destined for the Royal Smallpox Vaccine Expedition belonged to the province of Pontevedra and the other three to the province of A Coruña, in accordance with the dynamics of distribution corresponding to the year 1803. The participation of children in labor was a widespread practice among the society of the time; both families and institutions used them as labor for the execution of various tasks. Among other purposes, they were used as labor for medical or scientific purposes. This gave rise to the so-called "vacciniferous children", because children had not developed immunization against smallpox and this guaranteed the expedition's success.[21]

The publication of advertisements for wet nurses in the local press was not an isolated event, as many women opted for this method of obtaining work. In this way it was wet nurses themselves who offered their services. This type of advertising was mainly directed at private individuals.[2]

With regard to the salaries received by wet nurses in Santiago de Compostela, in comparison with other cities at the end of the eighteenth century; the salary was 30 reales a month for four years in Cartagena, without the possibility of returning the foundling; in Barcelona, 12 pounds a year for external wet nurses during lactation and 50 reales in the following 5 years; 60 reales a month as an internal wet nurse and 30 reales for two years as an external wet nurse in the foundling home of Lorca; but in Granada it was the lowest, being 16 reales a month during lactation and 11 in the following years.[3]

If we compare the salaries received by wet nurses with those of the other workers of the Hospital Real between 1803 and 1808, they had the third best salary; only the senior nurse and Antonia de la Concha, senior mistress of the foundling home in Santiago de Compostela from 1794 to 1829, were above them.[26,27]

When analyzing the expenses of the foundling home in 1807 and 1808, the cost of bread for wet nurses was 2.35% of the total in 1807 and 2.88% in 1808, while the cost of wine was 0.57% of the total in 1807 and 0.55% of the total in 1808. If we compare it with other institutions destined to the care of foundlings, its expenses at the end of the eighteenth century were the following: 24,000 reales per year in Cartagena, 37,492 reales per year in Lorca and 370,000 reales in Madrid.[3,28,29]

So, even though the Royal House was above Lorca and Cartagena in terms of foundling home expenses, it was still the one with the worst working conditions for wet nurses, ranking as the worst paid of the most important Spanish foundling homes.[3,30]

Finally, healthcare activity in the Hospital Real ceased in 1953, when care was transferred to the new hospital in the city and the building became a national inn for lodging[6].

The main limitations of this work lie in the fact that due to the dates of the primary sources used as bibliography for the writing of this manuscript (nineteenth century), all the documentation is handwritten in ink, implying difficulties in its reading. Additionally, some of the documents consulted were deteriorated (humidity, traces of ash after reading with candles...), so that sometimes it was impossible to read some of them completely. Regarding the secondary sources (books, newspaper articles, maps, papers) selected, they have been rewritten after the period studied, so biases could have occurred in the reediting process.

Conclusion

The duties performed by wet nurses at the Hospital Real between 1803 and 1808 were to provide basic care (warmth, feeding, hygiene and sleep) and to educate the foundlings in cultural and social aspects. They provided care for the pediatric community, therefore, they were the predecessors in specialized neonatal care following a holistic view of it before the creation of the specialty of pediatric nursing, since at that time nurses carried out generalist care.

The mortality rate of foundlings under the care of the Royal House between 1803 and 1808 fluctuated, with the lowest in the 1806-1807 interval with a mortality rate of 54%, and the highest between 1807-1808 with a mortality rate of 74%. The distribution of the foundlings by parish under the care of the Royal House between 1803 and 1808 was very similar, with a predominance in the provinces of A Coruña and Pontevedra and very few in the provinces of Ourense and Lugo. The maximum distance reached in that period was 220 km.

The foundlings were brought to the Hospital Real of Santiago de Compostela through a turnstile located in the first window that faced San Francisco Street. The origins of the Galician foundlings who participated in the Royal Smallpox Vaccine Expedition were as follows: Juan Antonio, from the parish of San Mamede de Rivadulla; Jacinto, from Santiago de Pardesoa; Gerónimo María, from San Isidro de Montes; Francisco Florencio, from San Tomé de Salto; and finally, Juan Francisco, from San Estevan de Cos.

The purpose of this paper is to show the fundamental work carried out by wet nurses throughout history, since they were the essential link to carry out holistic neonatal care at that time and the precursors of the pediatric nursing specialty.

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Repercussions of the COVID-19 pandemic on breast cancer actions in a Brazilian state

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Repercussions of the COVID-19 pandemic on breast cancer actions in a Brazilian State

Abstract

Objective. To analyze whether the COVID-19 pandemic had an impact on the screening, diagnosis and treatment of breast cancer in women up to 50 years of age in the state of Pará. **Methods.** Retrospective, cross-sectional study with a quantitative approach, using data from the Information Technology Department of the Brazilian Unified Health System. (DATASUS). The number of exams carried out in the pre-pandemic (2018-2019) and pandemic (2020-2021) period was analyzed based on the percentage variation, application of the chi-square test and G test for the time of exams and start time of treatment. **Results.** During the pandemic period, there was a greater number of screening mammograms (+3.68%), cytological (+23.68%), histological (+10.7%) and a lower number of diagnostic mammograms (-38.7%). The time interval for carrying out the exams was up to 30

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days for screening and diagnostic exams and more than 60 days to start treatment during the pandemic period. **Conclusion.** Although the results indicate an increase in the number of screening and diagnostic procedures for breast cancer during the pandemic period, with the exception of diagnostic mammography, when considering probability values, the study points out that statistically the COVID-19 pandemic did not interfere with actions of breast cancer, in women over 50 years of age, in the state of Pará. Considering the autonomy of nursing and its role in public health, it is up to the professionals who are in charge of primary care programs to implement contingency plans in periods of crisis so that the population is not left unassisted.

Descriptors: COVID-19; SARS-CoV-2; mammogram; breast neoplasms; breast carcinoma in situ.

Repercusiones de la pandemia de COVID-19 en las acciones contra el cáncer de mama en un estado brasileira

Resumen

Objetivo. Analizar si la pandemia de COVID-19 tuvo impacto en el tamizaje, diagnóstico y tratamiento del cáncer de mama en mujeres de 50 años y más del Estado do Pará-Brasil. **Métodos.** Estudio retrospectivo, transversal, con abordaje cuantitativo, en el que se utilizaron los datos del Departamento de Informática del Sistema Único de Salud de Brasil (DATASUS). Se comparó el número de exámenes realizados y el tiempo para el inicio de tratamiento en los períodos prepandémico (2018-2019) y pandémico (2020-2021). **Resultados.** Se observó un mayor número de mamografías de cribado (+3.68%), citologías (+23.68%) e histologías (+10.7%) y un menor número de mamografías diagnósticas (-38.7%) en el período pandémico. El tiempo para la realización de las pruebas fue de hasta 30 días para el cribado y diagnóstico y de más de 60 días para el inicio del tratamiento durante el período pandémico. **Conclusión.** Aunque los resultados indican un aumento del número de procedimientos de cribado y diagnóstico del cáncer de mama en el periodo pandémico, con la excepción de la mamografía diagnóstica, cuando consideramos los valores de p) el estudio muestra que la pandemia COVID-19 estadísticamente no interfirió en las acciones preventivas contra el cáncer de mama en mujeres de 50 años y más en el estado de Pará. Teniendo en cuenta la autonomía de la enfermería

y su papel en la salud pública, corresponde a los profesionales responsables de los programas de atención primaria implementar planes de contingencia en tiempos de crisis para no dejar desatendida a la población.

Descriptores: COVID-19; SARS-CoV-2; Mamografía, Neoplasias de la Mama, Carcinoma de Mama in situ

Repercussões a pandemia da COVID-19 nas ações do câncer de mama em um Estado Brasileiro

Resumo

Objetivo. Analisar se a pandemia da COVID-19 repercutiu no rastreamento, diagnóstico e tratamento do câncer de mama em mulheres paraenses a partir de 50 anos. **Métodos.** Estudo retrospectivo, transversal, de abordagem quantitativa, com utilização de dados do Departamento de Informática do Sistema Único de Saúde brasileiro. (DATASUS). Analisou-se o número de exames realizados no período pré-pandemia (2018-2019) e pandêmico (2020-2021) com base na variação percentual, aplicação do teste qui quadrado e teste G para o tempo de realização de exames e tempo de início de tratamento. **Resultados.** Observou-se no período pandêmico maior quantitativo de mamografias de rastreamento (+3.68%), citológicos (+23.68%), histológicos (+10.7%) e menor registro de mamografias diagnósticas (-38.7%). O intervalo de tempo para realização dos exames foi de até 30 dias para os exames de rastreamento e diagnóstico e tempo maior que 60 dias para início de tratamento no período pandêmico. **Conclusão.** Embora os resultados indiquem aumento no quantitativo de procedimentos de rastreamento e diagnósticos para o câncer de mama no período pandêmico, com exceção da mamografia diagnóstica, ao considerarmos os valores de probabilidade, o estudo aponta que estatisticamente a pandemia da COVID-19 não interferiu nas ações do câncer de mama, em mulheres a partir de 50 anos, no Estado do Pará. Considerando a autonomia da enfermagem e sua atuação na saúde pública, cabe aos profissionais que estão à frente dos programas da atenção básica implementar planos de contingência em períodos de crise para que a população não fique desassistida.

Descritores: COVID-19; SARS-CoV-2; mamografia; neoplasias da mama; carcinoma da mama in situ.

Introduction

Cancer is the leading cause of death before the age of 70 in several countries, with its incidence and mortality increasing on the world scenario.[1] Breast cancer is the most common among women, the second most frequent and the fifth leading cause of cancer death in the world. The global estimate for the year 2020 was 2.3 million new cases of breast carcinoma, representing 11.7% of all cancer cases in the world. Breast cancer ranks first in incidence in most countries and in mortality in 110 countries, accounting for 1 in 4 new cases and 1 in 6 cancer deaths.[1] Its incidence is higher both in countries with a high Human Development Index (HDI) and in countries with a low or medium HDI.[1]

In Brazil, in 2019, the estimated rate of breast cancer was 56.33 per 100,000 women.[2] In the northern region of the country, the estimated number of new cases of breast cancer for the year 2020/2022 was 1,970 cases, of these, 780 cases in the state of Pará.[3] For the 2023/2025 triennium, it is estimated that there will be 73,610 new cases of this type of cancer in Brazil.[4]The survival estimates of Brazilian individuals with breast cancer for the period from 2010 to 2014 were five years, so early diagnosis and timely treatment predict greater chances of curing the disease.[1] On the other hand, limited access to diagnostic methods and appropriate and timely treatment, as well as factors related to the knowledge of the disease, result in diagnoses in more advanced stages, worsening the prognosis.[1] The earlier a tumor is identified, the greater the chances of cure.

Research conducted before the pandemic indicates that most patients diagnosed with cancer have a delay of three to six months between the confirmed diagnosis and the start of treatment. The delay between diagnosis and initiation of treatment or care after the onset of symptoms is associated with a worsening of the prognosis of breast cancer, as well as with the repercussion of patient survival.[5] Delays in the diagnosis and treatment of cancer are related to several reasons, whether associated with the access and organization of health services, professionals or patients themselves.[2] The COVID-19 pandemic declared in 2020 possibly also affected the screening, diagnosis and treatment of cancers in the Brazilian population.

Diagnosing and treating breast cancer in a timely manner has always been the public health challenge in Brazil. In the state of Pará, a Brazilian state located in the northern region of the country, territorial aspects such as the distance from specialized health services and the socioeconomic condition of the population are conditioning factors for access to screening, diagnosis and treatment services for various diseases. The COVID-19 pandemic situation has become another barrier to the displacement of women in need of breast cancer screening and monitoring, given the lockdown period and other

social isolation measures established by local authorities. After the pandemic was declared by the World Health Organization (WHO), several changes occurred in society, with Brazilian states needing to adopt restrictive measures in order to contain the contagion of the disease. Brazil was one of the four countries with the highest number of confirmed COVID-19 infections, with high rates of transmissibility causing collapse in health services.[5,6]

A study carried out at a breast imaging center in the state of São Paulo, located in the most developed region of Brazil, identified a 78.9% reduction in imaging tests and breast procedures in the first 90 days of social isolation in 2020, compared to the previous year. The number of breast cancers identified by mammography was 3 times higher than in 2019. Other countries also reported a reduction in breast cancer diagnoses in the first period of the pandemic.[7] A study carried out in Brazil to identify the repercussions of COVID-19 on cancer screening, diagnosis and treatment found a reduction of 42.6% in mammograms, 35.3% in biopsies, 15.7% in oncological surgeries and 0.7% in radiotherapy procedures in 2020 compared to 2019.[8] In the population-based modeling study, the estimated increase in breast cancer deaths due to delayed diagnosis of the disease resulting from the pandemic, within 5 years of detection of the disease was 7.9% to 9.6%.[9]

As the pandemic progressed and the population became more contagious, measures such as isolation, quarantine and social distancing were necessary to control the spread of the disease. Considering that COVID-19 affects individuals with comorbidities, especially the elderly; individuals undergoing cancer treatment constitute a risk group given their decreased immune response as a result of treatment, and protective measures should be reinforced for this public.[10] That access to health services is an obstacle to the treatment of several diseases is nothing new to those who depend on the Brazilian health system or work in it. The poor distribution of health services in the vast territorial extension of the state of Pará reflects inequities in access to services. During the critical period of the pandemic, the difficulty of access to health services by the population was notorious, when the treatment of chronic diseases or elective surgeries was suspended due to the care of patients with COVID-19. There was no physical structure, human resources and equipment to meet the need for care. Based on the observation of the fragility of health services to maintain the monitoring of chronic diseases, including breast cancer,-the study aimed to identify whether there was an impact of the COVID-19 pandemic on the screening, diagnosis and treatment of breast cancer in women from 50 years of age in the state of Pará.

The flow of care for any disease must be strategically organized to meet the needs of users, passing through all levels of care. The knowledge and monitoring of care actions provided to the population in periods of crisis and the way this care is being offered, guides nurses in their practices of implementing health policies aimed at the population and in the strategic planning of better actions to be carried out in times of future health crisis. Considering that nurses are the ones who assume the important role of coordinating primary care health programs and also in secondary and tertiary care services, they can benefit from data such as this research, to execute intervention projects aiming at positive impacts on the health of the population.

Methods

This is a cross-sectional study, with a quantitative approach, with analysis of retrospective data, carried out in DATASUS, with samples of records from 144 municipalities in the Brazilian state. The state of Pará is the second largest territory in Brazil, with an area of 1,247,954.666 km^2 and an estimated population of 8,513,497 inhabitants, distributed in its 144 municipalities.

The state is cut by 20,000 kilometers of rivers, with water and road transport being predominant.

The sample consisted of 102,903 screening and diagnostic tests of women with breast cancer in the state of Pará, aged from 50 years, in addition to the registration of 1,040 treatments. The records were obtained through information systems of the Brazilian national cancer control program (Cancer Information System - SISCAN) and the oncology panel available in the Tabnet 3.2 application. Records of screening tests, diagnoses and treatments of women with breast cancer performed and initiated in the period from January to December 2018, 2019, 2020 and 2021 were selected. In order to verify the volume of exams, screening exams of any periodicity were considered.

Data collection took place from August 2022 to March 2023 due to data update of the DATASUS system. The following qualitative variables were selected: sex, time of exams and start of treatment. The quantitative variables chosen were: number of screening and diagnostic mammograms, number of cytologies (Fine Needle Aspiration Puncture - FNA), and number of histologies. The data were first organized in spreadsheets in the Microsoft Excel® software, with the pre-pandemic and pandemic periods being related to one of the selected variables (12 months of the year, time interval for the examination and time interval for treatment initiation).

The years 2018-2019 were characterized as a pre-pandemic period, while the years 2020-2021 were characterized as a pandemic period. The time of diagnostic mammography examination and screening were grouped into 2 groups, the first of up to 30 days and the second greater than 30 days; the time of diagnostic examination (FNA, histological) and time of treatment initiation in 3 groups with an interval of 30 days (Up to 30 days, 31 - 60 days, > 60 days). The time interval of the mammography exam comprises the time from the request for the exam to the performance of it, while the time interval of the histology and cytology exam apprehends the time in days from the day of collection to the release of the report by the laboratory, while the treatment start time comprises the interval between the diagnosis signed by the physician and the first therapy instituted. From the organization of the spreadsheets, the absolute frequencies and the percentage variation of exams performed over the months in the periods under study were calculated. Pearson's chi-square test and Williams' G-test were applied to analyze the pre-pandemic and pandemic periods in relation to the variable time to perform the exams and time to start breast cancer treatment in the Brazilian state. The statistical tests were performed in the Bioestat Software, version 5.3, with a significance level of 5%.

Results

The total number of breast cancer screening and diagnosis procedures performed in the state of Pará in the context of the pandemic (2020-2021) was 52,284, of which 387 were diagnostic mammograms, 50,914 screening mammograms, 141 cytologies and 842 histologies (Table 1), and 617 records of treatments performed were also observed.

All procedures performed, whether screening or diagnostic, varied over the periods studied. Diagnostic mammography fell during the pandemic period, while the other exams expressed an increase in their quantities. There was a difference of 244 diagnostic mammograms, 1805 screening mammograms in the pre-pandemic period in relation to the pandemic context. There was a total negative percentage variation of -38.7% in diagnostic mammograms and a positive percentage variation of 3.7% in screening mammograms (table-1). In the monthly relationship between the pre-pandemic and pandemic periods of April and May, there was a lower record of mammogram procedures performed, and this study showed a sharp drop of -33.5%, -37.1% and -88.6%, -90.7% of screening and diagnostic mammograms, respectively, in the months reported above (Table 1).

Table 1. Monthly and annual percentage variation of screening and diagnostic mammography in the state of Pará by period

Month	Screening Mammography			Diagnostic Mammography		
	Pre-pandemic	Pandemic	PV	Pre-pandemic	Pandemic	PV
	n	*n*	%	*n*	*n*	%
January	4376	4665	6.6	59	23	-61.0
February	4106	4490	9.4	51	29	-43.1
March	3769	4681	24.2	55	20	-63.6
April	3447	2291	-33.5	44	5	-88.6
May	3444	2167	-37.1	43	4	-90.7
June	3356	2886	-14.0	63	45	-28.6
July	3535	3642	3.0	49	32	-34.7
August	3972	4054	2.1	59	34	-42.4
September	3703	4358	17.7	63	56	-11.1
October	5002	5841	16.8	53	53	0.0
November	5353	6159	15.1	41	33	-19.5
December	5046	5680	12.6	51	53	3.9
Total	49109	50914	3.7	631	387	-38.7

Source: SISCAN. PV: Percentage variation; Pre-pandemic: 2018-2019; Pandemic: 2020-2021; *n*: Absolute number of exams.

Cytological and histological examinations showed a difference of 27 FNA and 77 histologies performed in the pre-pandemic period in relation to the pandemic context, with an even greater drop in May -73.3% and -46.5%, with an increase in October for FNA 220% and in January for histology 69.6% (Table 2).

Table 2. Monthly and annual percentage change in FNA and histology, in the state of Pará, by period

Month	PNA			Histology		
	Pre-pandemic	Pandemic	PV	Pre-pandemic	Pandemic	PV
	n	*n*	%	*n*	*n*	%
January	7	20	185.7	56	95	69.6
February	15	8	-46.7	112	73	-34.8
March	6	11	83.3	65	81	24.6
April	7	12	71.4	41	55	34.1
May	15	4	-73.3	86	46	-46.5
June	7	16	128.6	62	69	11.3
July	12	4	-66.7	65	62	-4.6
August	11	16	45.5	38	57	50.0
September	9	12	33.3	76	88	15.8
October	5	16	220.0	52	71	36.5
November	13	10	-23.1	70	92	31.4
December	7	12	71.4	42	53	26.2
Total	114	141	23.7	765	842	10.1

Source: SISCAN. PV: Percentage variation; Pre-pandemic: 2018-2019; Pandemic: 2020-2021; *n*: Absolute number of exams.

In the time interval for exams and treatment initiation, there was a significant difference between the pre-pandemic and pandemic periods, with p values <0.05. Of the total of 1108 registered diagnostic mammography exams, 62% were performed in the pre-pandemic period, 65.5% in the time interval greater than 30 days. While of 100,023 screening mammograms, 50.9% were performed in the pandemic period, with the highest number performed within 30 days. The difference between the periods under analysis was significant, with a *p* value <0.0001 for both types of mammography, based on the application of Pearson's Chi-square test. Of the FNA and histology exams (1862) 55.3% and 52.4%, respectively, were performed in the pandemic period with the highest proportion of exams recorded in the time interval of up to 30 days. For both exams, a statistically significant difference was observed in the relationship between the periods, with p values found, respectively, $p=0.0286$ and $p<0.0001$. To identify whether there was significance in the examination time interval between periods, Williams' G test was applied for FNA and Pearson's Chi-square test for histology (Table 3).

Table 3. Time interval for exams, by period, in the state of Pará

Exams	Pre-pandemic			Pandemic			*p*-value
	< 30 days	31-60 days	>60 days	< 30 days	31-60 days	>60 days	
Diagnostic Mammography	218	413	0	265	122	0	<0.0001*
Screening mammography	33287	5822	0	37546	13368	0	<0.0001*
Total	33505	16235	0	37811	13490	0	
PNA	97	8	9	132	7	2	0286
Histology	504	195	66	622	191	29	< 0.0001
Total	601	203	75	754	198	31	

Source: SISCAN. Pre-pandemic: 2018-2019; Pandemic: 2020-2021; *: Pearson's chi-square test; **: Williams' G test.

As for breast cancer therapy in Pará, 1040 treatments were recorded, of which 59.3% were performed in the pandemic period. The time interval for treatment initiation was greater than 60 days, with a percentage of 66.13% of treatments initiated in this period. There was a statistically significant difference between the periods studied, with a value of $p<0.0001$. (Table 4).

Table 4. Time to start breast cancer treatment, by period, in the state of Pará

Time	Pre-pandemic (n)	Pandemic (n)	PV
Up to 30 days	82	67	-18.3
31 - 60 days	124	142	+14.5
By 60 Days	217	408	+88
Total	423	617	+45.9

Source: SISCAN. Pre-pandemic: 2018-2019; Pandemic: 2020-2021

Discussion

The COVID 19 pandemic changed the global scenario in the economic, social and health context. The high number of people infected and the rapid spread of the virus had repercussions on the structuring, organization and delivery of health services around the world. Screening and monitoring procedures for several chronic non-communicable diseases, previously already weakened at national level, suffered harsh consequences, leaving patients unassisted. Studies carried out in Brazil and other countries indicate a negative impact of the pandemic on the screening, diagnosis and treatment of several cancers, including breast cancer. Analyses of the effect of the pandemic on breast cancer screening in Brazil, through the registration of mammograms, observed a reduction in the total number of this procedure performed in the pandemic period.[12]

In the United States, at the peak of the pandemic, a reduction of -85% in breast cancer examinations was identified.[13] While in an American network with a registry of 28 million patients, a reduction of -89.2% in breast cancer screening was also observed.[14] A study conducted in the regions of Brazil showed a decrease of -44% in the total number of screening mammograms performed in the country and -25% in the northern region.[15] While another survey showed a reduction of -40% in the total number of mammograms in 2020, screening mammograms were the most affected with a reduction of up to -41.65% and diagnostics -21.84%.[12] This investigation also states that although all Brazilian states showed a drop in the number of exams, Pará was one of the states with the lowest reduction in the volume of exams performed, - 2.01%.[12]

A Danish survey observed a drop in breast cancer screening shortly after the pandemic was decreed, even though the country maintained the breast cancer screening procedure in the pandemic period.[16] While in an Irish study 30.5% of women reported experiencing disruption in breast cancer services, and thus impacts of COVID-19.[17] In the state of Pará, through this study, a reduction in the registration of screening and diagnostic tests performed in 2020 was identified. This drop in the proportion of tests coincided with the first year of the pandemic in Brazil, when in March, the WHO declared the COVID-19 pandemic. The highest incidence of cases and deaths from COVID-19 recorded in the state of Pará occurred in April and May, months evidenced in the present study, in addition to June, as those with the highest drop in procedures performed compared to the previous year. In 2021, there was resumption in the performance of the exams; therefore, there was an increase in the number of exams performed. In the relationship between the pre-pandemic and pandemic periods, there was a greater registration of screening, FNA and histological mammography, and on the other hand, a decrease in diagnostic mammography performed in the period considered as pandemic. There was a difference of 1805 screening mammograms, 27 FNA, 77 histological and 244 diagnostic mammograms.

Although studies indicate that breast cancer actions in Brazil and around the world have been affected by the COVID-19 pandemic, the current study points out that in the state of Pará there was an increase in the number of exams carried out during the period considered pandemic. This divergence may be related to the relaxation of restrictive measures in the state, an attempt to normalize health services and the resumption of procedures carried out in 2021, which with an increase in the production of such exams had an impact on the gross number of exams carried out in the pre-pandemic and pandemic periods, the latter with a greater number of exams carried out. Given the large number of people infected, the WHO's main recommendation was social isolation in order to reduce the spread of the disease and mitigate the impact of the pandemic on the health system. Due to the concern of exposing patients to the COVID virus and the development of severe forms of the disease in cancer patients, the National Cancer Institute (INCA) recommended that health professionals postpone screening for breast cancer and evaluate each case for the real need to perform it.[18] In line with the recommendations of the WHO, the state of Pará decreed red flagging, adopting as measures to curb the advance of COVID; the restrictive time for the movement of people on the streets, restriction of the number of people in certain establishments, social distancing, among others. The overload on health services required the prioritization of care for COVID patients to the detriment of patients with chronic non-communicable diseases, including cancer. Health services were instructed to postpone consultations and examinations for a time of reduction of restrictions, having to evaluate the risks and benefits of elective procedures. In March 2021, the restrictive measures were again implemented due to the increase in new cases.

In the midst of the health crisis caused by the pandemic, the substantial role of nurses in the identification and active search for patients at high risk for breast cancer stands out, since screening is contraindicated by INCA. On March 26, 2020, the Federal Council of Nursing (COFEN) authorized and standardized the nursing tele-consultation for clarification, referrals and guidance to patients, facilitating the care process. Breast cancer patients need an individualized evaluation, access to information and safe assistance. Thus, through tele-consultation, nurses had the opportunity to ensure the safe access of cancer patients to health services, free of risks, either through hygiene guidelines, use of masks and reorganization of the care environment.

Regarding the time interval for performing screening tests and diagnoses of breast cancer, in the state of Pará, the tests were performed in their largest proportion in the time interval of up to 30 days, in both the pre-pandemic and pandemic periods. In order to ensure timely diagnosis and timely treatment, since 2019 Law number 13.896, directs that tests to confirm malignant neoplasm should be performed within a maximum of 30 days.[19, 20] Early diagnosis and therefore timely treatment provides for greater chances of curing breast cancer. An English survey estimated an increase of 2.1 to 9.6% in the number of deaths in the medium (1 year) and long term (5 years) from breast cancer due to delayed diagnosis in the pandemic period.[9] The reduced number of diagnostic tests performed in the state of Pará implies that women seek health services when the prognosis is no longer positive, which can be seen in the long term. The delay in diagnosis is related to the health system itself regarding its organization for the population's access to services and its own diagnostic capacity. Community awareness of the identification of signs and symptoms of the disease and timely service-seeking behavior is another influential factor in early diagnosis.

In the present study, the state had a time greater than 60 days to start breast cancer treatment, in addition to a greater record of cases treated in the pandemic period. Another study, which used data from the oncology panel, showed untreated patients within the 60-day period.[21] The treatment of cancers is

guaranteed free of charge by the Brazilian health system, and must be started within 60 days from the day of diagnosis confirmed by a report, whatever the therapeutic need.[19] Delays longer than 60 days in breast cancer therapy result in worsening patient survival.[22]

A Brazilian retrospective cohort study conducted between 2000 and 2011 showed that the time interval between diagnosis and treatment of breast cancer in the North region was 49 days. The same study also reveals that the North region has shown the worst results in relation to mammography, biopsies, early diagnosis and access to treatment. [22] In the state of Rio de Janeiro, located in the southeastern region of Brazil , the mean time to start breast cancer treatment was 206 days.[23]

Brazilian regional differences were highlighted regarding the structure of oncological services and mammographic coverage, also suggesting that the delay in the initiation of breast cancer treatment may be justified by the higher incidence of breast cancer in recent years and consequently greater demand for treatments not accompanied by the organization of oncology services.[22] Geographic disparities and the distribution of health services in the extensive territory of Pará, reinforce the aforementioned observations. The estimated incidence of breast cancer for the three-year period 2023-2025 is 24.99 new cases per 100,000 women in the North Region and 22.83% for 2023 in the state of Pará.[4]

Due to the large territorial extension of the state of Pará, the inequality in the distribution of health services and access of the population, in addition to socioeconomic and cultural issues, reflect in the performance of tests, time of diagnosis and treatment of women with cancer. The distance traveled by women with breast cancer to obtain access to health services confirms the fragility of the oncological care network in the state, exacerbated in the midst of the health crisis. The pandemic has brought to light several weaknesses in the health system of the countries. The response time, the rapid speed of transmission of the virus and the forms of treatment of the disease have become a challenge to Brazilian and Pará public health.

This study shows us, statistically, that there was no interference of the COVID-19 pandemic in the actions of breast cancer in the state; on the other hand, it is observed that in this period there was no orientation of reorganization of oncological services by the Ministry of Health (MH) and INCA so that the actions of screening and diagnosis were maintained, being the responsibility of the state and municipalities to develop strategies according to the demands of their oncology services. It is necessary to carry out studies that point out the distribution, coverage and organization of oncological services in Brazil, in order to reflect the promotion of strategies that minimize the disparities in the population's access to health services so that all the principles of the Brazilian health system are in fact met. For if in a future health crisis we neglect once again a disease that is the first cause of death in the world, we will condemn the population to a silent death. This study was limited by the fact that the data source is constantly updated and provides divergent data in terms of quantity. The oncology panel was only made available to managers in May 2019, and manual verification of the data obtained was required.

Conclusion From the data obtained, it was possible to achieve the objectives proposed for the study. The results indicated an important increase in the number of screening and diagnostic procedures for breast cancer in the pandemic period, with the exception of diagnostic mammography. However, when considering the values of (p), it appears that the COVID-19 pandemic did not interfere with breast cancer health actions in the state of Pará-Brazil.

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Development and Validation of a questionnaire on human dignity in nursing cares: an exploratory sequential mixed study

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Development and Validation of a questionnaire on human dignity in nursing cares: an exploratory sequential mixed study

Abstract

Objective. The current study aimed to develop and validate of human dignity questionnaire in nursing care. **Methods.** The present research is a sequential exploratory mixed method study. The questionnaire was developed and validated in three phases: (1) the concept of human dignity was defined through conventional content analysis qualitative approach, (2) early items of questionnaire was generated according to findings of the first phase, (3) validation of the questionnaire was evaluated using face, content and construct validity as well as reliability. The study was conducted with the participation of 13 nurses in the qualitative section and 203 nurses in the quantitative section in teaching hospitals affiliated to Jahrom University of Medical Sciences (Iran).

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Results. In the qualitative section, the definition and dimensions of the concept of human dignity in nursing care were discovered. In the quantitative section, the initial pool of items for the questionnaire of human dignity in nursing care was formed using the results of the qualitative section of the study and review of texts and related questionnaires. In factor analysis, four subscales including: respectful communication, equality of patient human value, preservation of privacy and patient-centered care were extracted by Eigen value above one. Internal consistency and stability of the questionnaire were calculated as 0.85 and 0.80, respectively, indicating an excellent reliability. **Conclusions.** The 20-item developed questionnaire is valid and reliable for measurement of human dignity questionnaire in nursing cares.

Descriptors: personal respect; psychometrics; reproducibility of results; nursing care.

Desarrollo y validación de un cuestionario sobre dignidad humana en los cuidados de enfermería. Un estudio exploratorio secuencial mixto

Resumen

Objetivo. Elaborar y validar un cuestionario sobre la dignidad humana en los cuidados de enfermería. **Métodos.** Estudio exploratorio secuencial de método mixto. El cuestionario se desarrolló y validó en tres fases: (1) se definió el concepto de dignidad humana mediante un enfoque cualitativo de análisis de contenido convencional, (2) se generaron los primeros ítems del cuestionario de acuerdo con los resultados de la primera fase, (3) se evaluó la validación del cuestionario mediante la validez facial, de contenido y de constructo, así como la fiabilidad. El estudio se llevó a cabo con la participación de 13 enfermeras en la sección cualitativa y 203 enfermeras en la sección cuantitativa en hospitales docentes afiliados a la Universidad de Ciencias Médicas de Jahrom (Irán). **Resultados.** En la fase cualitativa emergieron las dimensiones del concepto de dignidad humana en los cuidados de enfermería. En la sección cuantitativa, el grupo inicial de ítems para el cuestionario de dignidad humana en los cuidados de enfermería se formó utilizando los resultados de la sección cualitativa y de la revisión instrumentos relacionados. En el análisis factorial, se extrajeron cuatro subescalas con un valor Eigen superior a uno: comunicación respetuosa, igualdad del valor humano del paciente, preservación de la intimidad y cuidados centrados en el paciente,

consistencia interna y la estabilidad del cuestionario se calcularon en 0.85 y 0.80, respectivamente, lo que indica una excelente fiabilidad. **Conclusión.** El cuestionario de 20 ítems desarrollado es válido y fiable para medir la dignidad humana en los cuidados de enfermería.

Descriptores: respeto; psicometría; reproducibilidad de los resultados; atención de enfermería.

Desenvolvimento e validação de um questionário sobre a dignidade humana nos cuidados de enfermagem. Um estudo exploratório misto sequencial exploratório

Resumo

Objectivo. Desenvolver e validar um questionário sobre a dignidade humana nos cuidados de enfermagem. **Métodos.** Estudo exploratório sequencial misto de métodos exploratórios. O questionário foi desenvolvido e validado em três fases: (1) o conceito de dignidade humana foi definido utilizando uma abordagem de análise de conteúdo qualitativa convencional, (2) os primeiros itens do questionário foram gerados com base nos resultados da primeira fase, (3) a validação do questionário foi avaliada através da validade de face, de conteúdo e de construção, bem como da fiabilidade. O estudo foi realizado com a participação de 13 enfermeiros na secção qualitativa e 203 enfermeiros na secção quantitativa em hospitais universitários filiados na Universidade de Ciências Médicas de Jahrom (Irão). **Resultados.** Na fase qualitativa, emergiram as dimensões do conceito de dignidade humana nos cuidados de enfermagem. Na secção quantitativa, o conjunto inicial de itens para o questionário sobre a dignidade humana nos cuidados de enfermagem foi formado utilizando os resultados da secção qualitativa e a revisão de instrumentos relacionados. Na análise fatorial, foram extraídas quatro subescalas com um valor Eigen superior a 1: comunicação respeitosa, igual valor humano do doente, preservação da privacidade e cuidados centrados no doente. A consistência interna e a estabilidade do questionário foram calculadas em 0.85 e 0.80, respetivamente, indicando uma excelente fiabilidade. **Conclusão.** O questionário de 20 itens desenvolvido é válido e fiável para medir a dignidade humana nos cuidados de enfermagem.

Descritores: respeito; psicometria; reprodutibilidade dos testes; cuidados de enfermagem

Introduction

Human dignity is the value that belongs to every human being simply by virtue of being human. Dignity is a central concept in nursing care[1] and the maintenance of dignity has become an important aim in nursing care of patients.[2] The concept of human dignity in nursing was first introduced in the ethical charter by the American Nurses Association as follows: "nurses must act with love and respect in all their professional relationships, taking into account their value and dignity".[3] In the Iranian nursing ethics, which was approved in 2012, the preservation of dignity and human dignity of patients has been emphasized as the first value concept.[4] The fact that patients are one of the most vulnerable social groups doubles the importance of paying attention to maintaining their human dignity in hospital.[5] In care settings, there are many situations that can potentially threaten patients' human dignity. In situations such as taking care of patients, maintaining privacy, physical examinations, introducing patients, lack of attention to people's appearance, nurse and patient not being the same sex, mixed section, neglecting to cover the patient's body, etc., the dignity of patients may be threatened. Therefore, it is necessary that the human dignity of patients in nursing care constantly considered by nurses.[6] Research in this field also shows that the concept of human dignity is a global concern for nurses and most have emphasized the need for more research to identify the factors preservation of dignity and periodically assessment the human dignity of patients in the hospital.[7,8]

A review of studies shows that there are few questionnaires to assess the observance of human dignity in nursing care. Among these cases, the patient dignity inventory (PDI) is that developed by Chchinovo in 2008 to measure the sources of distress related to patient's dignity nearing the end-of-life stage with 25 items and 5 dimensions of symptom distress, existential distress, dependency, peace of mind, and social support. This questionnaire examines the sources of distress related to the patient's dignity in palliative care (patients the end-of-life stage) and its items are not specific to the observance of human dignity in nursing care.[9] The above questionnaire, which was designed based on a review of texts, did not use the views and experiences of nurses to produce questionnaire items. It is also different from the conditions of nurses and the health care system in Iran in terms of context and therefore cannot accurately measure the level of observance of human dignity in nursing care, especially in Iran. Other questionnaires in this field are researcher-made scale in which the psychometric steps not done and only collecting items using reviewing the texts and assessing the content validity and internal consistency.[10,11] Therefore, since the concept of human dignity is a context-dependent concept[5,12] and changes according to different moral, customary, religious, cultural and social conditions of the health care system in each country, there is a need for a specific questionnaire with socio-cultural relevance to be able to

measure the intended concept accurately. Hence, the present study was conducted with the aim of development and psychometric assessment of a questionnaire to assess the observance of human dignity in nursing care using a combined qualitative and quantitative study.

Methods

The present research is a sequential combined exploratory study that was conducted in two parts of qualitative and quantitative (Figure 1). Data were collected from January to October 2021 in teaching hospitals affiliated to Jahrom University of Medical Sciences. The present combined study was performed with the following phases:[13] 1-Define and explain the concept of human dignity using a qualitative study; 2- Design the initial items of the questionnaire using the results of the first step and review the related questionnaires; and 3- Checking the validity and reliability of the questionnaire items.

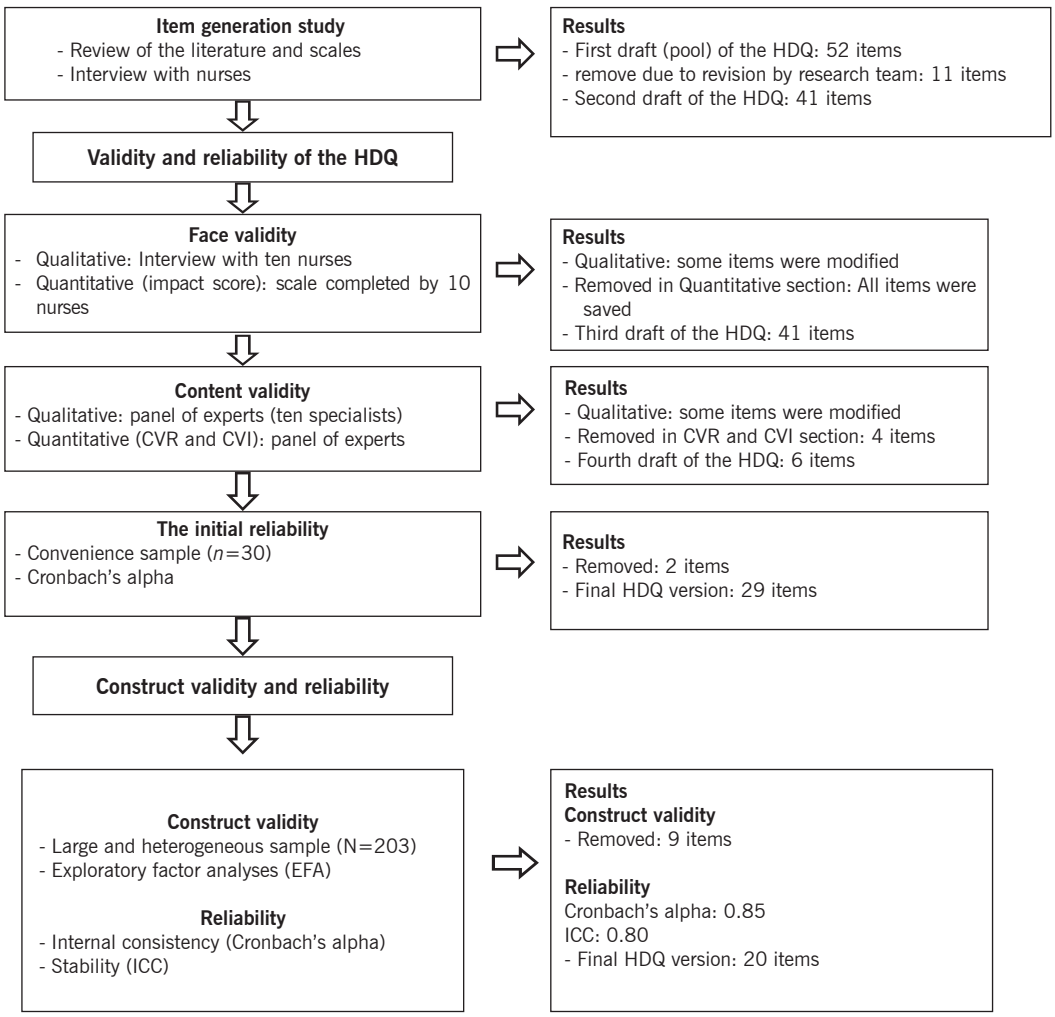

Figure 1. Flow diagram of the development and validation of the human dignity questionnaire (HDQ)

The first phase

In this phase, the concept of human dignity was defined and its dimensions were explored using qualitative content analysis. In this phase, the conventional content analysis method was used. In this approach, researchers interpret results by presenting data in words and themes, which involves understanding, interpreting, and conceptualizing the underlying meaning of qualitative data. In the conventional content analysis approach, the codes and categories of the concept are obtained directly from the interview.[14] Participants in the qualitative section included 13 nurses whose views on the concept of human dignity were collected through semi-structured face-to-face and in-depth interviews. The duration of each interview was between 40 - 60 minutes. Sampling from nurses in this section continued until data saturation so that no new data and category of interviews were obtained. Inclusion criteria for nurses included the ability to speak in Persian language, at least 2 years of clinical experience in hospital wards and willingness to participate in the study. The research environment was real field, so the interviews were conducted in the nurses' rest room at the hospital with the prior consent of the participants. In the present study, a series of pre-designed questions related to the research topic were used to guide the interview process. The interview started with more general questions and with the progress of the interviews and the simultaneous analysis of the data as well as the type of answers of the participants, more detailed questions were asked. Sample interview questions were as follows. 1) Can you tell me what ethical points you pay attention to in caring for patients? 2) What do you mean by human dignity? What does it matter? 3) What experiences (good and bad experiences) do you have in the field of respecting the human dignity of patients in nursing care? 4) How can nurses respect the human dignity of patients in nursing care? To analyze the findings in this section, the approach of qualitative content analysis by Granheim and Landman method was used.[15] First, the interviews were implemented in MAXQDA version 10 software for data management. Then interviews text read line by line and paragraph by paragraph several times to gain a general understanding of the concept. The initial codes were extracted. In the next step, sub-categories and categories were obtained based on the differences and similarities of the extracted codes. At the end of this phase, the definition and dimensions of the concept of human dignity in nursing care were discovered.

The second phase

In this phase, the initial pool of items for the questionnaire of human dignity in nursing care was formed using the results of the qualitative section of the study and review of texts and related questionnaires.

The third phase

In this phase, the psychometric steps of the scale were performed on the initial items of the questionnaire. Psychometric properties included face validity, content validity, structural validity and reliability.

***Face validity*.** The face validity of the questionnaire was performed using two methods of qualitative and quantitative. In the qualitative section, face-to-face interviews were conducted with 10 nurses regarding the difficulty, appropriateness and ambiguity of the items. Then their opinions were applied on the items of the questionnaire. In the quantitative part, in order to obtain the importance of the items, the impact factor of the items was used.[16,17] For this purpose, 10 participants will score the importance of the items based on the 5-point Likert scale as completely important (5), somewhat important (4), moderately important (3), slightly important (2), and not important at all (1).[16,17] The researcher then will calculate the impact score of each item separately using the following formula: Impact Score = Frequency (%) × Importance; Frequency (%) refers to the number of persons who scored 4 and 5 on each item, and importance refers to the mean score of importance based on the Likert spectrum. Items

were retained with an impact factor score greater than 1.5 for analysis of other psychometric steps.[16]

Content validity. The content validity of the questionnaire was performed using both qualitative and quantitative methods. In the qualitative section, the researcher asked a panel consisting of experts to give their opinions in terms of the grammar, proper word placement, proper item placement, and appropriate scoring after studying the scale. The scale was modified according to them. In the quantitative section, the content validity ratio (CVR) and content validity index (CVI) was determined. The CVR evaluate the necessity for items of scale from the perspective of the expert's panel. For this aim, the experts were asked to assess each item based on the 3-point scale (necessary, useful but unnecessary, and unnecessary). Then CVR was calculated based on the following formula: $CVR = (Ne - N/2) \div N/2$; where N is the total number of experts and Ne is the number of experts who choose the necessary option.[16,17] For determine of CVR from 10 experts was used. Then the decision was made based on Lawshe[18] and the modified table by Ayre and John Scally.[19] CVI checked out in the 4-point Likert scale for each item by 10 experts (e.g. 1: irrelevant; 2: somewhat relevant; 3: relevant; and 4: quite relevant). Then, the CVI score calculated through combining the agreement scores for each item ranked 3rd and 4th by the total number of experts. Values ranged from 0 to 1, and when CVI > 0.79, the item was relevant, from 0.70 to 0.79, the item needed revisions, and if the item value was below 0.70, was eliminated.[20]

The initial reliability. The initial reliability of the questionnaire was performed before the construct validity to determine the correlation between the items and the whole questionnaire. Calculating the initial reliability by deleting or correcting inappropriate items facilitates factor analysis and improves the reliability of the questionnaire. In this section, reliability was performed by calculating Cronbach's coefficient alpha and completing a questionnaire by 30 nurses.[16,17]

Construct validity. The construct validity of the questionnaire was assessed using exploratory factor analysis.[16,21]

The final reliability. In this section, two methods of internal consistency and stability were used. To determine the internal consistency, the questionnaire was completed by 30 nurses and then Cronbach's coefficient alpha was calculated. Cronbach's coefficient alpha above 0.7 indicated acceptable internal consistency. [16,17] Test-retest method was used to determine the stability. For this purpose, the questionnaire was completed twice at intervals of two weeks by at least 30 nurses. Then the intra-class correlation coefficient (ICC) was calculated. Intra-class correlation coefficient above 0.7 indicated acceptable stability.[16,22]

Ethics approval and consent to participate

The research was approved by the Ethics Committee at Jahrom University of Medical Sciences (ethical number: IR.JUMS.REC.1399.019). The research was conducted in accordance with the ethical principles of the Declaration of Helsinki and the guidelines of the Iranian Ministry of Health and Medical Education. All participants signed a written informed consent form.

Results

The results of the study are presented in three phases (Figure 1):

The first phase

Based on the experience of nurses using conventional content analysis and literature review, the dimensions of the concept of human dignity in nursing care included respectful communication, equality of patient human value, preservation of privacy and patient-centered care.

The second phase

Based on the categories extracted in the qualitative stage as well as reviewing the related

questionnaires in this field, the initial pool of items was designed to development the questionnaire. Thus, 52 items were formed in the primary pool of items. After review by the research team, 11 items were removed due to overlap.

The third phase

***Face validity*.** In this section, all items had an impact factor of 1.5. Therefore, no item was deleted in this section and a number of items were reviewed.

Content validity. No item was removed in the qualitative review of content validity. In the quantitative part, 4 items were removed due to CVR value less than 0.75 and 6 items were removed due to CVI value less than 0.79.

The initial reliability. The internal consistency of the whole questionnaire with Cronbach's coefficient alpha in a sample of 20 nurses was calculated 0.79. The number 2 item was removed using inter - item correlation due to a correlation of less than 0.3 with the whole questionnaire.

Construct validity

In this section, the developed questionnaire was completed by 203 nurses with the remaining 29 questions. The demographic characteristics of the nurses are given in Table 1. Then, to determine the number of factors, exploratory factor analysis was performed. KMO statistic was performed for sampling adequacy which was 0.9231. The Bartlett sphericity test was significant ($p = 0.001$). To extract the factor structure of the questionnaire, principal component analysis and varimax rotation were performed with Eigenvalue> 1. The factor loading of each item was considered at least 0.5.[16] Of the initial 29 items, 9 items were omitted due to a factor loading of less than 0.5. Thus, the final questionnaire with 20 items and 4 factors including respectful communication (5 items), equality of patient human value (4 items), preservation of privacy (4 items) and patient-centered care (7 items) was obtained (table 2). The variance of 4 factors was 56.76%.

Scoring. The items of the HDQ were rated on 5-point Likert-type scale from 1 to 5, 1 = never, 2 = rarely, 3 = sometimes, 4 = often, and 5 = always. The range of scores of this questionnaire is 20-100, so that a higher score indicates more observance of human dignity in nursing care.

***The final reliability*.** The internal consistency of the HDQ for 20 items using Cronbach's coefficient alpha was obtained 0.85. The stability of the HDQ using the ICC was calculated 0.80, which indicates that the HDQ has good stability over time. Internal consistency and ICC for 4 factors are listed separately in Table 3.

Table 1. Demographic characteristics of the nurses in the quantitative section of the study

Variable	Sub-variables	*n* (%)
Gender	Male	73 (35.97)
	Female	130 (64.03)
Marriage	Single	39 (19.2)
	Married	152 (74.88)
	divorced	12 (5.92)
Education	Bachelor of Nursing	175 (86.2)
	Master of Nursing	28 (13.8)
Age	Mean ± Standard deviation	34.05 ± 5.67
Work experience	Mean ± Standard deviation	9.86 ± 3.10

Table 2. Factors, items and factor loadings of the human dignity scale (HDQ-20)

Subscales	Items	Factors			
		1	2	3	4
Respectful communication	I treat the patient with respect.	**0.601**	0.321	0.343	0.232
	I consider having a good ethic in caring for the patient's rights and I adhere to it.	**0.589**	0.012	0.399	0.211
	I introduce patients to colleagues by name (not bed number).	**0.599**	0.287	0.323	0.123
	I make eye contact when talking to patients.	**0.564**	-0.014	0.321	0.234
	Before any care, I introduce myself to the patient.	**0.532**	0.146	0.156	0.121
Equality of patient human value	I see each patient as a unique person with equal human value.	0.278	**0.754**	0.265	0.278
	I accept the patient as a member of my family.	0.324	**0.721**	0.213	0.232
	I respect for rationality and patients' choices.	0.345	**0.678**	0.165	0.043
	In caring for the patient, nationality, race, culture, etc. are of equal importance to me.	0.235	**0.611**	-0.012	0.235
Preservation of privacy	In order to preservation the privacy of patients, I pay attention to their coverage during examinations, injections, etc.	0.290	0.343	**0.632**	0.190
	I do not tell patients' private secrets in front of others.	0.367	0.345	**0.598**	0.343
	I try to take care of female patients by a female nurse and male patients by a male nurse.	0.239	0.123	**0.578**	0.343
	Before entering the patient room, I knock on the door and enter the room with coordination.	0.354	0.278	**0.511**	0.231
Patient-centered care	I pay attention to patients' priorities regarding how and quality of care.	0.254	0.354	0.123	**0.755**
	I respect the patient's choice regarding the caregiver.	0.324	0.142	0.342	**0.721**
	I involve patients in self- care.	-0.243	0.234	0.361	**0.655**
	I respect patients' independence in treatment decisions.	0.288	0.288	0.195	**0.611**
	Based on the beliefs and religious principles of the patients, I provide them with the necessary facilities.	0.239	0.387	0.188	**0.634**
	I consider myself responsible for responding to the concerns and concerns of patients and their companions.	0.154	0.321	0.018	**0.443**
	I provide sufficient and required information to patients before performing care.	0.129	0.324	0.234	**0.524**
Eigenvalue		6.321	4.876	3.256	2.189
Percentage of variance		18.176	15.453	12.214	10.917

Table 3. The Cronbach's alpha and The ICC values of the HDQ scale

Factors	Subscales	Number of items	Internal consistency	Stability
1	Respectful communication	5	α = 0.88	ICC = 0.84
2	Equality of patient human value	4	α = 0.83	ICC = 0.77
3	Preservation of privacy	4	α = 0.78	ICC = 0.79
4	Patient-centered care	7	α = 0.89	ICC = 0.86
Total	HDQ	20	α = 0.85	ICC = 0.80

Discussion

The present study attempted to develop and validate a scale for human dignity in nursing cares. The findings show that the HDQ scale is a reliable and valid scale for the evaluation of the human dignity. The HDQ scale showed that the concept of human dignity in nursing care has many dimensions including respectful communication, equality of patient human value, preservation of privacy and patient-centered care. One of the dimensions of the HDQ scale was the respectful communication with 5 items. The Attributed Dignity Scale by Jacelon *et al*.,[23] had 23 items and three dimensions of self-value, behavioral respect-self, and behavioral respect-others. In this questionnaire, in order to observance of human dignity, the dimensions of respect for the patient have been considered, which is consistent with the dimension of respectful communication in the HDQ scale. In the study by Henderson et al., The issue of respectful communication was noted that most nurses do not spend enough time communicating with the patient and are busy with other tasks or looking at equipment and do not make proper eye contact with the patient, so that this neglect and indifference is effective in creating a sense of worthlessness and reduce human dignity in patients.[24]

The second dimension of the HDQ scale was the equality of patient human value with 4 items. The data of this dimension show that all human regardless of race, ethnicity, culture, nationality, skin color, etc., are equal and there should be the equal viewpoint of all patients in care. According to the nurse's viewpoint of participating in the study of Walsh and Kowanko[25] the object-oriented view of the patient is a threat to her human dignity, and all patients deserve respectful communication and the preservation of human dignity because of their equal intrinsic value. The results of this study also showed that from the nurses' point of view, issues related to the patient's dignity include the patient's body cover, patient's privacy, attention to emotions, time allocation, considering the patient as a human being, showing respect to the patient. Issues related to the patient's dignity from the patients' point of view include not exposing the patient's body, allocating time for the patient, being seen as a human being, thanking and appreciating, and paying special attention to the patient.[25] According to the results of the study of Manoukian *et al*.,[26] The personality traits of the medical-care staff, their individual values and beliefs about the value and human status of the patient are among the factors affecting the maintenance of human dignity of patients. The results of Cheraghi *et al*.[27] qualitative study based on patients' perspectives showed that the patient's dignity is integrated into two categories "exigency of respecting human nobility" and "providing person-centered care", which is consistent with the dimensions of " equality of patient human value " and "patient-centered care" extracted in the present study.

The third dimension of the HDQ scale was the preservation of privacy with 4 items. Previous studies demonstrated that nurses acknowledged that protecting patients' privacy is a necessary factor of preserving their human dignity, and that dignity can be lost when physical or other personal boundaries are transgressed. The results of a qualitative study by Papastavrou *et al*.[28] showed that one of the dimensions of the patient dignity from the perspective of nursing students is privacy and confidentiality. Also, the results of a qualitative study by Bagheri *et al*.[29] showed that communication and observance of privacy are effective factors on the dignity of patients with heart failure. In the qualitative study of Manoukian *et al*.,[5] one of the important dimensions of maintaining patient dignity, which is emphasized in the statements of participants, is confidentiality and keeping patient secrets, because the issue of patient privacy and information privacy as one of the accepted principles among patients and health care providers.

The fourth dimension of the HDQ scale was the patient-centered care with 7-item. Patients' dignity has been intertwined with the concept of caring and acknowledged by our caring capacity. Caring is an ethical attitude and is a characteristic of humans by acknowledging another person's self-determined ends as one's own to maintain or promote them.[27,30] According to Carrillo et al., patient-centered care is derived from study in cross-cultural care.[31] Wainwright and Gallagher stressed that it is essential for nurses to pay more attention to what it means for patients to be respected and provided proper culturally sensitive care.[32] This refers to "providing patient-centered care," where different features of a person's life contributing to diverse backgrounds are acknowledged.[33] Similarly, in the items of patient-centered care dimension in the HDQ scale, the issue of patients' beliefs and religion is mentioned, which should be considered by nurses as one of the dimensions of care. Developing a questionnaire for human dignity in nursing cares can pave the way for further plans and measures. This study is also based on a combination of methods; therefore, it can support the integration of different and even contradictory approaches and methods. Collecting qualitative and quantitative data will help better perceive nurses experiences regarding observance of human dignity in the patients.

Limitations of the study. This study has also limitation, including sampling in only one city of Iran. To mitigate this limitation, sampling was done with maximum variation. Another limitation of this study is the lack of interviewing and soliciting opinions from patients.

Conclusion. This study led to the creation of a valid and reliable questionnaire for assessing patients' human dignity in nursing care. The final version of the HDQ has 20 items in four domains including: respectful communication, equality of patient human value, preservation of privacy, and patient-centered care. This questionnaire is a consistent, simple, valid, reliable and context-based scale, which can be used in a variety situations of the clinical care. The Iranian healthcare and hygiene managers can periodically measure the patients' human dignity in nursing care and design and implement a care plan based on HDQ scale that includes the ethical principles related to human dignity.

Availability of data and material. Data is not and will not be made available elsewhere. Further data set could be obtained on request if required through corresponding author with email: ali. dehghani2000@ gmail.com.

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Original article

Predictive Role of Resilience and Hope on Adherence to Treatment in Hemodialysis Patients

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Predictive Role of Resilience and Hope on Adherence to Treatment in Hemodialysis Patients

Abstract

Objective. To determine the predictive role of resilience and hope on adherence to treatment in hemodialysis patients hospitalized in two hospitals affiliated to Shiraz University of Medical Sciences (Shiraz, Iran). **Methods.** This is a descriptive-analytical study that was conducted in 2021-2022 on 120 patients treated in hemodialysis sections in Namazi and Shahid Faqihi teaching hospitals. Sampling was conducted using a stratified random method. Demographic information questionnaires, Connor and Davidson's resilience, Snyder's hope and adherence to kidney patients' treatment questionnaires were used to collect the data. **Results.** The finds showed that the levels of resilience, hope, and adherence to treatment had hight level. More specifically, it was indicated that the mean and standard deviation for the total resilience score, the hope variable, and adherence to total treatment

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was 75.45±14.34, 40.43±3.66, and 80.12±18.20, respectively; which have maximum possible scores of 100, 48 and 100. Thus, it can be said that no correlation was observed between resilience and adherence to treatment variables ($p>0.05$); hope variable and adherence to treatment ($p>0.05$), and adherence to treatment with hope and resilience variables ($p>0.05$). However, hope and resilience variables showed a direct and weak correlation with each other (r=0.36, $p<0.05$); that is, patients who had more hope indicated better resilience as well. **Conclusion.** Although in this study we found that the resilience and hope variables were not able to predict the treatment adherence, hope and resilience indicated a direct and weak correlation. It is recommended that nurses should pay more attention to hope and resilience of hemodialysis patients in order to promote their health.

Descriptors: renal insufficiency, chronic; renal dialysis; resilience, psychological; treatment adherence and compliance; hope.

Papel predictivo de la resiliencia y la esperanza en la adherencia al tratamiento en pacientes en hemodiálisis

Resumen

Objetivo. Determinar el papel predictivo de la resiliencia y la esperanza en la adherencia al tratamiento en pacientes en hemodiálisis internados en dos hospitales afiliados a la Universidad de Ciencias Médicas de Shiraz (Shiraz, Irán). **Métodos.** Se trata de un estudio descriptivo-analítico que se realizó en 2021-2022 con la participación de 120 pacientes tratados en secciones de hemodiálisis en los hospitales docentes Namazi y Shahid Faqihi. El muestreo se realizó mediante un método aleatorio estratificado. Para la recogida de datos se utilizaron datos demográficos y las escalas de resiliencia de Connor y Davidson, de esperanza de Snyder y de adherencia al tratamiento de pacientes renales. **Resultados.** Los hallazgos mostraron que los niveles de resiliencia, esperanza y adherencia al tratamiento se encontraban en niveles altos. Más concretamente, se indicó que la media y la desviación estándar para la puntuación total de resiliencia, la variable esperanza y la adherencia al tratamiento total fueron 75.45±14.34, 40,43±3.66 y 80.12±18.20, respectivamente; las cuales tienen como puntajes máximos posibles 100, 48 y 100. No se observó correlación entre las variables: resiliencia y adherencia al tratamiento ($p>0.05$), esperanza y la adherencia al tratamiento ($p>0.05$), y adherencia al tratamiento y las variables esperanza y resiliencia ($p>0.05$). Sin embargo, las variables esperanza y resiliencia mostraron una correlación directa y débil entre sí (r=0.36, $p<0.05$); es decir, los pacientes que tenían más esperanza indicaron también mejor resiliencia. **Conclusión.** Aunque en este estudio encontramos que las variables resiliencia y

esperanza no fueron capaces de predecir la adherencia al tratamiento, la esperanza y la resiliencia indicaron una correlación directa y débil. Se recomienda que el personal de enfermería preste más atención a la esperanza y la resiliencia de los pacientes en hemodiálisis para promover su salud.

Descritores: insuficiencia renal crónica; diálisis renal; resiliencia psicológica; cumplimiento y adherencia al tratamiento; esperanza.

Papel preditivo da resiliência e da esperança na adesão ao tratamento em pacientes em hemodiálise

Resumo

Objetivo. Determinar o papel preditivo da resiliência e da esperança na adesão ao tratamento em pacientes em hemodiálise internados em dois hospitais afiliados à Universidade de Ciências Médicas de Shiraz (Shiraz, Irã). **Métodos.** Trata-se de um estudo descritivo-analítico realizado em 2021-2022 com a participação de 120 pacientes atendidos nas seções de hemodiálise dos hospitais universitários Namazi e Shahid Faqihi. A amostragem foi realizada por método aleatório estratificado. Para a coleta de dados foram utilizados dados demográficos e as escalas de resiliência de Connor e Davidson, escalas de esperança de Snyder e adesão ao tratamento de pacientes renais. **Resultados** As descobertas mostraram que os níveis de resiliência, esperança e adesão ao tratamento estavam em níveis elevados. Mais especificamente, foi indicado que a média e o desvio padrão do escore de resiliência total, da variável esperança e da adesão total ao tratamento foram 75.45±14.34, 40.43±3.66 e 80.12±18.20, respectivamente; que possuem as pontuações máximas possíveis de 100, 48 e 100. Não foi observada correlação entre as variáveis: resiliência e adesão ao tratamento ($p>0.05$), esperança e adesão ao tratamento ($p>0.05$), e adesão ao tratamento e esperança e variáveis de resiliência ($p>0.05$). Contudo, as variáveis esperança e resiliência apresentaram correlação direta e fraca entre si ($r=0.36$, $p<0.05$); Ou seja, os pacientes mais esperançosos também indicaram melhor resiliência. **Conclusão.** Embora neste estudo tenhamos constatado que as variáveis resiliência e esperança não foram capazes de predizer a adesão ao tratamento, a esperança e a resiliência indicaram uma correlação direta e fraca. Recomenda-se que a equipe de enfermagem preste mais atenção à esperança e à resiliência dos pacientes em hemodiálise para promover sua saúde.

Descritores: insuficiência renal crônica; diálise renal; resiliência psicológica; cooperação e adesão ao tratamento; esperança.

Introduction

Chronic kidney disease is a complex and common disease that is rapidly growing and leads to early death and reduced quality of life, imposing a heavy burden on the health systems.[1] Chronic kidney failure is a process of obvious and irreversible reduction in the number and function of nephrons by various mechanisms, in which toxins, fluids, and electrolytes accumulate in the body and usually ends in the final stage of kidney disease. In this case, the ability of the kidney for disposing metabolic wastes and maintaining fluids and electrolytes is lost, resulting in uremia syndrome.[2] The prevalence of chronic kidney failure is reported to be 14.2% in the world.[3] The population of patients with end stage renal disease is reported to be about 58,000 in Iran.[4] The treatment plan of these patients in Iran includes kidney transplants (49%), hemodialysis (48%), and peritoneal dialysis (3%).[5] Hemodialysis is considered as the main treatment for chronic kidney failure and although it can increase the life span of such patients, it is associated with many physical and psychological problems.[6] Most of the patients undergoing hemodialysis suffer from mental disorders such as disturbance in social relations, anxiety, and depression.[7] In other words, patients with kidney failure usually experience a decrease in the quality of their life, which is often caused by the long-term process of hemodialysis treatment and the complications caused by this disease.[8] Resilience variable, as a dynamic process, helps a person's response and adaptation to stressful situations and conditions.[9] Resilience is part of a human's ability, which enables a person to overcome the adverse conditions and use their adaptability in a proper way in order to suppress the destructive power of such situations.[10]

Hope is recognized as an influential part in the activities of a person, which is also considered as a factor that has a positive effect on sadness and lack of confidence and is a powerful tool in the fight against illness and disability.[11] Raising hope is an effective way to improve the quality of life in people with chronic diseases and enhancing hope increases the level of self-care, quality of life and improves the general health of patients.[12] Studies show that hemodialysis patients have a low level of hope, and hopelessness as well as the lack of meaningfulness in life can be the cause of many complications and problems for dialysis patients.[13] Snyder *et al*. proposed the theory of hope for the first time which consisted of willpower, way-finding power, having a goal, and recognizing obstacles.[14] Performing hemodialysis causes a change in the lifestyle, health, and roles of the hemodialysis patient. One of the problems reported in these patients is their lack of adherence to the treatment.[15] The World Health Organization suggests the term *adherence* to be used in chronic diseases. The definition of adherence or compliance is based on the definition of this organization: the extent to which a person performs a behavior including taking medicine, following a diet, or implementing a change in lifestyle in accordance with the recommendations provided by health care personnel.[16]

The level of adherence to treatment clearly affects the clinical outcomes of these patients, so that non-adherence to treatment is directly related to worse clinical outcomes. Today, there is evidence that a large number of hemodialysis patients do not adhere to the recommended treatment regimen.[17] It can be said that in chronic diseases, including chronic kidney failure, the unfavorable consequences of non-adherence to treatment can be considered as the fundamental problems and difficulties in the health and even life of these patients. Therefore, trying to solve these issues is one of the care-treatment priorities of these patients. Considering the issue that suffering from a chronic disease and the problems caused by it can result in a lot of stress, which in turn leads to a decrease in the optimal performance and creates limitations in different parts of the patients' life. Furthermore, because hope and resilience can increase a person's power in dealing with stress, identification of effective factors for non-adherence to treatment is of special priority and importance in this regard. It can be concluded from the studies conducted in this domain,[18,19] that high amounts of hope and resilience can help improve the quality of life and psychological factors of the patients. In addition, some related studies showed that there was a positive correlation between the quality of life and adherence to treatment.[20] However, according to extensive investigations in various databases (Google Scholar, PubMed, etc.), no study was found so on the correlation between resilience and hope variables with adherence to treatment in hemodialysis patients. Moreover, the uncertainty of the correlation between these variables and the existence of contradictions in their correlation in various sources can be considered as one of the reasons for conducting this study. Thus, the researchers decided to carry out a study with the aim of determining the predictive role of hope and resilience on adherence to the treatment of the patient's undergoing hemodialysis in the hospitals affiliated to Shiraz University of Medical Sciences.

Methods

This is an analytical-descriptive study that was conducted in 2021-2022 on the patients hospitalized in hemodialysis sections in Namazi and Shahid Faqihi teaching hospitals in Shiraz city in Fars province. After obtaining the approval of the ethics committee of Shiraz University of Medical Sciences, a list containing the names of the research population was prepared according to the list of the patients with active cases in the two selected hemodialysis sections of Shiraz University of Medical Sciences (the number of patients in the research population was 100 in Namazi hospital and 80 in Shahid Faqihi hospital). Then, sampling was performed using stratified random method. In this way, from each hemodialysis section, one hundred percent of patients eligible to enter the study and proportional to the total number of patients of that section were randomly selected as a sample. At the end, the sample of the current study consisted of 120 male and female patients with chronic kidney failure (67 patients from Namazi Hospital and 53 patients from Faqihi Hospital). To measure the sample size, we used the following formula and the Rahimi *et al.* study.[21]

$$n = \frac{\left(Z_{۱-\frac{\alpha}{۲}} + Z_{۱-\beta}\right)^{۲}}{(\omega)^{۲}} + ۲$$

The inclusion criteria in this study were willingness to participate in the study; age between 18-60 years; hemodialysis history of at least 6 months; number of times of hemodialysis at least 2 times and at most 4 times a week; lack of suffering from chronic diseases such as advanced cardiovascular diseases like heart failure; lack of suffering from cancer, rheumatic diseases and acute pulmonary edema; absence of sensory-neural disorders such as hearing and vision impairment or cognitive disorders such as dementia; lack of suffering from mental and psychological diseases; the use of drugs in these diseases; absence of drug

addiction; lack of an emotional crisis such as death of loved ones and divorce during the last 6 months. The exclusion criteria were failure to complete the questionnaire and unwillingness for further participation in the study. After obtaining the informed consent of the participants, the researchers went to the hospitals to distribute the questionnaires that should be completed by patients undergoing hemodialysis in November 2021. The stage of filling out the questionnaires lasted for three months.

After completing the questionnaires and collecting the necessary information, the data were entered into SPSS software. Data analysis included two parts: descriptive and inferential analysis. In the descriptive statistics section, mean and standard deviation were presented in the form of number and percentage. In the inferential section, research hypotheses were investigated using linear regression and Pearson's correlation coefficient. In all tests, a significance level of less than 0.05 was considered. SPSS version 24 was used for data analysis.

Data collection instruments and process

Four questionnaires were used to collect the data in this study.

Demographic information questionnaire

This questionnaire was designed by the researcher in relation to the demographic and individual characteristics of the patients participating in the current study and includes information such as age, gender, education level, marital status, employment status, duration and years of dialysis, number of times of dialysis per week, and the duration of dialysis in each session.

Connor and Davidson's resilience questionnaire

Connor and Davidson's resilience scale was designed in 2003 by reviewing 1979-1991 research sources in the field of resilience. It consists of 25 items and its purpose is to measure the level of resilience based on the components of competence/personal strength (24-12-11-25-10-23-17-16), trust in personal instincts (20-18-15-6-7-19-14), tolerance of negative emotions (1-4-5-2-8), restraint (21-13-22), and spirituality in people (3-9). Its response range is scored on a five-point Likert scale from completely false (zero) to always true (four), and the score of this questionnaire is between 0 and 100. A score of 75-100 that is obtained from the questionnaire means a very good resilience. Connor and Davidson reported the Cronbach's alpha coefficient of resilience scale as 0.89. Furthermore, the reliability coefficient obtained from the retest method in a 4-week interval was 0.87. In the research conducted by Samani *et al.,* the reliability of this research instrument among the students was reported as 0.93 using Cronbach's alpha, and the validity was verified (using factor analysis and convergent and divergent validity) by the test makers in different normal and at-risk groups.[22,23]

Snyder's hope scale

This questionnaire was designed by Snyder et al. to measure hope, which consists of 12 items and two subscales of agency thinking and pathways. Scoring is based on a five-point Likert scale from completely disagree with a score of zero to completely agree with a score of four, but this scoring method is reversed for questions 3, 7, and 11 (from 4 to 0). The range of test scores is between 0 and 48, a score of 37-48 that is obtained from the questionnaire means a very good hope. Snyder *et al*. reported its overall reliability as 0.85 by retesting after 3 weeks.[14] Grewal and Porter in 2007 described content validity as desirable.[24] In terms of construct validity, two factors of agency thinking and pathways have been obtained through factor analysis by implementing it on 676 subjects (295 mental patients, 112 criminals and 296 students).[25] In Kiafar et al. study (2014), the reliability obtained through Cronbach's alpha was reported as 0.80 for the entire scale, 0.68 for the agency thinking subscale, and 0.61 for the pathways, respectively.[26]

Questionnaire of adherence to the treatment of dialysis patients

This questionnaire consists of 46 questions in 5 main sections. The first section includes general information (5 items); the second section includes the behavior of regular participation in the hemodialysis sessions (14 items). The third section includes prescribed medication consumption (9 items), the fourth section includes limitation of the fluid intake (10 items), and the fifth section includes limitation of the dietary intake (8 items). The scoring of questions No. 14, 17, 18, 26, 31, and 46 is performed using a 5-point Likert scale, which directly evaluates the treatment adherence behavior of the patients. The sum of the point of the dimensions of the treatment adherence behavior is 1200 points (participation in the hemodialysis session: 0-600 points, timely and continues use of the medicines: 200-022 points, observance of the limitation of the fluid intake: 0-200 points and observance of the limitation of the dietary intake), and the questions were graded on a Likert scale.

The overall score of the treatment adherence is the sum of the scores of these 5 sections. The initial scores are converted into a score between 0-100. Accordingly, a score of 75-100% means a very good treatment adherence, a score of 50-74% means a good treatment adherence, a score of 26-49% means an average treatment adherence, and a score of 0-25% means a poor treatment adherence. This questionnaire was designed by Kim in 2009, who reported a favorable validity and reliability values of 83% for this instrument.[27] The validity of this questionnaire was confirmed using face validity and in two qualitative and quantitative ways by Seyed Fatemi *et al.* Furthermore, these researchers determined the reliability of this instrument by using two methods of internal consistency and consistency reliability; also, the validity and reliability of this questionnaire was evaluated in the study of Rafiee Vardanjani *et al*. Moreover, for the items of the questionnaire, the content validity was calculated as 98%, which has a favorable score in terms of content validity. The reliability of the questionnaire was calculated as 0.85 with retesting, which was an acceptable reliability.[28-30]

Results

The mean age of the participants in this study was 49.85 ± 12.74 years, the average duration of dialysis was 43.23 ± 8.51 months, and the average number of the sessions was 0.53 ± 2.73 sessions per week. The majority of the sample were men (55.8%), married (77.4%) with diploma education (27.5%) and retired (30%). The study samples were often completely capable of doing their daily tasks and were able to walk without any equipment (75%). (Table 1)

Table 1. Frequency distribution of demographic (qualitative) and clinical characteristics

Variable	Category	Number	Percentage
Gender	Male	67	55.8
	Female	53	44.2
Marital status	Single	25	20.8
	Married	93	77.4
	Widow	1	0.8
	Divorce	1	0.8
Education	Illiterate	25	20.8
	Elementary	32	26.7
	Junior	21	17.5
	Diploma	33	27.5
	Academic	9	7.5
Job status	Unemployed	30	25
	Housekeeper	41	34.3
	Retires	36	30
	Employed	13	10.7
The ability to do daily tasks	Completely	65	54.1
	Relatively	18	15
	Somewhat	15	12.5
	A little	11	9.2
	At all	11	9.2
Walking	Without the need of helping devices	90	75
	With a cane	13	10.8
	With a walker	5	4.2
	With a wheelchair	12	10
Total		120	100

As to resilience, the mean and total standard deviation was 75.45±14.34. The highest mean in the subscales was related to trust in personal instincts with a value of 22.26±4.31, and the lowest mean in the subscales was related to tolerance of negative emotions with a value of 14.1±3.52. Moreover, 55.2% of the participants had a very good level of resilience. In terms of the dimensions of resilience, the majority of the sample (63.3%) were at a very good level in the restraint and spirituality, 51.7% were at a good level in the tolerance of negative emotions, 60.7% were at a very good level in the component of trust in personal instincts, and the majority of the 63.3% were at a good level in the component of personal competence and strength. The average and standard deviation of the total score of hope was 40.43±3.66. Moreover, in the subscale

of agency thinking, the lowest average was 13.28±1.95, and the pathways indicated the highest average with a value of 13.35±2.15. In this study, 87.5% of the patients under study were at a good level in terms of hope, 60.8% were at a very good level in terms of pathways, but 44.1% were at a good level in terms of agency thinking.

As to adherence to the treatment, the mean and standard deviation of the subscale of regular participation in the hemodialysis sessions was 496.87±147.51, consumption of prescribed medication was 180.42±41.15, limitation of fluid intake was 140.41±56.25, limitation of the dietary intake was 143.75±58.54, general treatment adherence was 961.46±218.38, and total treatment adherence (transformed) was 80.12±18.20. The highest average value belonged to the subscale of regular participation in the hemodialysis sessions, and the lowest average value belonged to the subscale of the limitation of fluid intake. (Table 2)

Table 2. Mean, minimal and maximum values and standard deviation of treatment adherence in the hemodialysis patients

Variable	Minimal value	Maximal value	Average	Standard deviation
Regular participation in hemodialysis sessions	0	600	496.87	147.51
Prescribed drug consumption	0	200	180.42	41.15
Limitation of liquid intake	0	200	140.42	56.25
Limitation of dietary intake	0	200	143.75	58.54
Adherence to total treatment	250	1200	961.46	218.38
Adherence to total treatment (transformed)	80.12	100	80.12	18.20

68.3% of the participants obtained a very good level of total treatment adherence. Furthermore, as to the dimensions of adherence to the treatment, 40% in the limitation of the dietary intake, 31.7% in the limitation of liquid intake, 75.8% in the component of the use of the prescribed drugs, and 66.7% in the component of regular participation in hemodialysis sessions were at a very good level. Therefore, it can be mentioned that most of the participants in the current study indicated a very good treatment adherence in all dimensions. In general, 1.7% of the participants in poor level, 4.2% in average level, 25.8% in good level, and 68.3% in very good level indicated adherence to the total treatment.

In this study, Spearman's correlation test showed that there was no correlation between resilience and adherence to the treatment ($p>0.05$, r=-0.02). It was also found that there was a strong and direct correlation between resilience and its subscales ($p<0.05$). Furthermore, there was a moderate and direct correlation between personal competence/strength with the components of trust in personal instincts, tolerance of negative emotions, restraint, and spirituality ($p<0.05$, r=0.55, r=0.33, r=0.48). The components of trust in personal instincts, restraint, and spirituality indicated a moderate and direct correlation ($p<0.05$, r=0.45). There was also a weak and direct correlation between tolerance of negative emotions and restraint and spirituality (r=00.19, $p<0.05$). Moreover, there was a weak and inverse correlation between restraint, spirituality, and hope ($p<0.05$, r=- 0.2), and there was no correlation between hope and adherence to the

treatment ($p>0.05$, r=0.1). It was also found that there was a direct and moderate correlation between hope and its subscales ($p<0.05$).

Furthermore, pathways indicated a direct and weak correlation with resilience and adherence to the treatment ($p<0.05$, r=0.32, r=0.29). It was also found that there was a strong and direct correlation between adherence to the treatment and the subscales of regular participation in the hemodialysis sessions, but there was a moderate and direct correlation with the component of prescribed medication consumption (r=0.81, r=0.53, $p<0.05$). Moreover, there was a weak and direct correlation between regular participation in hemodialysis sessions with the consumption of prescribed medicine and the restriction of dietary intake components ($p<0.05$, r=0.41, r=0.27). It was also revealed that there was a weak and direct correlation between the restriction of fluid intake and hope (r=0.19, $p<0.05$); also, a moderate and direct correlation was observed between the restriction of liquid intake and the restriction of dietary intake ($p>0.05$, r=0.6). Finally, hope and resilience showed a direct and weak correlation with each other (r=0.36, $p<0.05$). (Table 3)

Table 3. Correlation coefficient between treatment adherence and its subscales with resilience and hope variables

Variables	A	HS	PM	FI	DI	R	H
Adherence to the treatment (A)	1.00	r=0.81 $p<0.001$	r=0.53 $p<0.001$	r=0.54 $p=0.111$	r=0.67 $p=0.310$	r=- 0.02 $p=0.277$	r=0.1 $p=0.273$
Participation in the hemodialysis sessions (HS)		1.00	r=0.41 $p<0.001$	r= 0.11 $p = 0.223$	r=0.27 $p=0.003$	r=0.02 $p=0.799$	r=0.04 $p=0.666$
Consumption of prescribed medicine (PM)			1.00	r=0.3 $p=0.001$	r=0.27 $p=0.003$	r=0.1 $p=0.314$	r=0.1 $p=0.289$
Limitation of fluid intake (FI)				1.00	r= 0.6 $p<0.001$	r=0.04 $p=0.674$	r=0.19 $p=0.036$
limitation of dietary intake (DI)					1.00	r=0.04 $p=0.633$	r=0.17 $p=0.069$
Resilience (R)						1.00	r=0.36 $p<0.001$
Hope (H)							1.00

A linear regression test was used to predict the effects of resilience and hope on adherence to the treatment. The results show that these two variables explain only 20% of the changes in treatment adherence ($R^2=0.20$) Furthermore, it was indicated that none of these two variables could predict the treatment adherence values ($p>0.05$). In addition, the results of Spearman's correlation test showed that there was no correlation between these two variables and adherence to the treatment.

As to demographic features, Spearman's correlation test in this study showed that there was a weak and direct correlation between resilience and age ($p<0.05$). It was also indicated that there was a weak and inverse correlation between the component of trust in personal instincts and

the duration of dialysis ($p<0.05$), and there was a weak and inverse correlation between hope and age ($p<0.05$). Finally, a weak and direct correlation was observed between the consumption of prescribed medicine and age ($p<0.05$).

Discussion

This study was conducted with the aim of determining the predictive role of resilience and hope on adherence to the treatment in hemodialysis patients. In the present study, more than half of the participants were at a very good level of resilience. As in some studies, resilience level is less than present study.[18,21] This discrepancy can be attributed to the differences in the age and type of the disease in the two studies. More patients under the study were at a good level in terms of hope. In 2016, Mirbaqher *et al.*[19] reported lower hope in hemodialysis patients than the mean score obtained in the present study and does not agree with the results of this study. This difference can be attributed to difference in the sample size of the two studies.

The results of the study showed a very good level of treatment adherence of the patients. In 2018, Naderi Far *et al.*[31] reported, lower treatment adherence than the average treatment adherence score obtained in the present study. Furthermore, in 2018, Rafiee and Shafie reported in their study that the average adherence score to the total treatment was, lower than the score obtained in the present study.[15] In 2017, Naalweh *et al.* stated that the mean score of adherence to the treatment in their study showed lower than the score obtained in the present study.[32] Considering the reasons for high mean score of the patients' adherence to the treatment in this study compared to other studies, it can be attributed to different size of the samples, cultural differences, different trainings provided by the treatment staff and different methods of evaluating the level of adherence to the hemodialysis program in these studies. Regarding the dimensions of adherence to the treatment, the results are also different. The levels of regular participation in the hemodialysis sessions, consumption of prescribed medication, and limitation of the dietary intake were found to be very good, these levels were moderate in the study of Naderi Far *et al.* conducted in 2018.[31] As indicated in the current study, level of these dimensions is more than the one in Naderi Far *et al*. study.[31] There is also a possibility that, due to the passage of time, the patients' attitude and understanding towards the disease have increased, and this has been effective in improving the level of treatment adherence.

As to determining the correlation between resilience and adherence to the treatment, the results of the current study showed that there was no correlation between resilience and adherence to the treatment in hemodialysis patients. In this regard, the results of the study by Naderi Far *et al.* showed that adherence to the therapeutic regimen had a significant effect on the quality of life of the patients. According to some previous studies, nurses can play a very important role in increasing adherence to the treatment regimen in the patients and improving the adherence conditions in the patients through establishing effective communications by the patients and supporting them.[31] Therefore, resilience and adherence to the treatment can affect a patient's quality of life and may have an indirect correlation with each other in terms of the quality of life, a subject which requires more research in this field. However, improving the level of resilience and adherence to the treatment can increase the physical condition and a patient's quality of life, which can finally lead to improvement of the level of mental health in the patient.

In terms of determining the correlation between hope and adherence to the treatment, the results of the current study showed that there was no significant correlation between hope and adherence to the treatment in patients. In the same line, the results of the study by Shareinia *et al*. in 2022 showed that there was no significant

correlation between hope and adherence to the treatment regimen,[33] a finding which is consistent with the results of this study. However, the results of the present study showed that there was a direct and weak relationship between hope and resilience. Some researchers showed in their studies that there was a significant positive relationship between hope and resilience.[34-36] These findings are consistent with the results of the present study. That is, by increasing hope, the amount of resilience increases as well. It can be mentioned that hope is a factor that enriches life and enables people to have a vision beyond their current situation, disorder, and pain. Among the positive results of improving hope, we can refer to creating a meaningful life, having energy for work; maintaining happiness and protecting life; having self-confidence, peace, and adaptability to conditions; and feeling superior in life. As to the relationship between hope and resilience, as found in this study, it is suggested that in order to improve the treatment of patients, psychological treatment programs should be used along with physical (medical) treatment programs; in this way, an attempt should be made to accelerate the recovery of the patients.

Finally, regarding the correlation the between components and subscales, it should be mentioned that the components indicated some correlations with their subscales. It was found that there was a strong and direct correlation between resilience and its subscales, and a direct and moderate correlation was revealed between hope and its subscales. Furthermore, a strong and direct correlation was indicated between adherence to the treatment and the subscales of regular participation in the hemodialysis sessions, but it indicated a moderate and direct correlation with the consumption of prescribed medicine. In terms of demographic features, Spearman's correlation test in this study showed that there was a weak and direct correlation between resilience and age. Furthermore, it was found that there was a weak and inverse correlation between the component of trust in the personal instincts and the duration of dialysis. A weak and direct correlation existed between the use of prescribed medicine and age, and we also found a weak and inverse correlation between hope and age. It can be stated in such a way that by increasing age, the amount of hope decreases, which can be due to the fact that aging makes the conditions more difficult for old patients, resulting in some characteristics that would lead to the appearance of some behavioral habits among such patients. In their study conducted in 2022, Khachian *et al.* showed that there was a significant relationship between adherence to the treatment and demographic variables,[37] which is consistent with the findings of the present study. One of the strengths of the present study was that no study has been conducted on the predictive role of resilience and hope on adherence to treatment in hemodialysis patients in Iran.

Limitations. One of the limitations of the current study was the lack of similar studies, which reduced the possibility of a better and more accurate comparison of the results for the researcher. As a result, it is suggested that similar studies should be conducted in order to more closely examine the impact of interventions and treatments on the hemodialysis patients by taking into account the passage of time from the disease and treatment. Furthermore, due to the lack of such studies, it is suggested that the effects of demographic, social, and clinical factors on the three components discussed in the present study should be investigated in order to gain a more comprehensive understanding of this matter. In addition, more studies are recommended to be conducted on the correlation between resilience and hope and adherence to the treatment. It is also possible that the sample size could not show this correlation statistically, thus, a similar study with a larger sample size is needed.

Conclusion. This study was conducted to investigate the predictive role of resilience and hope in adherence to the treatment of the patients

who were under hemodialysis in two hospitals affiliated to Shiraz University of Medical Sciences in 2021 and 2022. The results of this study indicated that the mean scores of resilience were at the desired level. Furthermore, the average scores of hope in the study also showed that hope was at a favorable level. It was found that the level of adherence to the treatment in the present study was generally at a very good level, only in the dimension of the limitation of the fluid intake; this level was lower than other dimensions, which requires training and improving the level of awareness of these patients regarding the consequences of reducing the fluid intake in their disease. Despite the favorable levels of the three variables of resilience, hope, and adherence to the treatment, there is a need for educational interventions by nurses and medical staff to maintain and improve the cases examined in this study. Because the patient's condition may undergo physical and mental changes over time and during the treatment, which may affect these variables, it is necessary to use the guidance and advice of nurses and treatment staff. Given that hope and resilience could not predict treatment adherence in the present study, more studies are needed in this regard.

Research implications. The main purpose of conducting a study in the field of disease and health is to apply it in different fields of the society and improve the quality of health. According to the subject of this study, in this section, the implications of the findings was discussed in the three areas of education, clinical services and management. In the field of education, it is suggested that more educational programs should be held in relation to the subject of the research because these programs can increase the level of knowledge and awareness of the performers of the interventions and treatments, which is effective in improving the implementation, results, and improving the mental and physical condition of the patients. In the field of clinical services, more attention can be paid to the role of nurses and nursing officials in holding consultation meetings and support forums to familiarize the patients with the related issues, to solve the problems and access information about the effectiveness of treatment and situation improvement, or to provide evidence from the previous studies conducted on the necessary issues for clarifying the patients, points which can be effective in improving the health condition in general. In the field of management, health managers and health policymakers can teach these concepts and their importance to health care workers during management and educational programs or through holding some workshops.

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Development and Evaluation of a Software Designed by a Nursing and Technology Team to Assess the Health Status of Adults over 65 Years of Age

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Development and Evaluation of a Software Designed by a Nursing and Technology Team to Assess the Health Status of Adults over 65 Years of Age

Abstract

Objective. This work sought to develop the *Actuasalud* platform as a useful tool for nursing that permits assessing health, in term of frailty, in population over 65 years of age. **Methods.** For the design and development of *Actuasalud*, two working groups were formed: one from nursing with different profiles, to identify the scientific content and a computer science group responsible for the software programming and development. Both teams adapted the scientific content to the technology so that the tool would allow for population screening with detection of health problems and frailty states. **Results.** The software was developed in three large blocks that include all the dimensions of frailty: a) sociodemographic variables, b) comorbidities, and c) assessment tools of autonomy-related needs that evaluate the dimensions of frailty. At the end of the evaluation, a detailed report is displayed through bar diagram with the diagnosis of each of the dimensions assessed. The assessment in the participating elderly showed that 44.7% (n = 38) of the population was considered not frail, and 55.3%; (n = 47) as frail. Regarding associated pathologies, high blood pressure (67.1%; n = 57), osteoarthritis and/or arthritis (55.3%; n = 47), diabetes (48.2%; n = 41) and falls during the last year (35.3%; n = 30) were highlighted. **Conclusion.** *Actuasalud* is an application that allows nursing professionals to evaluate frailty and issue a quick diagnosis with ordered sequence, which helps to provide individualized care to elderly individuals according to the problems detected during the evaluation.

Descriptors: aged; frailty; software; information systems; health management; needs assessment.

Desarrollo y evaluación de un software diseñado por un equipo de enfermería y tecnología para la valoración del estado de salud de los adultos mayores de 65 años

Resumen

Objetivo. Desarrollar la plataforma *Actuasalud* como una herramienta útil para enfermería que permita evaluar la salud, en términos de fragilidad, en población mayor de 65 años. **Métodos.** Para el diseño y desarrollo de *Actuasalud*, se constituyeron dos grupos de trabajo: uno de enfermería con diferentes perfiles para identificar el contenido científico y uno informático que se responsabilizó de la programación y desarrollo del software. Ambos equipos adaptaron el contenido científico a la tecnología de manera que la herramienta permitiese hacer un cribado poblacional con detección de problemas de salud y estados de fragilidad. **Resultados.** Se desarrolló el software en tres grandes bloques que incluyen todas las dimensiones de fragilidad: a) variables sociodemográficas, b) comorbilidades y c) herramientas de evaluación de necesidades relacionadas con la autonomía que evalúan las dimensiones de fragilidad. Al finalizar la evaluación, se visualiza un

informe detallado mediante diagrama de barras con el diagnóstico de cada una de las dimensiones evaluadas. La evaluación en los mayores participantes mostró que el 44.7% (*n* = 38) de la población se consideró como no frágil, y un 55.3%; *(n* = 47) como frágiles. En cuanto a las patologías asociadas, destacaron hipertensión arterial (67,1 %; *n* = 57), artrosis y/o artritis (55.3%; *n* = 47), diabetes (48.2 %; *n* = 41) y caídas en el último año (35,3 %; *n* = 30). **Conclusión.** *Actuasalud* es una aplicación que permite a los profesionales de enfermería evaluar fragilidad y emitir un diagnóstico de forma ágil con secuencia ordenada-que ayuda a brindar cuidados individualizados a personas mayores de acuerdo los problemas detectados en la evaluación.

Descriptores: adulto mayor; fragilidad, programas informáticos; sistemas de información; gestión en salud; evaluación de necesidades.

Desenvolvimento e avaliação de um software desenvolvido por uma equipe de enfermagem e tecnologia para avaliação do estado de saúde de adultos com mais de 65 anos

Resumo

Objetivo. Desenvolver a plataforma Actuasalud como uma ferramenta útil para a enfermagem que permite avaliar a saúde, em termos de fragilidade, numa população com mais de 65 anos. **Métodos.** Para a concepção e desenvolvimento do Actuasalud foram formados dois grupos de trabalho: um grupo de enfermagem com perfis diferentes, para identificar o conteúdo científico, e um grupo de informática que foi responsável pela programação e desenvolvimento do software. Ambas as equipas adaptaram o conteúdo científico à tecnologia para que a ferramenta permitisse o rastreio da população para detectar problemas de saúde e estados de fragilidade. **Resultados.** O software foi desenvolvido em três grandes blocos que incluem todas as dimensões da fragilidade: a) variáveis sociodemográficas, b) comorbidades ec) instrumentos de avaliação de necessidades relacionadas à autonomia que avaliam as dimensões da fragilidade. Ao final da avaliação é apresentado um relatório detalhado através de um diagrama de barras com o diagnóstico de cada uma das dimensões avaliadas. A avaliação nos idosos mostrou que 44.7% (*n*=38) da população foi considerada não frágil e 55.3%; (*n*=47) como frágil. Quanto às patologias associadas, destacaram-se a hipertensão arterial (67.1%; *n*=57), a osteoartrite e/ou artrite (55.3%; *n*=47), a diabetes (48.2%; *n*=41) e as quedas no último ano (35.3%; *n*=30). **Conclusão.** Actuasalud é um aplicativo que permite ao profissional de enfermagem avaliar a fragilidade e emitir um diagnóstico de forma ágil e com sequência ordenada que auxilia no atendimento individualizado ao idoso de acordo com os problemas detectados na avaliação.

Descriptores: idoso**;** fragilidade; software; sistemas de informação; gestão em saúde avaliação das necessidades.

Introduction

Health systems face an epidemiological outbreak of people with an elderly profile, multimorbidity and complex care needs, which represent a clinical and social challenge. Factors, like demographic change, increased life expectancy, lifestyles or sustainability of health systems, make the importance of prevention and health promotion acquire significant dimensions to guarantee accessible, universal, and equitable health care.[1] In the 21st century, digital resources provide the opportunity for communication to progressively reach all social levels, which means receiving immediate feedback for people. Nursing is not immune to this technological impact, but must seek a balance between the comprehensive care of individuals and the use of technologies that facilitate this task.

Information and communication technologies (ICTs) offer an opportunity for application in different areas from which the health sector is not exempt (e-health).[2] E-health programs contribute to enhance people-centered systems, improve public health capacity towards universal coverage, and enable quality care using technology and internet connectivity to improve health services.[2] Digital technologies and, especially mobile and wireless technologies, are appropriate in the health field given their ease of use, dissemination, and acceptance. Specifically, the elderly, by increasing technological usability, are an ideal group to benefit from advances in the use of ICTs that can help prevent frailty.[3] A survey conducted in 2022 by the Statistics National Institute (INE, for the term in Spanish) in Spain, related with technological usability, showed increased use of ICTs up to 85% in the elderly with 22% of the population over 75 years of age included in the survey data using the internet.[4] This may be the reason why many commercial companies and researchers have taken advantage of ICTs to design applications aimed at promoting healthy habits that can also serve as social support for the elderly.[5] Most applications focusing on the elderly address health problems such as multiple medications, monitoring of vital signs or falls, among other aspects, but in a single-dimensional manner.[6] Furthermore, the number of mobile applications that allow evaluating complex or frail situations and guaranteeing a comprehensive approach to nursing care is limited.[7]

To use the term frailty, we must go back to the 1980s when frailty was defined as a syndrome with a multiplicity of clinical-biological manifestations but no symptoms.[8] Frailty is dynamic, potentially reversible, process, predictor and risk factor for disability and of serious adverse events where, once a state of disability is reached, it is no longer reversible and evolves towards dependency.[8] Lack of consensus exists on the definition and screening methods for frailty, although by the late 1990s the World Health Organization defined as risk factors for frailty that of being over 80 years of age; having a disabling chronic illness; being institutionalized; suffering from comorbidities, disability,

dependence, cognitive alterations, depression, frequent falls, loneliness, and risk of poverty.[1]

Given the lack of comprehensive approaches to understanding the health status of the elderly, the scarcity of tools to support decision making, and the need to increase prevention and health promotion actions in this group, it seems pertinent to develop comprehensive assessment tools, as is the case of the *Actuasalud* digital platform, a software created for the purpose of standardizing and improving the assessment of health conditions and frailty screening in the elderly population living in the community. It is a software aimed at nurses that allows assessing the state of health and frailty in people over 65 years of age from any mobile device.[9] The aim of this study was to introduce the development of the *Actuasalud* platform from its conception as research (R), its technological development (D), and innovation (I) as a useful tool for nursing that permits assessing health in population over 65 years of age and showing the results obtained from the assessment of the first sample of elderly evaluated.

Methods

To create *Actuasalud*, a scientific team called Tecnosalud was organized at Universidad de Alicante in Spain, made up of two computer engineers and five nursing professionals with different profiles, two nurses with academic profile and > 5-year experience in public universities, two care nurses from the public primary health care system, and one nurse with private hospital management profile. To carry out the work, the scientific team was separated into two groups, a health group and a technology group. The coordination was performed by the senior academic nurse as head of the Tecnosalud team. Both groups established the conceptual bases for the construction of the *Actuasalud* platform: basic definition aspects of the application, development objectives, and contributions or results expected, as well as the objectives of each R+D+I phase. The research and development process was conducted between 2019 and 2020

The work of the health group consisted in conducting an exhaustive literature review to decide the content of the software with the best evidence on the environment in the assessment of the needs and syndromes that affect older adults prior to the development of the application. The study followed recommendations for the detection of alterations in human needs and frailty in primary care and in the community setting.[10,11] A selection of validated questionnaires and diagnostic tests was also made to assess health and provide a diagnosis related with frailty.[3] Additionally, a selection of complementary tests was conducted to allow specific health problems to be diagnosed independently. This would permit implementing adequate strategies in care, health promotion, and disease prevention to each group of elderly individuals with similar problems. Upon constructing the *Actuasalud* contents, for its validation with individuals, the study had four healthcare nurses from a primary care center and who had not participated in the construction of the platform. During the first 85 evaluations, every time five health diagnoses were made, a consensus group compared the results of the evaluation with the observation by the nurse evaluator, which allowed correcting possible diagnostic errors.

The software engineering used an agile application development method known as eXtreme Programming (XP).E.[12] The method followed was based on continuous feedback between nurses and the development team. Thus, dynamic and short development cycles were proposed. Through several meetings by both teams, the requirements and functionalities were agreed; these meetings were held periodically at the start of the development of each prototype. General phases in software development were followed to create the application's prototypes;[12] hence, in each cycle, a complete process of defining requirements and needs, design and development, and evaluation was carried out (Figure 1).

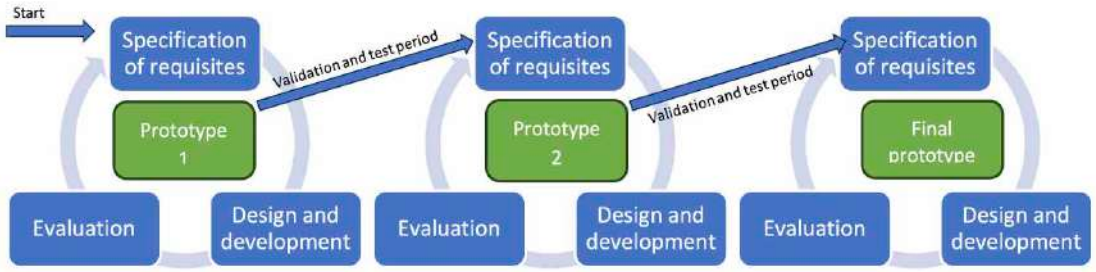

Figure 1. Phases of the development cycle of the *Actuasalud* s oftware to assess health in the elderly

Design and development de la Actuasalud platform

Upon establishing the system's minimum requirements through meetings between the nursing and technology groups, it was decided on the construction of a digital platform aimed at nursing professionals to expedite the evaluation of non-institutionalized individuals > 65 years of age without cognitive impairment. The evaluation had to determine the health status of the individuals by obtaining information related with their autonomy and possible state of frailty, in this order (Frailty; cognitive, functional, and nutritional states; health-related quality of life; socio-family situation; affective state; mobility; vision; hearing; security; sleep; and pain);[9] besides collecting socio-demographic data, comorbidities and pharmacological treatment. This permitted viewing a health diagnosis and formulating an individualized nursing care prescription. The order of the items and nursing assessment scales was determined; once the informed consent from each person is obtained, the evaluation begins with the socio-demographic data to continue with the comorbidities; prosthesis and drugs taken at the time of the evaluation to continue with the evaluation scales that the software should contain, as well as the scores that establish the differences among health states.

The software was developed with two principal elements: (i) Element 1. Application programed with WEB technology using the IONIC cross-platform mobile programming framework; (ii) Element 2. Administration panel and an application programming interface (API) that permit managing the information shown in the application. This part was developed via PHP through the Symfony development framework, which is connected to a MYSQL database through the ORM Doctrine. The application's research and development was carried out between March and September 2019 and innovation with knowledge transfer took place in November 2020. As of the moment of the knowledge transfer, the necessary steps to commercialize the platform were undertaken.[9]

Tool validation

To validate the tool, 85 individuals > 65 years of age without cognitive impairment and not institutionalized were evaluated. These subjects were contacted through nurses from primary care centers who decided to collaborate in the project. The assessment was performed by practicing clinical nurses who collaborated in the project through cooperation agreements with the university. To contrast the results of the assessments, six consensus groups organized made up of the nurse who had carried out the assessment, the person responsible for the software, an observer nurse, and the coordinator of the Tecnosalud team. The coordinator is an academic/research nurse with over five years of experience; the observer and evaluating nurses

had over five years of clinical experience; and the person responsible for the software was a computer engineer with five years of experience. This group met once per week to validate that the result, of the assessments issued by *Actuasalud*, corresponded to the evaluator's perception.[13] In case of disagreement between the score obtained in any dimension and the opinion of the evaluating nurse, its origin was analyzed to assess and even discard the evaluation with diagnostic purposes.

Statistical analysis

A descriptive statistical analysis was conducted using the chi-square test for the prevalence of frailty and care needs, comparing socio-demographic and clinical variables in function of two levels of frailty (Not frail and Frail). Thereafter, multivariate logistic models were adjusted to estimate the magnitude of the associations, estimating the Odds Ratios (OR). Analyses were performed via SPSS v.26 and R v.4.0.0 packages.

Ethical considerations

For the process of elaboration of *Actuasalud* and its validation, ethical and legal aspects have been followed according to the Declaration of Helsinki[14] and Organic Legislation 3/2018, of December 5, on the Protection of Personal Data and guarantee of digital rights,[15] as well as Regulation (EU) 2016/679 by the European Parliament and by the Council of 27 April 2016, on the Protection of Individuals. Prior to each assessment, informed consent was requested from each participant.

Data stored in *Actuasalud* is encrypted through a private key certificate, which encrypts all open response evaluation data, such as the observation fields and prevents data from an assessment from being associated with a patient. The server and database where the data is stored has an access control system where all access attempts are recorded. Lastly, access to data from an assessment from the application is recorded and monitored through files that keep the registry of user actions in the application. Thus, it allows to verify which person has accessed certain data. For data protection, *Actuasalud* includes a module online management of informed consents to ensure rights of access, rectification, cancellation, and opposition. Furthermore, the system is designed to generate, without trace, the assignment of a random number that will be used as identification of the user's assessment.

Results

This study resulted in the development of the *Actuasalud* software, registered by Universidad de Alicante,[9] transferred for its commercialization after having gone through all the technological maturity phases, using the Technology Readiness levels (TRL) scale from TRL1 (basic principles observed) to TRL9, real system tested in an operational environment (competitive manufacturing in the case of key enabling technologies). It can be assured that *Actuasalud* is able to evaluate autonomy, needs of daily life, and frailty states in population over 65 years of age without cognitive impair, with diagnostic report and data dump for subsequent analysis.

Software-related aspects

The *Actuasalud* platform comprises three large blocks: (i) Sociodemographic variables: age, sex, educational level, marital and socioeconomic status among others; (ii) Comorbidities; and (iii) Validated needs assessment scales that evaluate cognitive state, frailty, functional status, nutritional status, quality of life, socio-family situation, affective state, mobility, vision, hearing, safety (risk of falls and pressure ulcers), sleep, and pain.[3] The forgoing are summarized in Table 1.

Table 1. Scales used to assess needs and number of items that compose them

Need assessed	Scale used	Nº of items
Frailty	Frail	18
Cognitive state	PFEIFFER'S test	11
Nutritional assessment	Nutrition Screening Initiative (NSI)	10
Health-related quality of life	EQ-5D questionnaire	6
Functional state. Autonomy for basic daily living activities	BARTHEL'S index	10
Functional state. Instrumental daily living activities	LAWTON-BRODY index	8
Social risk	GIJON scale	5
Affective state	YESAVAGE scale	15
Assessment of visual ability	VF-14 scale	14
Hearing evaluation	ADDA scale	12
Risk and prediction of falls	STRATIFY scale	7
Risk of developing pressure ulcers	Braden's index	6
Quality of sleep	Athens scale	8
Pain assessment	Pain numerical scale	1
Total	-	131

The three large blocks of *Actuasalud* make up 214 items and the mean time used by nurses to conduct the assessment is 35 minutes. Construction of the application's functionalities had three iterations that served in the development of successive prototypes. For 3 months, a first version (first iteration) was developed, where the proof of concept was carried out, followed by a second iteration with intervention by the scientific team and the nurses who conducted the evaluations; this iteration lasted another three months and testing began on the final version. During this period (third iteration), the first 85 individuals were assessed by nurses from primary care centers and through the meetings of the consensus groups, the result obtained by the platform was evaluated, with respect to the observation by the evaluating nurse regarding the elderly person evaluated.

Results of the first assessment performed on elderly individuals with *Actuasalud*

The study included 85 participants who fulfilled the inclusion criteria with a mean age of 74.28 (±6.43) years, the minimum age was 65 years and the most advanced was 91 years. The sociodemographic characteristics revealed prevalence of the female sex (61.2%), no educational level (50.6%), not living alone (55.3%), and 77.6% were retired with income under 900 € (72.9%), and 71.8% did not receive social benefits.

Table 2. Sociodemographic variables of the 85 older adults participating in the study

Variables	Categories	*n*	%
Sex	Female	52	61.2
	Male	33	38.8
Educational level	None	43	50.6
	Primary studies	32	37.6
	High school	5	5.9
	University	5	5.9
Living conditions	Lives alone	38	44.7
	Lives with partner	42	49.4
	Lives with children	8	9.4
	Lives with a relative	3	3.5
	Lives with a caregiver	1	1.2
Usual occupation	Housekeeper	17	20.0
	Employed	0	0.0
	Unemployed	2	2.4
	Retired	66	77.6
Marital status	With a partner	43	50.6
	Without a partner	16	18.8
	Widowed	26	30.6
Monthly income	Without income	7	8.3
	< 900 €	55	64.7
	Between 900 € and 1200 €	10	11.9
	> 1200 €	13	15.5
Social benefits	Yes	24	28.2
	No	61	71.8

Comorbidities showed a series of associated pathologies among which were highlighted arterial hypertension (67.1%; $n = 57$), osteoarthritis and/or arthritis (55.3%; $n = 47$), diabetes (48.2%; $n = 4$ 1), and falls within the last year (35.3%; $n = 30$). Regarding the analysis of care needs based on frailty, it was found that 44.7% ($n = 38$) of the population was considered Not frail, and 55.3%; $n = 47$ as frail. The cut-off point to differentiate the groups is three or more points according with the frailty scale. The results of the sociodemographic and clinical variables showed statistically significant differences in function of frailty; specifically, a significant association was observed, with lower percentages in non-frail individuals against those who are frail, between being frail and receiving social benefits (25% Vs. 75%; $p = 0.001$), having circulatory problems (18.8% Vs. 81.2%; $p = 0.041$), and taking analgesics regularly (24.2% Vs. 75.8%; $p = 0.005$).

Regarding the results of the analysis of the battery of instruments to measure frailty-based care needs, those with statistical significance were included; it was noted that frail participants with respect to those not frail had greater care needs in relation to their cognitive state (50% Vs. 50%; $p = 0.004$), basic needs of daily life (75.9% Vs. 24.1%; $p = 0.012$), instrumental activities (45.5% Vs. 54.5%; $p = 0.002$). The quality of life results were broken down into three levels: very good; good, and fair-poor for correlation with frailty and observing very good 26.3% Vs. 73.7%; good 62.9% Vs. 37.1%, and fair-poor 64.5% Vs. 35.5; ($p = 0.016$). Among the responses to the EQ-5D questionnaire, statistical significance was found in the following items, mobility (39% Vs. 61%; $p = 0.037$), hearing (69.4% Vs. 30.6%; $p = 0.043$), falls (42.1% Vs. 57.9%; $p = 0.048$), risk of pressure ulcers (77.8% Vs. 22.2%; $p = 0.009$), and pain (35% Vs. 65; $p=0.001$).

According with the results of the logistic regression, any status other than retired was considered a risk factor for developing frailty (OR = 4.1, 95% CI = 1.1-15.7); $p = 0.0355$), while not being diabetic (OR = 0.3; 95% CI = 0.1-0.9; $p = 0.0446$) and not having hearing problems (OR = 0.2; 95% CI = 0.1-0.8; $p = 0.0202$) were considered protective factors (Table 3).

Table 3. Multivariate analysis of frailty with the total scores of the questionnaires, and with the sociodemographic variables and comorbidities

Variables	Categories	OR (95% CI OR)	*p*-value
Age in years	65-74	1	0.0544
	>= 75 years	2.6 (0.9-7.2)	
Sex	Female	1	0.3105
	Male	0.5 (0.2-1.6)	
Usual occupation	Retired	1	0.0355
	Other	4.1 (1.1-15.7)	
Diabetes	Yes	1	0.0446
	No	0.4(0.1-0.9)	
Final hearing score	Requires exploration	1	0.0202
	Does not require exploration	0.2 (0.1-0.8)	

Discussion

Evaluating the health status of the elderly population and seeking to identify intervention programs that improve the lives of the elderly is a socio-health need of interest. In this regard, *Actuasalud* has been developed, composed of 14 scales, which assesses 12 dimensions, like cognitive state, frailty, basic and instrumental activities of daily living, feeding, mobility, affective state, social, risk of falls, and pressure ulcers among others to allow autonomous decision making by nurses about the health of the elderly population. Most mobile applications aimed at assessing health problems lack a comprehensive evaluation system of health problems in the elderly, with their use limited to specific purposes.[16] Nevertheless, mobile applications exist that bear similarities with *Actuasalud*, given that they use similar tools to assess different dimensions with repercussion

on frailty and the elderly. A number of applications were identified with a frailty approach, each with different recipients for their use, different clinical criteria, scales and areas, on the one hand, some of these applications are commercialized, which is the case of Dependence Indicators[17] that include validated scales and permit calculating functional values, with an approach for social work professionals. Other applications have use on development based on comprehensive geriatric assessment, allowing to calculate scale scores and explore clinical recommendations.[18]

For example, there is PowerFrail that mainly evaluates muscle strength[19] or GeriatriAPP,[18] which although designed to carry out a comprehensive geriatric assessment, has a clinical approach that includes the prediction of mortality through the Charlson Index, evaluation of risk medications, and a frailty approach focused on the Study of Osteoporotic Fractures, which provides data for non-nursing decision making. According to a Cochrane systematic review published in 2022,[20] the comprehensive geriatric assessment was designed to elaborate a comprehensive care plan with inconclusive results.

Actuasalud was constructed with a preventive disease approach to promote active aging and identify prevention programs relevant to the older population, as recommended in frailty consensus documents, like the updated proposal by the Spanish Ministry of Health for 2022 that includes recent situations, such as the COVID-19 pandemic.[21] One of the key points in the *Actuasalud* design focuses on the evaluation of needs, early detection of problems, and care continuity, aspects of caring that are the responsibility of nurses and that assessment instruments, such as *Actuasalud*, contribute to decision making by nursing to maintain health in the elderly. According with the digital recommendations by the WHO, digital monitoring of the population is a priority to gather information on health status and its management and electronic health records allow the availability of information and facilitate the search, analysis, and way of sharing information and streamline different phases of care processes.

Screening for frailty and assessment of human needs in primary care is useful;[18,22] however, in actuality in the daily clinical practice screening is not yet carried out homogeneously and, in fact, in Spain, health indicators related with frailty since 2022 seek to gather reliable frailty monitoring information that permits intervening with prevention as of younger ages.[21] The challenge is to move towards a standardized definition of frailty, as well as the use of electronic problem detection systems that can be easily implemented in clinical practice.[18,22] Nevertheless, efforts in implementing tools that support surveillance, awareness, and support systems in decision making are currently the least implemented, behind services such as telephone services and telemedicine.

The need to use ICTs requires material and human resources that, in turn, increase the cost of care in the short term; nevertheless, in the mid- and long term ICTs diminish care costs.[23] Not only should we ponder about the search for new tools that include user participation, these must also be cost-effective and in addition to robotics[23] and technological innovation, be able to produce changes in the process of caring for the elderly. Along these lines, the presence of mobile technologies is evident, associated with monitoring daily activities and risk situations,[24] which are complementary to the contributions made by *Actuasalud*.

Herein, we highlight three points of improvement that can be obtained with the study of frailty: fall prevention, frailty prevention or detection, and improved autonomy to carry out activities of daily life.[8] Prevention is the key to improve the quality of life of the elderly and sensory-based fall prevention systems are advanced; the majority of fall prevention devices use wireless motion and pressure sensors to determine the risk of falls by comparing data with normal behavioral

patterns.[25] Sensorization of daily activities to report on habits, such as pressure in bed, time away from home, or home activities has also been used.[25] However, all prevention systems require prior evaluation and screening that starts with the health assessment, so that the results of said assessment permit guiding prevention actions efficiently. This is the principal function by *Actuasalud* that as usability increases, it will allow progress towards automatic care prescription and frailty prediction.

This study concludes that the *Actuasalud* digital platform has been constructed with knowledge from nursing and technology and is accessible to be used by nursing aimed at increasing the use of frailty assessment tools. Its use by clinical nurses contributes in decision making and to support the use and treatment of the assessment data. In the field of nursing education, it can be used in students learning about the use of information technology and computing to evaluate care needs.

With the selection of the dimensions to assess in *Actuasalud*, the dynamics of the interview between professional and user were favored, along with achieving reduced assessment time, improved visualization of patient data, the possibility of the tool to assist the interviewer (through notes in the questions), and, in short, speeding up the interview and data collection process. *Actuasalud* is a preventive tool for use by nurses that allows population screening to detect health problems and frailty states. It consists of a computer system accessible from any mobile device, which permits easily assessing and detecting altered human needs, health and frailty states in population over 65 years of age, with an ordered sequence and with featured functionalities, like management of informed consents, data storage and evaluations, export to databases for subsequent processing, and issuance of graphic reports of the assessments. *Actuasalud* has completed the R+D+I cycle successfully.

This research has a limitation in the recruitment of subjects and their subsequent follow-up, given its difficulty to compete with evaluation systems established in health systems. As future lines of research and development, the implementation of a meta tool is planned to simplify data collection while maintaining the effectiveness of the evaluation that is already being worked on. It is also planned, within the same tool, to advance in the prescription of care and monitoring of individuals assessed to observe possible improvements in their condition or delay in frailty, and even for the system to allow their reference healthcare team to be informed of these warning signs to prevent complications.

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Effect of Self-transcendence, Self-distancing, and Family Functionality on Self-care Agency in Older Adults

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Effect of Self-transcendence, Self-distancing, and Family Functionality on Self-care Agency in Older Adults

Abstract

Objective. To determine the effect of self-distancing, self-transcendence, and family functioning on self-care agency in Mexican older adults**.** **Methods.** Correlational-explanatory design, with a sample of 253 elderly, collecting data through a simple random sampling. A personal data questionnaire was applied, the scale of: self-transcendence, the self-distancing subscale, the family APGAR and the ability to self-care in Mexican population from different demographic groups. Descriptive and inferential statistics were applied (Mann-Whitney U and a structural equation model) and the study was approved by a registered ethics committee. **Results.** The study had participation from 253 elderly, with a mean age of 68.02 years, with prevalence of the female sex (60.1%); the level of education was primary school or lower (51.4%). It was observed that the group of chronic diseases had lower self-distancing (U = 4.449.5, p = 0.038) and greater self-transcendence (U = 4177.0, p = 0.008), and selfcare (U = 4365.5, p = 0.024) than the group without chronic diseases. It was also found that self-transcendence, self-distancing, and family functionality produce a positive effect of 37% on selfcare. **Conclusion.** Self-distancing, self-transcendence, and family functionality explain an important proportion of selfcare in the elderly. Said knowledge permits understanding the care behavior of the elderly and, thus, propose future educational interventions by nursing to prevent or avoid functional, cognitive loss and social effects.

Descriptors: aged; adult health; family relations; selfcare.

Efecto de la autotrascendencia, autodistanciamiento y funcionalidad familiar en la agencia de autocuidado en adultos mayores

Resumen

Objetivo. Determinar el efecto del autodistanciamiento, autotrascendencia y funcionamiento familiar sobre la agencia de autocuidado en adultos mayores mexicanos**.** **Métodos.** Diseño correlacional-explicativo, con una muestra de 253 adultos mayores, recolectado mediante un muestreo aleatorio simple. Se aplicó un cuestionario de datos personales, la escala de: autotrascendencia, la subescala de autodistanciamiento, el APGAR familiar y la capacidad de autocuidado en población mexicana de diferentes grupos demográficos. Se aplicó estadística descriptiva e inferencial (U de Mann-Whitney y un modelo de ecuación estructural) y contó con la aprobación de un comité de ética registrado. **Resultados.** Participaron 253 adultos

mayores, con una media de 68.02 años, predominó el sexo femenino (60.1 %) y el grado de estudio de primaria o menor (51.4 %). Se observó que el grupo de enfermedades crónicas tuvo menor autodistanciamiento (U = 4.449,5, p = 0.038) y mayor autotrascendencia (U = 4.177,0, p = 0,008) y autocuidado (U = 4.365,5, p = 0.024) que el grupo sin enfermedades crónicas. También se encontró que la autotrascendencia, autodistanciamiento y funcionalidad familiar producen un efecto positivo de un 37 % sobre el autocuidado. **Conclusión.** El autodistanciamiento, autotrascendencia y la funcionalidad familiar explican una importante proporción del autocuidado en los adultos mayores. Dicho conocimiento permite entender la conducta del cuidado del adulto mayor y de esta manera proponer a futuro intervenciones educativas por enfermería con miras a prevenir o evitar la pérdida funcional, cognitiva y afectaciones sociales.

Descriptores: anciano; salud del adulto; relaciones familiares; autocuidado

Efeito da autotranscendência, do autodistanciamento e da funcionalidade familiar na agência do autocuidado em idosos

Resumo

Objetivo. Determinar o efeito do autodistanciamento, da autotranscendência e do funcionamento familiar na capacidade de autocuidado em idosos mexicanos. **Métodos.** Desenho correlacional-explicativo, com amostra de 253 idosos, coletada por meio de amostragem aleatória simples. Aplicou-se um questionário de dados pessoais, a escala de autotranscendência, a subescala de autodistanciamento, o APGAR familiar e a capacidade de autocuidado na população mexicana de diferentes grupos demográficos. Estatísticas descritivas e inferenciais (U de Mann-Whitney e modelo de equações estruturais) foram aplicadas e tiveram aprovação de um comitê de ética registrado. **Resultados.** Participaram 253 idosos, com idade média de 68.02 anos, predominou o sexo feminino (60.1%) e o nível de escolaridade era fundamental ou inferior (51.4%). Observou-se que o grupo com doenças crônicas apresentou menor autodistanciamento (U=4.449.5, p=0.038) e maior autotranscendência (U=4177.0, p=0.008) e autocuidado (U=4365.5, p= 0.024) que o grupo sem doenças Crônicas. Verificou-se também que a autotranscendência, o autodistanciamento e a funcionalidade familiar produzem um efeito positivo de 37% no autocuidado. **Conclusão.** O autodistanciamento, a autotranscendência e a funcionalidade familiar explicam uma proporção importante do autocuidado em idosos. Esse conhecimento permite compreender o comportamento de cuidar do idoso e desta forma propor futuras intervenções educativas pela enfermagem com vistas a prevenir ou evitar perdas funcionais, cognitivas e efeitos sociais.

Descritores: idoso; saúde do adulto; relações familiares; autocuidado

Introduction

The increased prevalence of chronic diseases and the progressive aging of the population is a source of concern and occupation for diverse professionals responsible for health care.[1] The care of the elderly is often attended to from a "physical" point of view, ignoring the psychological aspects involved in self-care agency,[1] which could increase the demand for services and care costs, mainly generated by new diagnoses or complications, with existence of factors like self-transcendence, self-distancing, and family functionality – variables that could affect selfcare.[2,3]

Among these behavioral factors, there is self-transcendence and it is understood as the human capacity to go beyond one's own self and, as a consequence, expand personal limits through a spiritual path to give meaning to life and that is linked to a connection with the self, the environment, and with the spirit of the universe, that is, it is the meaning of one's existence.[4-6] In turn, when addressing self-distancing, it is understood as the conscious ability to distance oneself from situations that may affect oneself, being able to confront this situation and improve behavioral processes.[7] With the foregoing, a knowledge gap exists in the field of application of the elderly in nursing, finding an approach from chronic disease in this age group, where it is mentioned that with chronic disease in the elderly, they stop caring for themselves, derived from the physical, psychological and, family changes caused by the disease,[8] which becomes an area of opportunity for geriatric nursing upon considering the behavior as a modifying factor of self-care agency.

Likewise, when approaching the family, it is understood that it could be a factor that may influence upon selfcare, given that the family functionality or a functional family is achieved by promoting the integral development of its members, as well as by keeping the elderly in a favorable state of health, and with such, the elderly perceive family functioning, manifesting the degree of satisfaction with the compliance of the basic parameters of family function, such as, adaptation, participation, gain or growth, affect and resources, recognizing the family as a principal support institution of the care by nursing, highlighting the need to consider them in the factors that could modify selfcare.[9]

Lastly, when speaking of the self-care agency in the elderly, mention is made of the quality, aptitude or ability as fundamental capacity that groups the individual's basic abilities (sensation, perception, memory, and orientation), the components of power (specific capacities related with the individual's ability to commit to selfcare), and the capabilities for self-care operations, seeking a balance among physical, psychological and social aspects.[10] Hence, it is necessary to approach in this age group the self-care behavior in the elderly with and without chronic diseases, which separately constitute

an important percentage of the global disease burden and, often, occur simultaneously, which is why they should be considered jointly and above all taking into account other intrinsic factors, like self-transcendence and self-distancing. [11]

Thus, it is noted that nursing also participates in geriatric care, given that it addresses the functional, cognitive-psychological and social field, where the family is included within it, justifying itself as part of the Nursing Interventions Classification, such as the actions denominated as aid in modifying oneself. This way, it is anticipated that self-distancing, self-transcendence and family dynamics could modify selfcare in the elderly with chronic conditions, so researching said problem could generate interventions based on the behavior, the family and improved self-care agency. Based on what was described, the following general objective was proposed: to determine the effect of self-distancing, self-transcendence, and family functioning on the self-care agency in Mexican elderly.

Methods

This was a correlational-explanatory study. The study population was comprised by elderly inhabitants of Chetumal, Quintana Roo in Mexico. The sample was obtained through the G Power® program, considering an effect size of 0.10, error probability of 0.05, power of 0.91 and three explanatory factors, obtaining a sample of 253 elderly. Simple random sampling was applied for finite samples. The inclusion criteria included being an adult 60 years old or more, living in the municipality of Quintana Roo, Mexico in 2023 and who live with at least one direct or indirect relative. With respect to the exclusion criteria, the study considered the elderly with some hearing or speech limitation, and anyone with a score < 9 on the Pfeiffer test, whose indicator is the presence of risk of cognitive impairment.

A questionnaire of the population's characteristic data was applied (age, sex, perceived economic level, current illnesses, years living with the disease, whether caring for somebody, and if suffering any chronic disease). The instruments used were: (i) The Self-transcendence scale designed by Reed[12] validated in Mexican population to measure how individuals expand their limits in different forms. The instrument has 15 items with a Likert-type scale with four response options from 1 to 4. The total score varies between 15 and 60, in which high scores in the scale indicate higher self-transcendence and low scores indicate lower self-transcendence, with a Cronbach's alpha of 0.85;[12] (ii) the Existential Scale Adapted to measure only the Self-distancing subscale, comprised by eight Likert-type items from 1 to 6, where 1 is yes, absolutely and 6 no, absolutely. It is interpreted with data of levels of: very low (6-17 points) low (18-24 points), medium (25-31 points), high (32-39 points), and very high (40-48 points). This scale has a Cronbach's alpha of 0.99.[13] (iii) Family *APGAR*, which shows how the family members perceive globally the level of functioning of the family unit. It has Likert-type response options ranging from: almost always (2 points) to almost never (0 points). A score from 7 to 10 suggests a very functional family, while a score from 4 to 6 suggests a moderately dysfunctional family, and a score from 0 to 3 suggests a highly dysfunctional family. It has a Cronbach's alpha of 0.77; (iv) Self-care capacity in Mexican population from different demographic groups, which is composed of 24 items with a response format of five Likert-type alternatives, where 1 (totally disagree) means the lowest value of the capacity for selfcare and 5 (totally agree) being the highest. The results are interpreted according to the score obtained in the total sum of each of the items, where a lower score means lower self-care agency and a higher score indicates higher self-care agency; this has a Cronbach's alpha of 0.80 in the Mexican population.[14]

The research proposal was approved by the Research Ethics Committee registered with the National Bioethics Commission (CONBIOETICA), complying with the provisions of the regulations of

the General Health Law regarding research, which applied article 13 of chapter 1, second title, treating with respect and protecting participant well-being, clearly explaining the objective of the study, where the human rights of the participants were protected, their autonomy, with the right to free decision, involving collection of their data, respecting confidentiality, and anonymity if desired, without seeking to cause discomfort or harm the study subjects in a given time. Therefore, reference was made to the general health law in its second title "On the ethical aspects of research on human beings", the following articles: Article 13, 17, 18, 20, 21, which addresses study subjects as beings who must prevail in the criteria of respect, dignity, and protection of their rights and well-being; this was considered a risk-free study, coupled with the fact that informed consent was applied, and explained in a clear and precise manner. Lastly and in compliance with the General Law of Protection of Personal Data in Possession of Obligated Subjects and the Law of Protection of Personal Data Possession of Obligated Subjects for the State of Quintana Roo, the data collected was used solely for research purposes, with the research team assuming the legal and security measures to protect the personal data of the participants.

The results were analyzed with the Statistical Package for Social Sciences (SPSS) version 25 for Windows 2010. Absolute frequencies, proportions, and percentages were used. A distribution analysis of the continuous variables was carried out with the Kolmogorov Smirnov test, categorizing the variables as non-parametric. Moreover, given the normality of the data to determine the difference in means by groups, the Mann-Whitney U test was applied. A structural equation model was tested using EQS v6.1 statistical software. The statistical indicator was the chi-square; if this relationship results with a significance level of $p > 0.05$, it was considered that the model has adequate statistical fit. Considering that ?2 is usually susceptible to sample number, the relative $\chi 2$ was used, which is calculated by dividing the adjusted $\chi 2$ index by the degrees of freedom. If this value is < 5, it was considered a good statistical fit. Furthermore, given that given that statistical indicators tend to be quite sensitive to sample size, The Comparative Fit Index (CFI), Bentler-Bonett Normed Fit (BBNFI) and Non-normed Fit (BBNNFI) were included, along with the Root Mean Square Error of Approximation (RMSEA).

The data collection process began with the request permissions in six public centers caring for the elderly; after that, the participants were selected randomly, applying a physical informed consent with the help of a research aide. Thereafter, and the study proceed to apply the aforementioned scales through a digital document. The dissemination of the results will be carried out after its publication through a community forum where society, civil associations, and universities will be in attendance.

Results

The study had 253 elderly participants with a mean age of 68 ± 7.5 years (95% CI= 67.1-68.9), with a mean of years living with the chronic disease of 10.14 years ± 10.5 years (95% CI= 8.8-11.4). Regarding the other demographic characteristics, there was prevalence of women (n = 152, 60.1%), primary or lower level of schooling (n= 130, 51.4%), with perceived medium economic level (n = 163, 64.4%), not caring for another person (n = 208, 82.2%), and having chronic diseases (n = 189, 78.3%), as seen in Table 1.

Table 1. Characterization of the 253 elderly participants

Variable	*n*	%
Sex		
Male	101	39.9
Female	152	60.1
Level of studies		
Did not study	50	19.8
Primary	80	31.6
Secondary	42	16.6
High school	16	6.3
Technical career	24	9.5
Undergraduate	27	10.7
Specialization	5	2
Master's	9	9.5
Economic level		
Low	81	32
Medium	163	64.4
High	9	3.6
Caring for another person		
Yes	45	17.5
No	208	82.2
Suffers chronic disease		
Yes	189	78.3
No	55	21.7
Prevalence of chronic diseases		
Diabetes	79	41.7
Hypertension	55	29.1
Arthritis	16	8.4
Asthma	14	7.4
Cardiopathy	13	6.8
Cancer	1	0.5
Parkinson's	1	0.5
	10	5.6

Less alteration was found in the variables of self-distancing, self-transcendence, family functionality, and self-care agency with respect to that presented in the validation of the instruments (Table 2).

Table 2. Description of the scores of the variables studied in 253 elderly participants

Variable	M	SD	Max Val	Min Val	95% CI
Self-distancing	27.7	7.3	48	9	26.8-28.6
Self-transcendence	47.1	0.4	60	30	47.9-46.3
Family functionality	7.3	0.1	10	0	7.7-6.9
Self-care agency	86.8	988	120	36	88.8-84.9

Note: *M* = Mean, *SD* = Standard deviation, *Max Val* = Maximum value, *Min Val* = Minimum value, *95% CI* = Confidence Interval of 95% from the mean

Table 3 displays difference of means in the scores of self-distancing, self-transcendence, and selfcare, with the first variable being greater in the group without chronic diseases, while self-transcendence and selfcare were higher in the group with chronic diseases.

Table 3. Difference of means of the variables studied according to the condition of having or not having a chronic disease

Variable	With chronic disease (n = 189)		Without chronic disease (n = 55)		U	p - value
	M	*SD*	M	SD		
Self-distancing	27.1	7.0	29.7	7.8	4.449.5	0.038
Self-transcendence	47.0	6.2	49.4	6.3	4177.0	0.008
Family functionality	7.3	8	7.5	2.8	5029.0	0.377
Self-care agency	87.1	13.8	91.6	12.7	4365.5	0.024

Note: M = Mean, SD= Standard deviation, U = Mann-Whitney U test, p = probability

The following structural model shows the effect of factors, like self-distancing ($\lambda = 0.36$), self-transcendence ($\lambda = 0.50$), and family functionality ($\lambda = 0.54$) on the self-care agency, demonstrating that these three constructs covaried with each other in positive and significant manner ($p < 0.05$). The factor loadings were high and significant ($p < 0.05$) indicating convergent construct validity for all the factors. Cronbach's alpha for the entire set of indicators of self-transcendence, self-distancing, family functionality, and self-care agency resulted acceptable ($\alpha = 0.87$). The goodness-of-fit indicators included a non-significant chi-squared ($\chi^2 = 234.12$ [145 *g.l.*], $p = 0.123$) and practical goodness-of-fit indicators close to 1 (*BBNFI = 0.95, BBNNFI = 0.95, CFI = 0.97*), added to the fact that the RMSEA value was 0.05. Self-distancing, self-transcendence, and family functionality explained 37% of the total variance explained of the factor of self-care agency, which is why all these values suggest that the theoretical model is backed by the data.

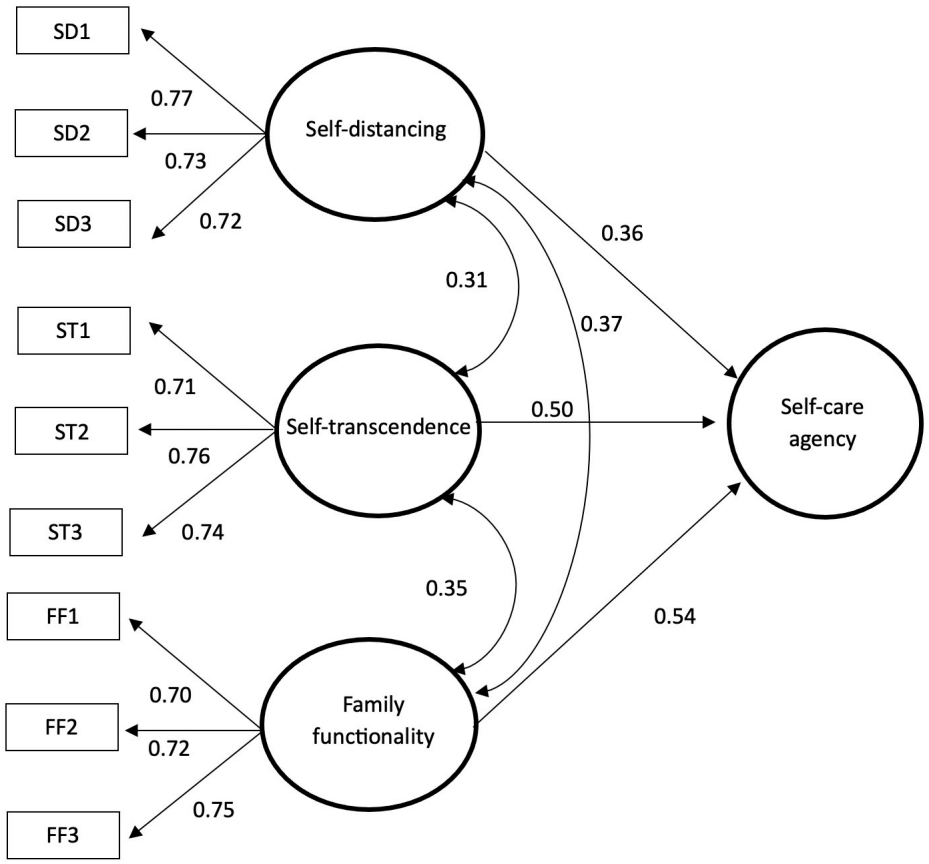

Figure 1. Structural model of the effect of self-distancing, self-transcendence, and family functionality on self-care agency

AD= self-distancing parcel, AT= self-transcendence parcel, and FF= family functionality parcel.

Discussion

Social inequalities in the elderly have been affected in diverse areas, with health being one of them; this is different due to the biological, psychological, and social factors that determine functioning and the risk of falling ill, and it is unequal because norms and social values assign differentiated settings and roles to this age group, conditioning their life experiences, especially their health.[15,16] This research addressed factors that modify the self-care agency in the elderly, finding slightly high self-distancing, self-transcendence, and family functionality, confirming that conducted by researchers in the United States of America and Poland, which suggest that self-distancing is a differentiating factor for the strategies used by the elderly in their autobiographical reflection. When based on self-distancing strategies, the autobiographical reflection correlates with a higher sense of purpose in life and a higher level of self-care agency.[17,18] Likewise, in Peru, researchers found high significance between the degree of family support and selfcare in the elderly because the relative or caregiver impacts on the support of

the elderly, becoming an important part in caring for their disease.[19,20]

On the other hand, other studies carried out in Mexico by Guerrero *et al*.,[21] as in Peru by Peralta *et al*.,[22] highlight that self-transcendence generates grand benefits in all the spheres of the individual, such as at emotional, functional, social, spiritual and family level; for this reason, self-transcendence is considered valuable and inherent to humans to confront difficult situations in life, helping them to overcome and adapt adequately to the different stages of their existence. Thus, when the elderly have chronic diseases, they have greater self-distancing, while the elderly without pathologies have greater self-transcendence and better family functionality. This demonstrates that the fact of suffering a chronic disease modifies the elderly individual's behavior, added to the mental health and the family function are also altered, with the disease factor being that which modifies the noological resources in this age group.[8,23-25]

Lastly, the study found that self-distancing, self-transcendence, and family functionality predict self-care agency, this is justified given that the elderly are essentially beings; within this it leads them to identify within themselves, and makes them in some way enter into a disturbing search for meaning to their own existence and essence, leading to self-reflection that permits identifying the positive and negative aspects that influence upon their health, which triggers maintenance or improves self-care.[26-28]

The importance of these results for the nursing practice lies in the possibility of developing educational interventions that enhance self-transcendence, self-distancing, and family functionality in the elderly. Said interventions may be designed to foster autobiographical reflection, family support, and emotional and social adaptation, thus, contributing to improve the self-care agency of this vulnerable population.[29] Nevertheless, these advances have significant challenges for the nursing profession, given that continuous and specific training is required in logotherapy that includes self-transcendence and self-distancing, as well as in communication skills and emotional support to effectively implement these interventions. Similarly, it is necessary to address the structural and social barriers that limit access by the elderly to health and community support resources.[30] Based on the foregoing, this study provides a solid base to improve knowledge and the nursing practice in relation to the self-care agency of the elderly from a behavioral perspective with participation by the family and nursing professionals, given that a key role is played in the promotion of health and wellbeing in this population, facing challenges with a holistic and emphatic approach. Among the limitations of the study was the lack of in-depth research on the topic in this age group, coupled with the fact that the size of the population is not updated at the state level, which could be a factor that modifies the sample size. Also, lack of government support was found to enter other public health care centers for the elderly to have a more random sample.

This study concludes that self-transcendence, self-distancing, and family functionality explain 37% of selfcare in the elderly. In this sense, it is crucial for nursing professionals to implement health educational interventions focused on these behavioral factors and the family, given that by doing so, the self-care agency may be promoted and improved in this vulnerable population, which in turn will contribute to preventing the loss of functionality and to having greater independence in the elderly.

These interventions must include strategies to strengthen self-transcendence and self-distancing, as well as to foster a functional and supportive family environment. Application of the results from this research in the nursing practice can result in a more holistic and effective approach in caring for the elderly, guaranteeing continuous and personalized monitoring of their health and wellbeing.

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Original article

Factors to Effective Clinical Experience, Willingness to pursue Career in Rural Health Facilities among Nursing Students on Clinical Placement in Southeast Nigeria and Rural Development

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Factors to Effective Clinical Experience, Willingness to pursue Career in Rural Health Facilities among Nursing Students on Clinical Placement in Southeast Nigeria and Rural Development

Abstract

Objective. To describe the Factors to Effective Clinical Experience and Willingness to pursue Career in Rural Health Facilities among Nursing Students on Clinical Placement in southeast Nigeria. **Methods. T**he study was conducted among 48 rural health centres and general hospitals with 528 respondents from different higher institutions of learning serving in these health facilities for their clinical experience. The study applied survey design and utilized questionnaire instrument for data collection. **Results.** Majority of the students (60%) agreed that their school lacked functional practical demonstration laboratory for students' clinical practice, 66.7% agreed that their school lab lacked large space for all the students to observe what is being taught, 79.9% that their school lab lacked enough equipment that can enable many students to practice procedures; majority of the students (79.9%) answered that the hospitals where they are on clinical placement lacked enough equipment needed for the students on each shift of practice, 59.9% agreed that student/client ratio in each ward during clinical experience periods was not enough for students' practice under supervision, while 73.3% indicated that their school lacked library with current nursing texts for references. Personal, socioeconomic and institutional factors explain the 76% of the variance of effective clinical experience and the 52% of the variance of the willingness to work in rural health facilities in the future if offered employment. **Conclusion.** The factors surrounding effective clinical experience in rural healthcare facilities in southeastern Nigeria are unfavorable and could discourage future nurses from working there. It is necessary to implement strategies to improve the management of these centers in order to promote the perspective of improving sustainable rural health in this region.

Descriptors: rural health services; clinical competence; public health; students, nursing; Nigeria.

Factores para una experiencia clínica eficaz, voluntad de seguir una carrera en instalaciones de salud rurales entre estudiantes de enfermería en prácticas clínicas en el sudeste de Nigeria y desarrollo rural

Resumen

Objetivo. Describir la experiencia clínica efectiva entre los estudiantes de enfermería en prácticas clínicas en las instalaciones sanitarias rurales en el sudeste de Nigeria. **Métodos.** Este estudio descriptivo se llevó a cabo entre 48 centros de salud rurales y hospitales generales con 528 encuestados de diferentes instituciones de enseñanza superior que prestaban servicio en estas instalaciones sanitarias para su experiencia clínica. **Resultados.** 60% de los estudiantes comentaron que su centro carecía de un laboratorio de simulación para las prácticas clínicas de los estudiantes, el 66.7% indicó que el laboratorio de su centro carecía de un espacio para que todos los estudiantes pudieran observar lo que se enseñaba. Un 79.9% indicó que el laboratorio de su centro no disponía de equipos suficientes para practicar los

procedimientos, y otro porcentaje igual (79.9%) manifestaron que los hospitales carecían del equipo necesario para realizar adecuadamente las prácticas clínicas. El 59.9% indicaron que la razón de estudiantes por paciente en cada sala durante los periodos de experiencia clínica era insuficiente para que los estudiantes realizaran prácticas bajo supervisión, y el 73.3% indicaron que los recursos de la biblioteca en textos de enfermería eran insuficientes para sus necesidades. Los factores personales, socioeconómicos e institucionales explican el 76% de la varianza en la experiencia clínica efectiva y el 52% en la disposición a trabajar en centros sanitarios rurales en el futuro. **Conclusión.** Los factores que rodean la experiencia clínica efectiva en los centros sanitarios rurales del sudeste de Nigeria son desfavorables y podrían desanimar a los futuros enfermeros a trabajar en ellos. Es necesario implementar estrategias de mejoramiento de la gestión de estos centros con el fin de impulsar la perspectiva de mejorar la salud rural sostenible en esta región.

Descriptores: servicios de salud rural; competencia clínica; salud pública; estudiantes de enfermería; Nigeria.

Fatores para experiência clínica eficaz, vontade de seguir carreira em unidades de saúde rurais entre estudantes de enfermagem em estágios clínicos no sudeste da Nigéria e desenvolvimento rural

Resumo

Objetivo. Descrever a experiência clínica eficaz entre estudantes de enfermagem em estágios clínicos em unidades de saúde rurais no sudeste da Nigéria (África). **Métodos.** Este estudo descritivo foi realizado em 48 centros de saúde rurais e hospitais gerais com 528 entrevistados de diferentes instituições de ensino superior que atendem essas unidades de saúde pela sua experiência clínica. **Resultados.** 60% dos alunos comentaram que seu centro não possuía laboratório de simulação para as práticas clínicas dos alunos, 66.7% indicaram que o laboratório de seu centro carecia de espaço para que todos os alunos pudessem observar o que estava sendo ensinado. 79.9% indicaram que o laboratório do seu centro não possuía equipamentos suficientes para a realização dos procedimentos e outro percentual igual (79.9%) afirmou que os hospitais não possuíam os equipamentos necessários para a realização adequada das práticas clínicas. 59.9% indicaram que a proporção de estudantes por pacientes em cada sala durante os períodos de experiência clínica era insuficiente para que os estudantes realizassem as práticas sob supervisão e 73.3% indicaram que os recursos da biblioteca em textos de enfermagem eram insuficientes para suas necessidades. Fatores pessoais, socioeconómicos e institucionais explicam 76% da variação na experiência clínica efetiva e 52% na vontade de trabalhar em centros de saúde rurais no futuro. **Conclusão.** Os fatores que rodeiam a experiência clínica eficaz em unidades de saúde rurais no sudeste da Nigéria são desfavoráveis e podem desencorajar futuros enfermeiros de trabalhar lá. É necessário implementar estratégias para melhorar a gestão destes centros, a fim de promover a perspectiva de melhorar a saúde rural sustentável nesta região.

Descritores: serviços de saúde rural; competência clínica; saúde pública: estudantes de enfermagem; Nigeria.

Introduction

Health institutions across the world have become the centre of attraction in the recent history owing to their pertinence to the overall human survival anywhere in the world. While the developed nations have improved in the management of their health institutions and infrastructures with more innovative approaches, in the developing nations such as in sub-Saharan Africa, the situation is still struggling with a number of challenges mostly in the area of manpower.[1,2] Nurses are the pillar of the professional health workers designed theoretically and practical to sustain the health facilities in their capacities in collaboration with other health professionals and this finds its reality in the availability of functioning health facilities and management. Among other things, the nursing students through series of assignments and engagements in the institutions of trainings are prepared to competently meet the preventive and curative health needs of the population in the hospital and other settings after their trainings; these included the clinical placement and other health and hospital management-based programs during the period of their training in the institutions of higher learning.[3,4] While these placements and other categories of engagements are designed to make these students competent and familiar with hospital settings towards their post-training service engagement, the engagement at this stage of their training equally contributes to their ability to contribute to the overall efficiency of the public health institutions as they graduate to continue their career in the hospitals and allied institutions.[5,6] Consequently, the level of preparation and assimilation of the clinical and management knowledge at this stage among the students, become the bedrock for the preparation of another generation of nurses to sustain the hospitals and the health institution as a whole owing to the fact that, when these students graduate and get employed in the hospitals and allied institutions, they over time become the replacement of the retiring nurses and health management officials phasing out of the system.

Clinical experience is one of the direct engagements with the hospital and health institutional/infrastructural settings by the nursing students during their trainings in the institutions of higher learning. While this engagement is one of the core aspects of their training, it is also observed as commitment to their training with much workload compared to other class works, they do. This is in view of the fact that, clinical experience is designed for the translation of the 'theoretical' knowledge of medicine and health management into practical dealings with preventive and curative health needs of a given population.[7,8] Across times and regions, clinical experience among nursing students has been regularised to technically prepare the nursing students in institutions of higher learning, the hospital and health management, which are the chief of their career base. However, while this as part of nursing program has been stabilized world over in terms of timing in the student's program and patterns

of implementation, there appears to be challenges with its effectiveness and impacts among the students and the overall health system in different parts of the world such as in the developing nations. These challenges hover around some factors such as institutional, socioeconomic factors as well as personal factors among the students engaging in clinical experience.

Institutional factors according to the study by Shokria, Chitra and Manal,[9] Woo and Li[10] includes but not limited to organisational settings, management organogram, intra and inter personal and group relationship within the hospital setting between the students and the hospital staff as well as the patients. From the studies by Gemuhay, Kalolo, Mirisho, Chipwaza and Nyangena,[11] Jafarian-Amiri, Zabihi and Qalehsari,[12] socioeconomic factors among the students such as family background, ability to cope with the financial and other demands of the training, marital status and other similar factors all together have their impact on the commitment and performance of the medical students during their clinical experience. Nevertheless, personal factors such as attitude to clinical placement, anxiety, lack of self-confidence, absenteeism and engagement with step by step mentorship and assignment by the preceptors during clinical experience have significant impacts on the ability of the students to successfully engage and complete their clinical experience.[13,14]

According to the studies by Alshammari *et al*.[15] clinical experience among the nursing students in places around Middle East is fraught with such challenges as institutional framework; inter personal relationship with the preceptors, poor organizational arrangement framework of operation to accommodate the students as well as poor clinical facilities lacking basic instrument and equipment for learning in hospital setting. The study by Mbakaya *et al*.[16] carried out in Malawi, showed that hostile environment, poor relationship with a qualified staff, absence of clinical supervisor and lack of teaching and learning resources affected the clinical experience among the nursing students. According to the study by Fooladi *et al*.[17] in Australia, nursing students posted to the clinical facilities faced with the challenges of lack of preceptors and effective supervision due to the hospital protocols, which lacked specific arrangement for the students coming for clinical experience in the organogram. Also, another study in Australia revealed that due to the nursing students who come for clinical experience in most cases lacked readily available skill to be used in hospital services, the preceptors and hospital management treat them as liabilities and as such gave them poor attention in supervision and assignment of duties.[18] This according to the study further demoralised the students and affected their participating in clinical placement.

The study by Salim *et al*.[19] showed the impacts of marital status on the nursing students participating in clinical experience in Doha Qatar. According to the study, married students are appeared to be wearied in the clinical placement activities and showed little or no aptitude for the learning processes in clinical placement in the hospital setting. From the findings of the study by Trede *et al*.,[20] clinical experience among the students in Canada appeared to be complicated with perceived unfriendly preceptors who gave little or no attention to relationship management with the nursing students on clinical placement who are invariably unfamiliar with the hospital setting. The study further revealed that the inability of the hospital management to specify when, how, where and what should be the commitment of the students for clinical experience made the students vulnerable to some individual behavioural issues peculiar to some preceptors and other hospital staff in the setting.

In sub-Saharan Africa involving Nigeria, nursing students going for clinical experience have over the years been subjected to complications and difficulties emanating from the hospital setting, institutional setting as well as socioeconomic

factors obtainable in the environment. The challenges mostly peculiar to the students of nursing participating in clinical experience have hovered around the management, supervision, infrastructures, facilities and coordination of the activities involved in the program between the institution of higher learning and clinical facilities receiving nursing students on clinical placement.[21,22] Most clinical facilities are ill-equipped resulting to the inability of the nursing students to have the experiential knowledge of practicing the theoretical learning in the classroom with appropriate equipment and facilities at the clinical facility settings. In some cases, some of the trusted staff of the clinical facilities mentoring the nursing students on clinical placement lacked the required skills and capacity to manage and supervise the nursing students.

As part of the effort to develop a sustainable public health facilities and services to reach the rural population, the World Health Organization recommended students exposure to the rural health facilities in order to arouse their interest in working in the rural clinical facilities. This is to ensure adequate curative and preventive health services to the rural population especially in the developing nations where majority of the population are still located in the rural settings. However, among the sub-Sahara African nations and other developing nations, the clinical facilities in the rural areas have failed to maintain a synergy with institutions of higher learning where the nursing students and other medical students are trained, in sustaining rural rotation (RR) program among the nursing students on clinical placement. For instance, during the pilot study, this study discovered that numerous public clinic facilities have no arrangement for clinical placement for nursing students. In any case, the nursing students on clinical placement have been unconsciously restricted in the urban settings where they are carried away by the urban lifestyles and facilities that discourage the idea of working in rural clinical facilities. In the special case of the rural clinic facilities in southeast Nigeria, the infrastructures and human resources are relatively scarce and complicated owing to the long term neglect by the government.[23,24] Owing to the three tier government structure and the developmental stage obtainable in sub-Saharan Africa such as in southeast Nigeria, public health facilities, which are mainly the destination of the nursing students on clinical placement are in dilapidated conditions and lacks the capacity to fulfil the purposes of clinical experience for the nursing students.[25,26] The public clinical facilities in rural southeast Nigeria are characterized by absenteeism of the health workers, obsolete medical equipment, poor nurse-to-patient ratio, poor doctor-patient ratio, corruption among the health staff and more.[27,28]

The condition of the public clinic facilities in the rural communities in southeast Nigeria in view of their pertinence to effective clinical experience among the nursing students is a challenge to sustainable public health and rural development owing to the gap such situation generates in sustainable development chain analysis. For instance, the rural-urban and international migrations of the health workers experienced in Nigerian health sector today is largely connected to poor health infrastructures and welfare of the health workers, which originates from the poor management in public health facilities and institution as well as government negligence of the rural clinic facilities.[29,30,31] For instance, the study by Chuke *et a*l. showed the truancy of the health workers in the rural clinical facilities mainly because the staff lived in the urban communities and preferred working in such vicinity than the rural communities. Equally, the studies by Yakubu *et al*.[32] and Adebayo and Akinyemi[33] revealed that poor satisfaction among health workers in the public clinical facilities, poor remuneration, poor work environment, and insecurity especially in the rural areas as well as lack of opportunity for career development triggered the intension of health workers of emigrating to developed nations. According to the Organisation for Economic Co-operation and Development, between 2008 and 2021 United Kingdom alone received 36467

migrating medical doctors from Nigeria; between 2002 and 2021, 60 729 nurses migrated from Nigeria to the United Kingdom and this has continued to increase in other areas of medical professions.A substantive number of higher institutions of learning do send their nursing students on clinical placement in the rural clinical facilities in southeast Nigeria, owing to the fact that a significant percentage (approximately 57%) of the population live in the rural areas and these institutions equally are mostly located in-between the urban communities and the rural communities.[34] This by implication creates the opportunity for the rural rotation (RR) program as recommended by the World Health Organization as well as given these students some feels with the rural clinic facilities. However, the missed opportunity here, which is the poor management of clinical experience among the nursing students in the rural clinical facilities and unpleasant experiences jeopardise the overall prospect of sustainable rural health in southeast Nigeria.

Clinical experience among the nursing students in places such as sub-Saharan Africa and southeast Nigeria in particular has attracted research attention of a number of scholars but in different dimensions and areas of the region. Some scholars in sub-Saharan Africa have researched on clinical placement among the nursing students in the areas of socioeconomic and personal factors affecting the nursing students on clinical placement,[35-37] poor clinical facilities, management crises at the clinical facilities and other institutional factors affecting clinical placement among the nursing students,[38,39] however, to the best knowledge of this study, there is yet to be a study specifically focusing on the effective clinical placement among the nursing students in the rural clinical facilities especially in southeast Nigeria rural communities. Even though some surface arguments tend to be projecting the unseen problems of poor-quality healthcare, incompetence among the health workers and some other crises, empirical evidence is lacking to substantiate the challenges and the related factors as well as to inform social and health policies suitable in dealing with the problems. The absence of empirical substantiation of these arguments has created unseen but felt gap in literature especially from the sub-Saharan Africa in the ongoing discuss on clinical experience among nursing students and sustainable rural health. This in essence warrants the present study, which aimed to fill the observed gap in literature. As such, the study is designed to answer the following research questions: (i) What are the factors affecting effective clinical experience among the nursing students in rural clinic facilities in southeast Nigeria?, (ii) What are the predicting factors to effective clinical experience among the nursing students in rural clinic facilities in southeast Nigeria?, and (iii) What are the predictors of willingness to work in rural clinic facilities if offered employment in the future among the nursing students on clinical experience in rural clinic facilities in southeast Nigeria?

Methods

The study took place in southeast Nigerian rural communities, focusing on the community health centers and general hospitals with formal arrangement for clinical placement for nursing students from different institutions of higher learning. Due to the nature of the rural public clinic facilities in southeast Nigeria, which are not consistent in terms of capacity and functionality classifications, the study resorted to pilot study for initial classifications and development of sampling frame. From the pilot study, 92 public health centers and general hospitals were classified as active with formal arrangements for clinical placement for the nursing students from different institutions of higher learning. Clinical posting to public health facilities in the rural southeast Nigeria are limited to community health centers and the general hospitals across the local government areas with proximity to government approved higher institutions such as the federal universities, state universities, government and private universities, school of health and nursing.

With the increasing insecurity in southeast Nigeria in the recent times such as mass kidnapping of commuters and other road users, the clinical posting of the nursing students has been limited to the rural communities with some level of security guarantee owing to the fact that the students do move in mass to their designated place of clinical placement. As such, the pilot study helped the researchers to group and classifies the community health centers and general hospitals in the rural locations, which are currently maintaining a formal arrangement with the higher institutions of learning for posting of nursing students on clinical experience. Also, due to the slanting of the posting towards urban health centers, the study carefully separated and classified rural communities with health centers and general hospitals engaging in clinical placement.

From the confirmed 92 rural health centers and general hospitals currently maintaining a formal arrangement with the higher institutions of learning for posting of nursing students on clinical experience, the study randomly selected 48 community health centers and general hospitals. From the 48 health facilities randomly selected for the study, quota sampling technique was applied to select 528 respondents. The study followed the season of posting and the number of institutions posting nursing students to different general hospitals and health centers included in the study. In view of the fact that virtually all the health facilities selected for the study do entertain posting of nursing students from at least two institutions of higher learning with at least three batches of posting in three seasons, the study selected 11 respondents from each of the 48 selected health facilities maintaining inclusive and exclusive criteria.

The inclusive criteria for the students to participate in the study were their coming to the facilities for the first time and not being included in this study in another facility at this period. This was because, some institutions preferred sending a set of students to more than one facility at different times in different locations in the region especially the host state within the same calendar year. The study purposely selected at least 3 students from each batch of placement from the health facilities that receives at least three batches of placement from different institutions, and equally selected at least 5 respondents from the facilities that received at least two batches of placement from different institutions of higher learning. In total, the study selected 528 respondents for the administration of research instrument.

The study instrument was developed in nominal and ordinal scales, but was grouped into socio-demographic information of the respondents, personal factors affecting effective clinical experience, socioeconomic factors affecting effective clinical experience and institutional factors affecting effective clinical experience among the nursing students in the rural health facilities. The research instrument was administered to the respondents between November 2022 and June 2023 to accommodate the posting schedules of the different institutions involved in the clinical placement of the nursing students in the rural health facilities in order to meet the targeted population for the study. The research instrument was shared during the day in view of the fact that each group that was posted to each facility was scheduled to maintain morning, afternoon and night shifts. With the help of research assistants, the study shared 528 questionnaires to the selected respondents and these were carefully done to control bias and misplacement of the questionnaire instrument. The collected data were analyzed using descriptive and inferential statistics with the aid of SPSS version 23. At the first stage of the analysis, the collected data were presented in percentages (%) to show the socio-demographic information of the respondents, followed by the percentage (%) analysis of the substantive issues to the study such as personal and institutional factors affecting effective clinical experience among the students. The next stage of the analysis to answer the question on the predicting factors to effective clinical experience was carried out with the aid of Linear regression, which enabled the study to explore the relationship

of the key variables on this with more focus on the direction of the relationship between the selected variables.

Results

Table1 showed the socio-demographic information of the respondents. According to the table, majority of the respondents (58.3%) are females, while 41.7% are males. Majority of the respondents (46.8%) are in the age categories of 29years and above, 33.1% are in the age category of 23-28years, while 20.1% are in the age category of 17-22years. On the distribution of the marital status of the respondents, majority of the respondents (40.2%) are married, 40% are single, 13.3% are separated, while about six percent of the respondents are divorced. Among the students, majority (39.8%) are in their 4th year of study, 26.7% are in their third year of study, 19.9% are in their 5th year of study, while 13.6% are in their 2nd year of study. Majority of the respondents (40%) source their school fees through the family, 26.5% depended on their personal income, 26.5% of the respondents are on scholarship, while about six percent depended on appeal for support. According to the socioeconomic capacities of their parents and guardians, majority of the respondents (46.4%) indicated that the monthly income of their parents/guardians is 101.000 and above; 33.3% indicated that their parents/guardians monthly income is between 71 000 and 100 000, 13.4% indicated that their parents/guardians monthly income is between 41 000 and 70 000, while about six percent indicated that their parents/guardians monthly income is between ₦10,000 and 40,000 Naira.

Table 1. Socio-demographic information of the respondents

Variables		*N*	Percentage
Respondents' gender	Males	220	41.7
	Females	308	58.3
Respondents' age	17-22	106	20.1
	23-28	175	33.1
	29 and above	247	46.8
Marital status	Single	211	40.0
	Married	212	40.2
	Separated	70	13.3
	Divorced	35	6.6
Study year	2nd year	72	13.6
	3rd year	141	26.7
	4thyear	210	39.8
	5th year	105	19.9
Respondents' source of school fees	Appeal for support	36	6.8
	Personal income	141	26.7
	Family	211	40.0
	Scholarship	140	26.5
Parents/guardian monthly income	10 000 – 40 000	36	6.8
	41 000 - 70 000	71	13.4
	71 000 - 100 000	176	33.3
	101 000 and above	245	46.4
Total		528	100.0%

Table2 showed the distribution of the respondents on the other substantive issues to the study. According to the table, majority of the students (73.1%) indicated that they attended clinical experience regularly as scheduled, majority of the respondents (59.8%) indicated that they did all the clinical experience assignments given to them during their clinical placement while, majority of the respondents (93.4%) indicated that they partially made use of the equipment in the hospital's laboratory for clinical practice on their own. Majority of the students (80.1%) partially did self-assessment of their performance during clinical experience, majority of the students (73.3%) indicated that they accepted corrections and ask your ward staff questions during clinical experience, while majority of the students (93.4%) indicated that they either did not, or partially used the nursing care procedure book during clinical experience as a guide for practice: during clinical experience.

Majority of the respondents (60%) indicated that their school has no practical demonstration laboratory for students' clinical practice, majority of the students (66.7%) indicated that their school lab does not have large space for all the students to observe what is being taught, while majority of the students (79.9%) indicated that their school lab does not have enough equipment that can enable many students to practice procedures. Majority of the students (79.9%) indicated that the hospitals where they are on clinical placement do not have enough equipment needed for the students on each shift of practice, majority of the students (59.9%) indicated that student/client ratio in each ward during clinical experience periods was not enough for students' practice under supervision, while majority of the students (73.3%) indicated that their school do not have a library with current nursing texts for references.

Table2. Substantive Issues to the Study

Substantive Issues		*n*	%
You attended the clinical experience regularly as scheduled	Not at all	36	6.8
	Rarely	106	20.1
	Sometimes	281	53.2
	Often times	105	19.9
You did all the clinical experience assignments/tests given to you during your posting (preparing patient's room, help patient with meal and bathing, screen for health abnormality, etc.)	Not at all	71	13.4
	Rarely	141	26.7
	Sometimes	176	33.3
	Often times	140	26.5
You made use of the equipment in the hospital laboratory for clinical practice on your own	Rarely	212	40.2
	Sometimes	281	53.2
	Often times	35	6.6
You did self-assessment of your performance during clinical experience	Not at all	35	6.6
	Rarely	247	46.8
	Sometimes	176	33.3
	Often times	70	13.3

Table2. Substantive Issues to the Study (Cont.)

Substantive Issues		*n*	%
You accepted corrections and ask your ward staff questions during clinical experience	Not at all	36	6.8
	Rarely	105	19.9
	Sometimes	211	40.0
	Often times	176	33.3
You used the nursing care procedure book during clinical experience as a guide for practice: during clinical experience	Not at all	70	13.3
	Rarely	247	46.8
	Sometimes	176	33.3
	Often times	35	6.6
Your school has practical demonstration laboratory for students' clinical practice	S-D	71	13.4
	Disagree	246	46.6
	Agree	140	26.5
	S-A	71	13.4
Your school lab has large space for all the students to observe what is being taught	S-D	106	20.1
	Disagree	246	46.6
	Agree	140	26.5
	S-A	36	6.8
Your school lab has enough equipment that can enable many students to practice procedures	S-D	140	26.5
	Disagree	282	53.4
	Agree	106	20.1
The hospital has enough equipment needed for the students on each shift of practice	S-D	106	20.1
	Disagree	316	59.8
	Agree	106	20.1
Student/client ratio in each ward during clinical periods is enough for students' practice under supervision	S-D	70	13.3
	Disagree	246	46.6
	Agree	212	40.2
Your school has a library with current nursing texts for references	S-D	105	19.9
	Disagree	282	53.4
	Agree	141	26.7
Total		**528**	**100.0%**

The model predicted the effectiveness of clinical experience among the nursing students in rural health facilities in southeast Nigeria R^2=.763, *F (170.553).* According to the model several factors included in the model significantly contributed in the explanation of effective clinical experience among the nursing students on clinical placement in rural health facilities; these factors included gender of the respondents, study years of the respondents, source of their school fees, parents/

guardians' monthly income, institutional factors (1&2) as well as the willingness to serve in the rural health facilities after graduation. Factors such as gender, source of school fees, monthly income of the parents/guardians, personal factors and willingness to serve in the rural health facilities after graduation contributed in the positive prediction of the likelihood of effective clinical experience among the nursing students on clinical placement in the rural health facilities.

Meanwhile, factors such as study years, institutional factors (1&2) all negatively predicted the likelihood of effective clinical experience among the nursing students on clinical placement in the rural health facilities. Gender in this context is significant in the model owing to the number of women involved in the study as nursing career in this part of the world is still seen as women career; this seems to play out in the extent of commitment that can come from the female folks participating in the career. Also, following the coding of the source of school fees of the students in the positive calibration, the presence and position of this factor in the model showed that the more comfortable the students are in terms of school fees sponsorship, the more likely they are going to be effective in the clinical experience; this also applies to the monthly income of their sponsors. Nonetheless, personal factors as positively significant in the model showed the passion for the career among the students as impacting on the effectiveness of their clinical experience. (Table 3)

Table 3. Coefficients of effective clinical experience

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	-0.439	0.228		-1.925	0.055	-0.887	0.009
Respondents' gender	0.458	0.054***	0.267	8.421	<0.001	0.351	0.565
Respondents' age	0.039	0.063	0.036	0.628	0.530	-0.084	0.163
Marital status	-0.004	0.025	-0.004	-0.172	0.864	-0.053	0.045
Study year	-0.290	0.040***	-0.321	-7.304	<0.001	-0.368	-0.212
Respondents' source of school fees	0.419	0.034***	0.435	12.299	<0.001	0.352	0.486
Parents/guardian monthly income	0.582	0.058***	0.621	10.050	<0.001	0.468	0.695
Personal factors among the students	0.115	0.051*	0.109	2.271	0.024	0.016	0.215
Institutional factor[1] (Institution of training)	-0.263	0.057***	-0.271	-4.634	<0.001	-0.375	-0.152
Institutional factor[2] (rural clinic facility)	-0.149	0.070*	-0.110	-2.123	<0.001	-0.287	-0.011
Willingness to working in rural health facilities after graduation	0.299	0.025***	0.329	12.157	<0.001	0.251	0.348

a. Dependent Variable: Effective Clinical Experience

df 10, *p<0.05, ** p<0.01, *** p<0.001, R = 0.876 (76.7) R^2=.763 (58.2), F (170.553)

The above model predicted the effectiveness of clinical experience among the nursing students in rural health facilities in southeast Nigeria R^2=.763, F (170.553). According to the model several factors included in the model significantly contributed in the explanation of effective clinical experience among the nursing students on clinical placement in rural health facilities; these factors included gender of the respondents, study years of the respondents, source of their school fees, parents/guardians monthly income, institutional factors (1&2) as well as the willingness to serve in the rural health facilities after graduation. Factors such as gender, source of school fees, monthly income of the parents/guardians, personal factors and willingness to serve in the rural health facilities after graduation contributed in the positive prediction of the likelihood of effective clinical experience among the nursing students on clinical placement in the rural health facilities.

Meanwhile, factors such as study years, institutional factors (1&2) all negatively predicted the likelihood of effective clinical experience among the nursing students on clinical placement in the rural health facilities. Gender in this context is significant in the model owing to the number of women involved in the study as nursing career in this part of the world is still seen as women career; this seems to play out in the extent of commitment that can come from the female folks participating in the career. Also, following the coding of the source of school fees of the students in the positive calibration, the presence and position of this factor in the model showed that the more comfortable the students are in terms of school fees sponsorship, the more likely they are going to be effective in the clinical experience; this also applies to the monthly income of their sponsors. Nonetheless, personal factors as positively significant in the model showed the passion for the career among the students as impacting on the effectiveness of their clinical experience. (Table 3)

From the findings, 19.9% of the respondents strongly disagreed that they will be working in rural health facilities after graduation, 40.3% disagreed, 26.5% agreed, while 13.3% strongly agreed that they will be working in the rural health facilities after graduation.The model predicted willingness to work in rural health facilities after graduation among the nursing students on clinical placement in the rural health facilities in southeast Nigeria R^2=0.523 (27.4), F (56.634). A number of factors contributed in the model in predicting the likelihood of working in the rural health facilities after graduation among the nursing students on clinical placement in the rural health facilities in southeast Nigeria; among the factors are, gender, age, respondents' source of school fees, parents/guardians monthly income, personal factors among the students, institutional factors (1&2) and effective clinical experience. However, only parents/guardians monthly income and effective clinical experience contributed to the explanatory power of the model in the positive dimension. The willingness to serve in the rural health facilities among the upcoming nurses is one of the unseen factors affecting the sustainability of rural health workers especially the nurses who make up the 60% of the rural health workers in the southeast Nigeria. And this factor in its respect is dependent on other factors, which the present findings have revealed. Women health workers are more likely to prefer urban setting for their careers than their male counterparts, this is confirmed in the findings of the model as majority of the participants in this study are females. (Table 4)

Table 4. Coefficients of Willingness to work in rural health facilities after graduation

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	3.482	0.326		10.673	<0.001	20.841	40.122
Respondents' gender	-0.388***	0.090	-0.206	-4.332	<0.001	-0.565	-0.212
Respondents' age	-0.542***	0.096	-0.446	-5.659	<0.001	-0.730	-0.354
Marital status	-0.020	0.039	-0.019	-.513	0.608	-0.097	0.057
Study year	0.008	0.066	0.008	.125	0.901	-0.121	0.137
Respondents' source of school fees	-0.507***	0.057	-0.478	-8.925	<0.001	-0.619	-0.396
Parents/guardian monthly income	0.357***	0.098	0.346	3.624	<0.001	0.163	0.550
Personal factors among the students	-0.267**	0.079	-0.229	-3.358	0.001	-0.423	-0.111
Institutional factor1 (Institution of training)	-0.271*	0.091	-0.254	-2.996	<0.001	-0.449	-0.093
Institutional factor2 (rural clinic facility)	-0.196	0.111	-0.132	-1.768	<0.001	-0.022	0.413
Effective Clinical Experience	0.743***	0.061	0.675	12.157	<0.001	0.623	0.863

a. Dependent Variable: Willingness to work in rural health facilities after graduation

df 10, *p<0.05, ** p<0.01, *** p<0.000, R = 0.723 (52.3) R^2=0.523 (27.4), F (56.634)

Discussion

In this study, it was specified as a research objective, to understand the factors affecting effective clinical experience among the nursing students in the rural clinic facilities with focus on the personal, socioeconomic and institutional factors. Although these factors have been explored by other researchers, the uniqueness of the present approach is found in the context of the study, which is southeast Nigeria, elements of rurality and rural health sustainability. From the findings of the study, socioeconomic, personal and institutional factors appeared to have sway over effective clinical experience rather negatively. Among the nursing students studied, the institutional factors (here which were categorized as clinic facilities as institution and institutions of higher learning), have affected the potentials of the nursing students for effective clinical experience. This challenge is anchored on the failed responsibilities of these institutions to provide the necessary basic equipment and facilities to aid the clinical experience for the students on clinical placement. This is reflected on the elements of responsibilities by these institutions, which were explored in the study; for instance, majority of the respondents (60%) indicated that their school has no practical demonstration laboratory for students' clinical practice, majority of the students (66.7%) indicated that their school lab do not have large space for all the students to observe what is being taught, while majority of the students (79.9%) indicated that their school lab do not have enough equipment that can enable many students to practice procedures. Majority of the students

(79.9%) indicated that the hospitals where they are on clinical placement do not have enough equipment needed for the students on each shift of practice, majority of the students (59.9%) indicated that student/client ratio in each ward during clinical experience periods was not enough for students' practice under supervision, while majority of the students (73.3%) indicated that their school do not have a library with current nursing texts for references. basically, these two institutions as categorized in this study are the cardinal points to achieve effective clinical experience among the students through the expected provision of the basic facilities and synergy aimed at cultivating discipline in the students at the cause of the clinical placement program. The availability of the basic equipment and facilities at this stage of the students' training are necessary to give them familiarities they needed in the nursing career for future operation. From the studies of other scholars, the inability of nurses to use medical equipment properly have been found as connected to inefficiency among some nurses resulting to preventable deaths of patients and other preventable complications.[40,41]

The clinical experience for the nursing students is usually the much opportunity they have to interact with the atmosphere of managing health situations and health facilities especially the emergency and specialized equipment and approaches such as medications, first aid supplies, air way management, patient transport, personal protective equipment, injection and IV supplies, etc.; missing the opportunity of learning to handle these equipment and situations at this stage is an alteration of the training procedure bound to cause crises for the students and their future place of career. This applies to self-assessment and using nursing care procedure book, which are practical procedures for adapting into the overall nursing career and health management. From the findings of this study, majority of the respondents (93.4%) indicated that they did not or partially made use of the equipment in the hospital's laboratory for clinical practice on their own; 80.1% partially did self-assessment of their performance during clinical experience, while 93.4% indicated that they either did not, or partially used the nursing care procedure book during clinical experience as a guide for practice. In comparison to the findings of other studies, inability of the nursing students on clinical experience to do self-examination has been discovered as responsible for practice complication and disorderliness in the latter stage of their career. Nursing staffs who applied self-assessment during clinical experience have been found more efficient than those who did not during clinical experience.[42-46] Equally, some studies have reported the relationship between observing and using nursing care procedure book during clinical experience and efficiency of nursing practice in the latter stage of the profession.[47,48] In essence, the inability of the students to maintain self-assessment and the use of nursing care procedure book due to poor supervision and poor facilities are potential challenges in the future practice of the profession for the students involved.

In a correlation model to check for the predicting factors to effective clinical experience among the nursing students serving in rural health facilities, this variable (effective clinical experience) is predicted by such factors as gender, source of school fees, parents' source of income, institutional factors (1&2) and willingness to serve in the rural health facilities after graduation. As evidence of many females involving the study, being a female according to the model, is much likely to positively affect effective clinical experience in the rural clinic facilities. This finding support other related studies in this area, which have shown that women are more likely to do well in the nursing profession than their male counterparts.[49,50] In the issues of institutional factors (the clinic facilities and the facilities in the institutions of higher learning), which appeared with negative signs in the model, the hospital facilities and school facilities appeared to be hindering effective clinical experience among the

students on clinical placement in the rural health facilities; this is evidence in the number of factors connected to the health and school facilities such as provision of equipment and materials for successfully undergoing clinical experience by the students. In further clarification of the negative significance of the institutional factors on the model,60% of the students indicated that their school has no practical demonstration laboratory for students' clinical practice, majority of the students (66.7%) indicated that their school lab do not have large space for all the students to observe what is being taught, while majority of the students (79.9%) indicated that their school lab do not have enough equipment that can enable many students to practice procedures. Majority of the students (79.9%) indicated that the hospitals where they are on clinical placement do not have enough equipment needed for the students on each shift of practice, majority of the students (59.9%) indicated that student/client ratio in each ward during clinical experience periods was not enough for students' practice under supervision, while majority of the students (73.3%) indicated that their school do not have a library with current nursing texts for references. The finding corroborates with the findings of other studies such as the ones by Akyüzand Ergöl;[51] Jacob *et al*;[52] Hakim;[53] Fego *et al.*[54] who concluded from their studies that institutional facilities are the heaviest challenges to clinical experience by the nursing students and other medical students in the developing nations.

The possibility of serving in rural health facilities by the nursing students after graduation was examined using statistical model; from the model, certain factors predicted the probability of nursing students having their clinical experience in the rural clinic facilities, showing willingness to return as staffs in such and similar facilities in the future if given employment. From the findings of the model, the higher the age of the students, the more likelihood that they will not be interested in serving in the rural clinic facilities if given employment as a nurse in the future. Other factors such as gender, age, socioeconomic status and the individual preferences appeared as negatively predicting the probability of the nursing students on clinical placement in the rural clinic facilities returning in the future if offered employment. Related studies on brain drain issues in Nigeria and other developing nations have indicated the above mentioned factors,[55-59] but the present study deepened the knowledge by focusing on the rural clinic facilities and the future nurses. Sustainability of rural health in the developing nations such as in southeast Nigeria is much dependent on the process of training the health workers in the institutions of higher learning, which includes familiarity with the rural clinic facilities. This could be realized through the clinical placement among the nursing students, which technically condition them to go for practical experience in different clinical facilities during the cause of their training. This is captured by the recommended World Health Organization's rural rotation (RR) program, which aims at exposing the medical (nursing) students to the rural health facilities.[60,61]

Health management in the rural southeast Nigeria is unique in its own appearance compared to other regions and conventional expectations. This is visible in the patients/nurses ratio in the region, which is one of the poorest in the world (1:160 compared to the WHO standard of 1:5).[62-64] In rural southeast Nigeria, much of the health management burdens are on the nurses owing to the shortages of medical doctors and other specialists. This by implication has placed much demand on the recruitment and training of nurses in government and private institutions of higher learning. Although the problem of paramedics with little or poor training who now become cheap labor (nurses and more) for most private hospitals in the rural communities in the region has dominated the atmosphere of rural health, the few public health centers and general hospitals in the rural communities still operate to manage the rural population. And, the bulk of the human resources to maintain these facilities

in the rural communities come from the students trained by the government and private institutions due to the extant employment laws that the government health facilities cannot employ any staff with less than certificates obtained from government approved institutions. As such, the nursing students who are attending the clinical experiences in these health facilities in most cases become the next generation to be employed in the health system involving the rural health facilities. As a concern to this study, the way and manner these nurses are trained determines the future fate of the rural health facilities management to some extent.

The implication of the findings of this study, which showed the factors surrounding effective clinical experience in the rural health facilities in the southeast Nigeria, is the need for urgent attention to the factors indirectly fueling discouragement of the nurses and other health workers from engaging with the rural health facilities in southeast Nigeria.

Rural health in the developing regions such as southeast Nigeria is gradually becoming obsolete owing to several factors including the ones revealed in this study. According to the United Nations Sustainable Development Goal3, there is need for health and wellbeing for all across urban and rural community's world over of which the situation in southeast Nigeria rural communities negates as many rural clinic facilities are virtually empty due to the chronic problem of rural-urban migration of the nurses and other health workers. More importantly as this study has revealed, the problem of desertion of the rural clinic facilities by the upcoming nurses and perhaps, other health workers are connected to institutional factors directly anchored on the nature of the rural clinic facilities and the institutions of higher learning. With the current challenges as the students are encountering, the system is gradually creating a repulsive atmosphere against the future potential rural health workers in this region.

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Motivations and expectations of pregnant women using psychoactive substances during prenatal care: phenomenological study

Original article

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Motivations and expectations of pregnant women using psychoactive substances during prenatal care: a phenomenological study

Abstract

Objective. Understand the motivations and expectations of pregnant women using psychoactive substances during prenatal care. **Methods.** A qualitative study developed in the light of Alfred Schütz's Theoretical Framework of Phenomenological Sociology, in which 25 pregnant women using psychoactive substances, belonging to a Family Health Strategy, participated. Data production took place between August and November 2022. **Results.** Two units of meanings emerged: (i) social influences for the performance of prenatal care and (ii) expectation regarding the care to be received by the health professional. Pregnant women do pre-natal due to family influences, for fear of losing their children due to loss of guardianship and concern about the well-being and development of the baby. And, the expectations are that they receive good attention, feel safe when they are attended to by health professionals and also that they are understood and have a relationship of trust. **Conclusion.** Pregnant women who use psychoactive substances bring motivations for prenatal care linked to the past, such as influences from family members and previous experiences. As for expectations, they are related to the child's health and the care expected by professionals. Finally, strategies to reduce harm during pregnancy of users of psychoactive substances are fundamental for the effectiveness of care.

Descriptors: substance-related disorders; pregnancy; prenatal care; maternal and child health; primary health care.

Motivaciones y expectativas de las gestantes consumidoras de sustancias psicoactivas durante la atención prenatal: un estudio fenomenológico

Resumen

Objetivo. Conocer las motivaciones y expectativas de las gestantes consumidoras de sustancias psicoactivas durante la atención prenatal. **Método.** Se trata de un estudio cualitativo basado en el marco teórico de la sociología fenomenológica de Alfred Schütz, en el que participaron 25 gestantes consumidoras de sustancias psicoactivas pertenecientes a una Estrategia de Salud Familiar de una unidad de salud en Brasil. Los datos se recogieron entre agosto y noviembre de 2022. **Resultados.** Emergieron dos unidades de significado: (i) influencias sociales para la atención prenatal y (ii) expectativas sobre la atención recibida por el profesional

de salud. Las gestantes acuden al control prenatal por influencias familiares, miedo a separarse de sus hijos por pérdida de la tutela y preocupación por el bienestar y desarrollo del bebé. Sus expectativas son recibir una buena atención, sentirse seguras con los profesionales sanitarios y ser comprendidas y escuchadas a través de una relación de confianza. **Conclusión.** Las embarazadas usuarias de sustancias psicoactivas tienen motivaciones para el cuidado prenatal relacionadas con su pasado, como influencias familiares y experiencias individuales previas. En cuanto a las expectativas, están relacionadas con la salud del niño y los cuidados esperados que les brindarán los profesionales de salud. Por último, el diseño de estrategias para reducir los daños durante el embarazo de las consumidoras de sustancias psicoactivas es fundamental para un cuidado eficaz.

Descriptores: trastornos relacionados con sustancias; embarazo; atención prenatal; salud materno-infantil; atención primaria de salud.

Motivações e expectativas do pré-natal de gestantes usuárias de substâncias psicoativas: estudo fenomenológico

Resumo

Objetivo. Compreender as motivações e expectativas de gestantes usuárias de substâncias psicoativas durante a realização do pré-natal. **Métodos.** Estudo de abordagem qualitativa desenvolvida à luz do referencial Teórico da Sociologia fenomenológica de Alfred Schütz, em que participaram 25 gestantes usuárias de substâncias psicoativas, pertencentes a uma Estratégia Saúde da Família. A produção de dados ocorreu entre os meses de agosto a novembro de 2022. **Resultados.** Emergiram duas unidades de significados: (i) influências sociais para a realização do pré-natal e (ii) expectativa em relação ao cuidado a ser recebido pelo profissional de saúde. As gestantes realizam o pré-natal por influências de familiares, por receio de afastamento dos filhos decorrente de perda da tutela e pela preocupação com o bem-estar e desenvolvimento do bebê. E, as expectativas é de que recebam um bom atendimento, sintam segurança nos profissionais de saúde e que sejam compreendidas e ouvidas por meio de uma relação de confiança. **Conclusão.** As gestantes usuárias de substâncias psicoativas trazem motivações para a realização do pré-natal atreladas ao passado, como influências de familiares e experiências prévias. Quanto as expectativas, estão relacionadas à saúde da criança e o cuidado esperado pelos profissionais. Por fim, as estratégias para reduzir danos durante a gestação de usuárias de substâncias psicoativas é fundamental para a efetividade do cuidado.

Descritores: transtornos relacionados ao uso de substâncias; gravidez; cuidado pré-natal; saúde materno-infantil; atenção primária à saúde.

Introduction

The pregnancy period is characterized by being a different experience in women's lives, because at that moment there are numerous changes, from physiological, psychological and even social, which requires actions aimed at adequate and quality care for the pregnant woman.[1] In view of these changes, prenatal care is fundamental to boost health promotion, as it aims to promote care for women, taking into account all the singularities that involve this process.[2] However, although prenatal care is fundamental for the care of pregnant women, there are still difficulties in accessing health services, especially for women living in vulnerable situations,[2] among them, women who use psychoactive substances (PAS) stand out. Also, the factors that predispose pregnant women who use PAS should be considered. These women are in contexts of vulnerability due to issues of gender, race, education, abusive family relationships, addictive behavior in the family and violence.[3]

It is estimated that about 20% of women use some type of PAS during pregnancy.[4] However, there is still an underestimation of the prevalence of this population,[5] which indicates that this data may be higher. The prevalence of prenatal PAS use is difficult to estimate due to gaps in identification.[6] In addition, rates of PAS use continue to rise among this population.[7,8] There is a worldwide concern about the use of PAS by pregnant women, so it is already considered an important public health problem that affects the health of mother and baby.[6,9,10] The use of PAS, whether licit or illicit, causes negative outcomes for maternal and child health,[6,7] causing spontaneous abortions, premature birth, low birth weight and congenital malformations.

In view of this, the importance of a prenatal care that meets the uniqueness of pregnant women using a PAS is emphasized, given that when pregnant women use a PAS, they experience prejudice and stigmas even by health professionals. Prenatal care for pregnant women using PAS needs to be differentiated, considering that drug users deny that they use such drugs or are dependent on them; because of this, these women do not seek prenatal consultations and health care, or when they seek this help it is already too late.[3]

The theme of pregnant women using PAS has many issues to be discussed and unveiled, especially those related to prenatal care, in order to drive improvements in care and understanding of the life context of these pregnant women. Thus, giving voice to pregnant women and understanding the uniqueness, experiences and social relations for prenatal care are fundamental. Given the above, this study aimed to understand the motivations and expectations of pregnant women using PAS during prenatal care.

Methods

Qualitative approach study developed in the light of Alfred Schütz's Theoretical Framework of Phenomenological Sociology.[11] Phenomenological sociology allows the understanding of the meaning of the actions, experiences and social relations that human beings experience in the world of life, as well as interpreting their experiences. According to the framework, when women act in the world thinking about something they have already experienced or experiences they have observed in their social relationships, they reveal the reasons "why". And, when they act with prospects for the future, they express their intentionality, thus revealing the "reasons for".

The study was developed in a Family Health Strategy (FHS) of a municipality located in the central region of southern Brazil, with pregnant women using PAS who performed prenatal care at the service. The inclusion criteria for this study were: being pregnant and using psychoactive substances, prenatal care with a physician or nurse in the FHS during the data collection period, and being 18 years of age or older. As exclusion criteria, being under the effect of a PAS during the prenatal consultation or interview, or presenting problems for communication. The setting and data collection took place between August and November 2022, by the main researcher of the study, female, who was a student of the undergraduate nursing course. The setting and approach to pregnant women occurred prior to the interviews, in which the researcher had already participated in health education groups with pregnant women in the aforementioned service. In addition, the student completed the final stage of the nursing course, with a high semester workload in this place, which made the pregnant women get to know her and feel comfortable talking to her, as well as sharing prenatal consultations with the nurse or physician of that service.

The student had the assumption that pregnant women did not do prenatal care only due to the use of drugs, which sometimes made it impossible for them to go to the service, but that the approach of health professionals interfered with their care and reception. The student's interest in developing the research is related to her trajectory, in which she observed, in different health services in the city during the course's practical classes, the weaknesses in assistance and social exclusion that pregnant women who use drugs experience in their daily lives.

Data collection took place through phenomenological interviews, which provided an opportunity to understand how pregnant women express their lived experiences and expectations in relation to prenatal care and the care received by the health team. In this sense, the approach and setting contributed significantly to data collection, as it was necessary to establish bonding and empathy relationships so that pregnant women felt comfortable to express their experiences during the phenomenological interview. Thus, the interviews were conducted by the main researcher. The student was trained to conduct phenomenological interviews. The training was given by the PhD professor and researcher responsible for the research, who has experience in phenomenological research. For data collection, the researcher followed a predefined script with the characterization of the pregnant women, which contained age, education, profession or occupation, history of use and type of PAS used by a family member, and type of PAS she used. Together with the characterization questions, the following questions were asked: "What are the reasons that lead you to do prenatal care?" "What are your expectations when performing prenatal care?" "What do you expect from health professionals when performing prenatal care?"

Interviews were scheduled in advance, by verbal and face-to-face invitation, shortly after prenatal consultations or group health education activities. The invitation to participate in the interview was intentional. There were no refusals to participate in the survey. These were carried out individually, in which only the pregnant woman and the researcher

were present in a room in the health service, in order to maintain the privacy of the women and the confidentiality of the information. A digital recorder was used to capture the participants' utterances, and the recordings lasted a mean of 35 minutes per interview. The interviews ended when the sufficiency of meanings was reached, that is, when the information began to repeat itself and no new information emerged.[12]

The testimonies were transcribed in full in the Microsoft Word Software by the main researcher, concomitantly with the collection period. The conference was held based on attentive listening to the interviews and dynamic reading of the transcripts by the main researcher and the responsible PhD professor, in order to ensure the reliability of the information and the veracity of the data. For the analysis, the paths elaborated by researchers of phenomenological sociology were used,[13] where the speeches were read and reread in text form, in order to understand the reasons and expectations of pregnant women in relation to prenatal care. Therefore, excerpts were identified through chromatic coding and selected speeches referring to the proposed objectives. After selecting these data, the units of meanings were identified and grouped according to their similarity, which allowed the construction of the concrete categories of the lived experience.

The interpretation of the results was analyzed through the theoretical conceptions of Alfred Schütz's Phenomenological Sociology and related literature. During all phases of the preparation of this study, the ethical principles were followed, as provided for in Resolution number 466, of December 12, 2012, of the National Health Council and Resolution number 510, of April 7, 2016, of the National Health Council/ Ministry of Health (CNS/MH) directed to research with human beings. All participants signed the Informed Consent Form. The study was approved by the Research Ethics Committee of the Franciscana University under opinion number 5.183.201 on December 21, 2021.

Results

The study included 25 pregnant women, aged between 20 and 41 years, with a history of previous pregnancies. Of these, 20 had a family history of drug use, by parents, siblings or current spouse/partner. Regarding education, 3 women studied until complete high school (CHS), 4 had completed elementary school in Youth and Adult Education (EJA), while 18 studied until elementary school (ES). With regard to the profession, 10 had occupations as housewives, 7 worked in local business and 8 were unemployed.

The profile of women denotes that they are mostly away from the labor market even at a productive age and that their education predominates in ES. However, it cannot be said that these conditions are due to the excessive use of PAS that can disable them and hinder the work and study routine. Economic conditions, income, access to education and job opportunities were not discussed in this study. As for the type of drug, pregnant women are users of multiple drugs such as tobacco, cocaine, crack, marijuana and alcoholic beverages (Table 1). From the analysis of the phenomenological interviews, two concrete categories of the experience were revealed: Social influences for the performance of prenatal care and Expectations regarding the care to be received by the health professionals.

Table 1. Characteristics of the 25 pregnant women participating in the study

Code	Age (years)	Education	Occupation	Previous pregnancies	Family history and type of PAS	Type of PAS you use
PW1	25	CHS	Trade store seller	2	Mother: tobacco Husband: tobacco & Alcoholic Beverages	Alcoholic beverages, tobacco and marijuana
PW2	27	ES	Local business: autonomous seller	6	Mother: uses tobacco Father and Husband: Alcoholic Beverages	Alcoholic beverages and tobacco
PW3	32	YAE	Housewife	1	Mother, father, brothers and sisters-users of tobacco and alcoholic beverages	Alcoholic beverages, tobacco and marijuana
PW4	30	CHS	Unemployed	3	Husband: tobacco, Alcoholic beverages and crack	Alcoholic beverages
PW5	39	ES	Housewife	5	Husband: tobacco and Alcoholic Beverages	Alcoholic beverages, tobacco and marijuana
PW6	41	ES	Housewife	3	Sister: marijuana and alcoholic beverages	Alcohol beverages, tobacco and cocaine
PW7	21	ES	Trade In-store seller	2	Mother: Alcoholic beverages Partner: Alcoholic beverages	Tobacco and alcoholic beverages
PW8	20	ES	Unemployed	1	Father: Alcoholic beverages Partner: cocaine	Alcoholic beverages, tobacco, marijuana, and cocaine.
PW9	25	ES	Housewife	1	None	Tobacco
PW10	20	ES	Trade self-employed candy seller	2	Mother, Brother and Husband: tobacco and alcoholic beverages	Alcoholic beverages and tobacco
PW11	25	YAE	Trade: saleswoman	3	Mother: tobacco Sisters: tobacco, alcoholic beverages and cocaine	Alcoholic beverages and tobacco
PW12	38	ES	Housewife	2	Father: tobacco and alcoholic beverages	Alcoholic beverages; and tobacco
PW13	34	ES	Unemployed	2	Husband: alcohol, cocaine and crack; Father: Alcoholic beverages	Alcoholic beverages, cocaine and crack

Table 1. Characteristics of the 25 pregnant women participating in the study (Cont.)

Code	Age (years)	Education	Occupation	Previous pregnancies	Family history and type of PAS	Type of PAS you use
PW14	26	ES	Unemployed	1	None	Alcoholic beverages and crack
PW15	28	CHS	Unemployed	2	Partner: Alcoholic beverages and tobacco	Alcoholic beverages, cocaine and crack
PW16	27	ES	Housewife	2	None	Alcoholic beverages, tobacco and cocaine
PW17	23	ES	Housewife	1	Mother: tobacco and alcoholic beverages Partner: alcoholic beverages and cocaine	Alcoholic beverages, cocaine and tobacco
PW18	38	ES	Local business: cleaning of environments	3	None	Alcoholic beverages; and tobacco
PW19	32	YAE	Unemployed	2	Mother and brother: alcoholic beverages	Alcoholic beverages and cocaine
PW20	27	ES	Unemployed	2	Father: alcoholic beverages	Alcoholic beverages and marijuana
PW21	27	ES	Local business: informal older adults caregiver	1	None	Alcoholic beverages, tobacco and crack
PW22	33	ES	Housewife	3	None	Alcoholic beverages and cocaine
PW23	28	ES	Housewife	2	Sister: marijuana and tobacco	Alcoholic beverages, cocaine and crack
PW24	39	YAE	Housewife	2	Brothers: Alcoholic beverages Partner: tobacco	Alcoholic beverages and tobacco
PW25	29	ES	Unemployed	1	Mother: uses tobacco and alcoholic beverages Husband: alcoholic beverages	Alcoholic beverages, Cocaine and crack

This category shows the "reasons why" represented by the social influences that the pregnant women had, that is, it was a learning experience they had with their families. In this sense, the influence of the mother and sister for the performance of prenatal care is revealed, in which their experience made them learn that it is necessary to perform prenatal care. Thus, they reproduce the actions seized. In addition, they learned that this implies the possibility of losing custody of their children due to negligence: *I can't say, because by then I had already grown up with this learning from my mother. My [mother] always did prenatal care to see if the baby was okay (G1); I learned from my mother, who always said that she has to do prenatal care, that it is important to control, take care (G7); My sisters were all upset at the hospital, they almost lost their children! When you get there, they ask if you had prenatal care, if everything is registered on your card, because it seems like we are negligent with the baby if we don't do prenatal care (G11).*

The life history of the pregnant women, through their previous experiences, expressed by previous hospitalizations, threats of abortions and diseases caused in the gestational period, made the women perform prenatal care in the current pregnancy. Given the biographical situation, pregnant women do not have the same experiences, and therefore perform prenatal care: *The right thing is to do prenatal care! I learned when I was pregnant with my second child, because I didn't have prenatal care for my first daughter. I lived in the country and didn't know about prenatal care. And when I went to the hospital they told me that I had to have done it. I was admitted to the hospital, I had a threatened miscarriage; I think it was because I used [PAS] a lot. So, from that I learned that you have to do prenatal care (G6); The other time I was pregnant I didn't take prenatal care and I didn't take proper care of myself, because I was using a lot of drugs. Then my daughter was born with a problem. I had already heard about prenatal care, but I didn't do it because I was using [PAS]; I couldn't even think about anything at that time (G15).*

In addition, the loss of guardianship of the children due to the use of PAS, combined with the non-performance of prenatal care in previous pregnancies, caused the pregnant women to seek the health service to perform prenatal care. Thus, the action of seeking prenatal care is motivated by not having to go through the removal of the children again: *I lost custody of my son. I was using drugs all the time. And then, I didn't come for prenatal care either. And, as I wasn't there for follow-up, they contacted the Guardianship Council. I lost my son because of myself! (G14); I had a lot of problems with the Child Protection Council, because they took custody of my son, my mother is the one who has custody. They said that I didn't take care of the baby, that I was negligent. I didn't do prenatal care. And I was still using a lot of drugs at that time. I had my son but I wasn't a mother. I couldn't be a mother to my own child (G15).*

In addition, when performing prenatal care they have expectations, represented by the "reasons for", in which they are motivated by the possibility of sharing their life with their successors and avoiding the status of being negligent before the Guardianship Council: *This son here, I don't want custody taken away from me (G14); Because if I didn't get prenatal care I would lose my baby! Because otherwise, when it was time to have the baby, they would bother you. They said they would call the Guardianship Council to take my baby away (G2); You have to do prenatal care nowadays, because if you don't do it, the Guardianship Council will come after you. They call the council because they say we are neglecting our son. Because we miss the appointment, we don't take the exams, we don't receive the vaccines (G10); It's so we don't get upset in the hospital. Otherwise, they will contact the Guardianship Council. And they can even take our child away from us (G11).*

Still in the case of social influences, pregnant women when performing prenatal care have expectations directed to the health of their babies. In this sense, the "reasons for" are linked to the monitoring of the baby's growth and development, as well as the concern that the baby may be born with some damage resulting from their use of PAS: *If the little heart is beating normally, and everything is going well. And to be born healthy. I'm afraid that the fact that I use drugs will interfere with something (G1); To see the baby's health. Whether it will be born well or not, because I'm afraid because of the things I use [psychoactive substance] (G5); I'm afraid the baby will be born with problems, so I do the exams, I come to the appointments correctly. I think it's possible to follow it better, to know what's going on inside the belly (G19).*

Expectations regarding the care to be received by the healthcare professional

The expectations that pregnant women have in relation to the care of the health professionals who accompany them during the prenatal consultation, is that they receive good care, have guidance about their health and the baby, so that they feel safe in the pregnant-professional relationship, through a clear and understandable dialogue: *We expect to be treated well. Today was a day that paid attention to me. They did everything they were supposed to do. I'm not leaving with the pain I arrived with. I hope they examine it, talk to us (G3); I wanted them to explain it well, because nobody actually told me what pre-eclampsia was. I didn't even know what that was! I found out when I felt ill and went to the hospital, and then they said I could die, either me or my daughter (G7); I hope they guide the right things for us (G11).* Furthermore, they expect health professionals to break the relationship of disbelief in the face of statements about having stopped using PAS. Thus, they expect care to be based on the establishment of a relationship of trust: *I used drugs in previous [pregnancies], which I used a lot. And no matter how much I say that I stopped using it, they don't believe it. Now it's just drinking, and not much, like it was before (G2); And the nurse said: "Are you sure you're not smoking anymore?" I said, "I'm sure! I'm not smoking anymore. I only drink a few beers from time to time, but I no longer drink other strong drinks" (G4).*

Pregnant women have knowledge about the losses of using a PAS and the act of stopping using it is something that becomes difficult in their daily lives. In this sense, when they want to be understood by professionals, they reveal the "reasons for": *They do everything they can for the baby's sake, they pay attention to me during the consultation, but they always say that I need to stop smoking and drinking because it's harming the baby. I feel charged, but I can't stop (G12); "I wanted them to understand my whole situation. I've been using it for years and I know it's bad for children, and yet the desire to use it is greater. I couldn't stop using it. And they charge me a lot of it! I find this pressure annoying, I feel low, it's like I don't want to take care of the baby (G17); I've cut down on marijuana a lot, but I still smoke. And I only drink on the weekends, but I haven't stopped. And in consultations they always ask and say to stop. If it were easy, I would have stopped already. They need to understand that it's not like that, that it's not a button that I press and then I stop (G20); I slowed down, but drugs rule us! I feel like a total failure. And I'm very afraid that my daughter will be born with a problem because of me (G25).*

The statements reveal that pregnant women are aware of the harm caused by drug use during pregnancy, but the addiction remains, even with the reduction in consumption. The participants also praised the guidance received and their feelings regarding the guidance to stop drug use.

Discussion

The findings of this study reveal that the motivation to perform prenatal care is related to the influences that pregnant women had from their mother and sister, so prenatal care is part of the culture of these family nuclei. The learning that pregnant women obtained, through the establishment of social relationships and sharing of experiences boosted them to adhere to prenatal care. In this sense, the act of performing prenatal care was learned from peers, because the world in which people live and exchange occurs is intersubjective and cultural. Thus, prenatal care proved to be a socially constructed custom,[11] in which the family assumes a role of social cohesion.[14] Another reason that led pregnant women to undergo prenatal care is related to previous experiences of previous gestational diseases, which culminated in hospitalization, and also because they experienced threats of abortion. This can be corroborated in a study that shows that pregnancy will not always be a moment permeated only with happiness, pleasure and positivity, since it is a subjective experience and each pregnant woman will experience it from her point of view.[15]

The experiences of pregnant women in the world of life, together with their biographical situation, were present as motivations for prenatal care. Pregnant women act in the world of life according to the knowledge they have acquired in their life trajectory. Thus, their stories are constituted by subjective experiences.[11] Among the experiences they had, the loss of guardianship of their children was also a motivation for prenatal care. The loss of the right to live with their children left marks on the memory of pregnant women, causing them feelings of suffering and distress. The biographical situation is unique to each person, and brings with it the memories and marks of the past.[11] In this sense, they do prenatal care in order not to have to go through the same life experiences.

Also, they have the intention of monitoring the intrauterine development of the baby, and perceive prenatal care as something relevant and as a possibility to know if the baby is developing well. They demonstrate that they are aware that the use of psychoactive substances affects the development of the baby, as already evidenced in the literature,[16,17] but they cannot stop using it. As well as, the imposition of ceasing use impairs the establishment of the intersubjective relationship between the professionals of the pregnant women, which has repercussions on the rupture of the relationship-of-us.[11]The use of drugs by women by themselves is permeated by stigmatization and as something inappropriate, which causes them to be judged morally.[18]

Pregnant women want good care, adequate guidance, through a clear dialogue and that the relationship established makes them feel safe and is based on trust. Still, they expect to be understood by professionals, because the relationship of subordination and distrust causes them to be demotivated to perform prenatal care. Therefore, it is important to establish a relationship of trust, since many women do not verbalize or partially report the use of PAS due to the discomfort that occurs during screening and which may also be related to the reduced workload of professionals, which causes consultations to occur in a limited time.[19] Some pregnant women mention the discomfort they feel when professionals act in a prohibitionist way about the use of PAS, ignoring their subjectivity and their mental health. This type of relationship leads to abandonment of prenatal care, as people live in a network of complex social relationships and expect to have their expectations met in relation to the other.[11] Also, the need for singular care for pregnant women was revealed, taking into account the paradigm of harm reduction and not only abstinence. For this, it is important to strengthen measures and develop new strategies aimed at understanding, empowering and choosing women's habits during pregnancy.[20]

Professionals should develop their ethical and non-exclusive practices, and use harm reduction strategies.[21] The prenatal care of women who use PAS is marked by unsatisfactory reception practices, insufficient health educational information and fragile ties with the health team.[3] Other ways of caring are needed, from the perspective of human rights and harm reduction, so that assistance does not translate into violence against women and their withdrawal from services.[3.22] Identifying the factors that are associated with the use of PAS during pregnancy is essential for the identification and treatment of pregnant women to reduce risks and to improve outcomes for maternal and child health.[8] The low access of pregnant women using PAS to prenatal care culminates in a greater risk of obstetric and fetal complications,[4] which even has repercussions on leave in the postpartum period.[23]

Low adherence to services is a response associated with psychosocial and sociodemographic crossings[24] and lack of reception and bonding with prenatal health teams.[3] Therefore, there is a need for the development of continuing education for professionals in order to improve the understanding of aspects related to mental health and social and cultural differences. The study allowed us to advance in the understanding of the life contexts, motivations and expectations of pregnant women who use PAS and who perform prenatal care. The (re)knowledge of these contexts in the gestational period can be useful in the formulation of harm reduction strategies and health problems related to the use of PAS during pregnancy, leading to a favorable gestational outcome and a humanized care based on the uniqueness and biographical situation of each pregnant woman.

This study allowed us to elucidate the motivations and expectations of pregnant women using PAS during prenatal care and understand them through the sociological phenomenology of Alfred Schütz. During prenatal care, pregnant women refer to the past to bring the reasons for carrying out care during pregnancy as family influences and previous experiences, but also to the future with expectations related to the baby's health, combined with the care expected by professionals in the sense of attention, guidance and understanding about the use of PAS during pregnancy. Understanding the motivations and expectations of pregnant women allows the construction of comprehensive care from the perspective of reducing damage to the health of the pregnant woman and the baby, as well as for the construction of specific public policies for this population. Finally, strategies to reduce harm during pregnancy of users of psychoactive substances are fundamental for the effectiveness of care.

The limitation of the study is related to the profile of pregnant women using PAS in a single health territory, since it is necessary to further deepen the motivations and expectations of pregnant women in a comprehensive way, however it highlights a reality that can occur in several scenarios.

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Perception of Knowledge Transfer from Clinical Simulations to the Care Practice in Nursing Students

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Perception of Knowledge Transfer from Clinical Simulations to the Care Practice in Nursing Students

Abstract

Objective. This work sought to assess the perception of knowledge transfer from clinical simulations to the care practice in nursing students through effective debriefing. **Methods.** An observational, descriptive, and cross-sectional study was conducted with a sample of 281 students during the 2020-2021 course, through una *ad hoc* survey from the *Debriefing Assessment for Simulation in Healthcare* (DASH) in Spanish, to assess competence areas that undergraduate students must reach to complete their studies. **Results.** The survey conducted after each simulation showed that the students valued positively the debriefing sessions conducted by experts, with a mean score of 6.61 over 7 [6.56%-6.65%] based on 675 surveys analyzed, given that each student conducted more than one simulation within the academic course. It was observed in 221 completed answers that what was learned in the simulation was transferred to the practice in

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89.23% [86.39%-92.06%], specifically in areas of Communication, Patient safety, Teamwork, and Leadership. **Conclusion.** In the perception by the participating students, the use of effective debriefing in clinical simulation enabled knowledge transfer to the care practice, proving to be a crucial tool that helps to improve the formation of the future nurses.

Descriptors: patient simulation; simulation training; nursing; knowledge management.

Percepción de la transferencia de conocimientos de las simulaciones clínicas a la práctica asistencial en estudiantes de enfermería

Resumen

Objetivo. Evaluar la percepción de la transferencia de conocimientos de las simulaciones clínicas a la práctica asistencial en estudiantes de enfermería mediante un *debriefing* eficaz. **Métodos.** Se realizó un estudio observacional, descriptivo y transversal con una muestra de 281 estudiantes durante el curso 2020-2021, mediante una encuesta *ad hoc* a partir de la *Debriefing Assessment for Simulation in Healthcare* (DASH) en español, para valorar las áreas competenciales que un estudiante de grado debe alcanzar al finalizar sus estudios. **Resultados.** La encuesta realizada después de cada simulación mostró que los estudiantes valoraban positivamente las sesiones de *debriefing* realizadas por expertos, con una puntuación media de 6.61 sobre 7 [6.56 % - 6.65 %] en base a 675 encuestas analizadas, ya que cada estudiante realizaba más de una simulación dentro del curso académico. Se observó en 221 respuestas cumplimentadas que lo aprendido en la simulación se transfirió a la práctica en el 89.23 % [86.39 % - 92.06 %], específicamente en áreas de Comunicación, Seguridad del paciente, Trabajo en equipo y Liderazgo. **Conclusión.** En la percepción de los estudiantes participantes, el uso de un *debriefing* eficaz en la simulación clínica permitió la transferencia de conocimientos a la práctica asistencial, mostrando ser una herramienta crucial que ayuda a mejorar la formación a de los futuros enfermeros.

Descriptores: simulación de paciente; entrenamiento simulado; enfermería; gestión del conocimiento.

Percepção da transferência de conhecimentos das simulações clínicas para a prática assistencial em estudantes de enfermagem

Resumo

Objetivo. Avaliar a percepção da transferência de conhecimentos das simulações clínicas para a prática assistencial em estudantes de enfermagem por meio de um *debriefing* eficaz. **Métodos.** Foi realizado um estudo observacional, descritivo e transversal com uma lista de 281 estudantes de enfermagem de uma universidade espanhola durante o curso 2020-2021, por meio de uma consulta ad hoc a partir do *Debriefing Assessment for Simulation in Healthcare* (DASH) em português, para valorizar as áreas competentes que um estudante de graduação deve alcançar ao finalizar seus estudos. **Resultados.** A consulta realizada após cada simulação mostrou que os estudantes valorizaram positivamente as sessões de *debriefing* realizadas por especialistas, com uma pontuação média de 6.61 sobre 7 [6.56-6.65%] com base em 675 consultas analisadas, e cada estudante realizou mais de uma simulação dentro do curso acadêmico. Foram observadas 221 respostas cumulativas que o aprendizado na simulação se traduziu na prática em 89.23% [86.39-92.06%], especificamente nas áreas de Comunicação, Segurança do paciente, Trabalho em equipe e Liderança. **Conclusão.** Na percepção dos estudantes participantes, o uso de um *debriefing* eficaz na simulação clínica permitiu a transferência de conhecimentos para a prática assistencial, mostrando ser uma ferramenta crucial que ajuda a melhorar a formação dos futuros enfermeiros.

Descritores: simulação de paciente; treinamento por simulação; enfermagem; gestão do conhecimento.

Introduction

Learning in the Spanish health education system, established in 1977, focuses on acquiring necessary abilities and skills for the nursing care practice nurse, guaranteeing patient safety and quality of care.[1] With the introduction of new health teaching technologies based on competence areas in the European Higher Education Area since the year 2000, it became necessary to incorporate these advances to the nursing curriculum.[2] Clinical simulation has emerged as a valuable educational tool in diverse fields, with the aim of improving the professional practice, minimizing errors, and promoting professionals towards excellence. Due to its use, it is possible to recreate scenarios that resemble real patient care situations where students face the challenge of applying their abilities, knowledge, and clinical attitudes, thus integrating theory and practice. This methodology usually consists of three main phases: predebriefing, simulation and debriefing.[3] The debriefing, a crucial component of the experimental learning process that encompasses reflection, feedback, and future experimentation, allows students to develop and integrate knowledge acquired during direct experience.[4,5]

Simulation scenarios are classified in different zones (from 0 to 4) in function of their complexity, starting with learning clinical abilities and technical procedures (zone 0 and 1) and advancing to teamwork training in crisis situations and human factors (zona 2 a 4).[6] In 2014, the Degree in Nursing from the Faculty of Health Sciences at Manresa of Universitat de Vic- Universitat Central de Catalunya (UVic-UCC) incorporated the clinical simulation as key methodology to prevent errors, improve care practices, and guarantee patient safety. The clinical simulation sessions were aligned with specific themes of the study plan to educate nursing students about providing professional care, acquisition of legal and ethical standards, emphasizing on safety and quality.

To assess the effectiveness of the clinical simulation, two scales have been used internationally: the *Debriefing Assessment for Simulation in Healthcare* (DASH), developed by the Boston Center for Medical Simulation, centered on evaluating the debriefing process from the perspectives by students, evaluators, and instructors;[7] and the Satisfaction with Simulated Clinical Experiences scale, validated in Spanish by Negrão *et al*.,[8] and which measures satisfaction by nursing students with simulated clinical sessions in three dimensions: practice, realism, and cognitive.

Although these scales provide information about perceptions and student satisfaction, they do not evaluate specifically the transferability of the competences practiced in the clinical simulation to the real care practice. Previous studies[9] indicate that simulations represent an advantage for health workers as they progress in reflective learning, clinical judgment, and decision making. Additionally, simulation scenarios represent a close, safe and non-punitive environment, where students can practice techniques in controlled, supervised manner, with the possibility of errors and unlimited

repetition.[10] Currently, studies exist[11] that assess student satisfaction in relation to their participation in the simulation. Another study[12] adds the debriefing evaluation, as previously discussed with the DASH, but no scale was found in the literature that measures knowledge transfer from clinical simulation to care practices, being a challenge to be achieved by the community of professors who teach or practice this simulation methodology. The aim of this research was to evaluate the perception of knowledge transfer from clinical simulations to the care practice in nursing students through effective debriefing.

Methods

With the purpose of contributing to understanding how an effective or good quality debriefing in clinical simulation facilitates knowledge transfer to the care practice and improves the formation of future nurses.

Population and sample. The entire study population included 428 nursing students registered in the Nursing Degree of the Faculty of Health Sciences at Manresa of Universitat de Vic- Universitat Central de Catalunya (UVic-UCC) with a final sample of 281 participants. The study sample was determined through convenience and included all the students who had participated in simulations and clinical practices during the academic year 2020-2021.

Type of study with observational, descriptive, and cross-sectional quantitative methodology.

Techniques and procedures

Two surveys were used: "1st Post Clinical Simulation Survey" and "2nd Post-Practicum Survey" to analyze the students' perception of their knowledge transfer from clinical simulations to care practice.

Before starting the study, the researchers obtained approval from the Ethics Committee at Universitat de Vic- Universitat Central de Catalunya (UVic-UCC), students were informed of the study objective, of their voluntary and anonymous participation, after signing the informed consent prior to starting the simulations that include using recorded material for educational and/or research purpose. To achieve effectiveness and/or quality of the debriefings, it was guaranteed that all simulation instructors had a postgraduate or master's degree in simulation.

The clinical simulation sessions were classified into zones 2 and 3, centered on fostering teamwork, the practice of systematic processes integrated in clinical cases and development of the capacity to make decisions. First-course students performed a simulation about communication skills; those from the second course carried out four simulations of cardiology, home care, nutrition and therapeutic communication; the third-course students conducted three simulations about hematology, healthy-child evaluation and immediate life support, and finally, those from the fourth course performed three simulations in pediatric advanced life support, adult advanced life support and complex chronic patient (CCP).

The first questionnaire, the "1st Post Clinical Simulation Survey", was elaborated from the Debriefing Assessment for Simulation in Healthcare (DASH) in Spanish, specifically the extended version for students,[13] adding questions related to gender, course, academic year, practicum and simulation case. The DASH in Spanish was chosen because of its effectiveness and capacity to gather the students' perspectives about the quality of the debriefing by their instructors, assessing the behaviors by the professors who facilitate learning and change in experimental settings through the analysis and assessment of six elements: Element 1 - The instructor established an environment for a participative learning experience; Element 2 - The instructor maintained an environment of participative learning; Element 3 - The instructor structured the debriefing in organized manner; Element 4 - The instructor generated profound discussions that made me reflect about my performance; Element 5 - The instructor identified

what I did well or poorly; and Element 6 - The instructor helped me to see how to achieve or maintain good performance.

Upon completing the simulation, using a link in a QR code, students assessed each of the elements, with a Likert scale from 1 to 7, thus: 1 = Extremely ineffective / Harmful; 2 = Consistently ineffective/Very poor; 3 = Mostly ineffective/Poor; 4 = Somewhat effective / Average; 5 = Mostly effective / Good; 6 = Consistently effective / Very good; and 7 = Extremely effective / Outstanding. For such, prior permission was requested from the authors of the DASH in Spanish for its use and digitization on the Redcap platform.

The "2nd Post-Practicum Survey", of *ad hoc* elaboration, was created bearing in mind the competence, cross-sectional, and specific areas nursing students must achieve upon ending the at the end of the course, which was agreed upon through the Delphi method, with participation by the emerging group recognized by the Generalitat of Catalonia for Research in Teaching Innovation, Simulation, and Patient safety, along with the teaching staff from the Nursing Program of the Faculty of Health Sciences at Manresa in Universitat de Vic- Universitat Central de Catalunya (UVic-UCC). This second survey was also digitized and made accessible through the Redcap platform. This survey sought to know students' perception about the transfer of knowledge acquired during the simulations to the care practices upon completing their practical formation and return to the university.

The "2nd Post-Practicum Survey" is divided into two sections: a *first part* corresponding to the transversal competence areas worked on throughout each of the simulations of the nursing degree (communication and patient safety as of the first course, teamwork as of the third course, and leadership only during the last year), where the participating students respond to their perception about the transference from the simulation to their clinical practices, more generally, through questions related with their activities during their practice period. A *second part* in which specific competence worked in concrete simulation cases (basic communication skills, cardiology, home care, nutrition, therapeutic communication, hematology, healthy child evaluation, immediate life support, pediatric advanced life support, adult advanced life support, and chronic complex patient) to observe if that learnt during simulation had been applied in their places of practice, through questions based on their competence level.

Data were analyzed with the STATA, v. 17 statistical program. Each variable was described by calculating means and 95% confidence intervals, with 5% margin of error. Each demographic variable was described globally by course and specifically for each simulation, as well as the competences acquired in the simulations and transferred to the care practices. Regarding the "1st Post Clinical Simulation Survey", each student answered it out after each simulation case, bearing in mind the teaching program described above where more than one session is carried out in each course. Due to this, from the 281 students participating, 675 surveys were analyzed, of which 93.63% were female. By academic year, they were distributed thus: 99 (14.67%) in the first; 309 (45.77%) in the second; 149 (22.07%) in the third; and 118 (17.48%) in the fourth.

Results

Throughout the four courses and for all the simulations, the mean global score obtained for the six elements of the DASH in Spanish was 6.61 over 7.00 [95% CI: 6.56-6.65] (Table 1).

Table 1. Mean global score of the DASH in Spanish according to course, simulation, and element

Course	Simulation	Mean	Error	95CI of the mean
First (*n*=99)	Communication skills	6.51	0.08	6.36-6.66
Second (*n*=309)	Cardiology	6.58	0.09	6.39-6.76
	Home care	6.62	0.07	6.49-6.67
	Nutrition	6.8	0.06	6.68-6.93
	Therapeutic communication	6.77	0.03	6.70-6.84
Third (*n*=149)	Hematology	6.62	0.05	6.51-6.72
	Healthy child evaluation	6.54	0.09	6.37-6.71
	Immediate life support	6.49	0.31	5.88-7.00
Fourth (*n*=118)	Pediatric advanced life support	6.56	0.17	6.23-6.89
	Adult advanced life support	6.79	0.15	6.49-7.00
	Chronic complex patient	6.43	0.08	6.26-6.60
Evaluation elements (*n*=675)				
E1: The instructor established an environment for participative learning experiences		6.47	0.16	6.31-6.62
E2: The instructor maintained an environment of participative learning		6.64	0.165	6.51-6.84
E3: The instructor structured the debriefing in organized manner		6.63	0.08	6.56-6.71
E4: The instructor generated profound discussions that made me reflect about my performance		6.63	0.02	6.59-6.63
E5: The instructor identified what I did well or poorly – and why		6.63	0.14	6.51-6.78
E6: The instructor helped me to see how to achieve or maintain good performance		6.63	0.09	6.48-6.65
Total		6.61	0.05	6.56-6.65

Of the 281 participants, 221 (representing 78.64%) had the opportunity during the practice period of experiencing the same cases as those worked on in the simulation; 83.20% were females and, by course, they were distributed thus: 45 students from the first, 84 from the second, 61 from the third, and 31 from the fourth. Regarding the transversal competence areas worked on during the simulations, the areas of *patient safety*, globally, 81.00% [78.77%-83.28%] of the students agreed that what was learnt during the simulation was transferred to the practice. The most transferred aspects were use of gloves with 99.52% [98.66%-100%] and introduction with name and professional category with 95.91% [93.30%-98.55%] for the four courses. Nevertheless, second-course students were the ones who least considered that this knowledge was transferred with 75.40% [71.88%-78.95%]; specifically, the least transferable aspects were:

use of railings with bedridden patients with 54.82% [43.99%-65.53%], bringing the bell closer to a dependent patient with 69.00% [59.05-79.05], and verification of allergies with 40.53% [29.86%-51.09%]. Moreover, overall, the students reported that the simulations helped them to integrate strategies to improve this competence area with 78.50% [71.68%-85.27].

Additionally, the *communication* competence was the most transferred to the clinical practice with a mean of 95.40% [94.31%-96.46%] in all courses, with the first course having the highest rate with 97.30% [95.63%-99.04%] and the third course having a rather low rate with 94.10% [92.07%-96.13%]. The most-transferred item of communication was active listening, with 100% incidence and, on the contrary, the least-transferred item, although high at global rate, was effective communication among team members with 80.60% [66.43%-94.86%]; finally, the students stated that the simulations helped them to integrate strategies to improve this competence with 81.90% [76.78%-87.02%].

At the same time, teamwork, a competence of the third and fourth courses, obtained an overall transferability of 92.20% [89.57%-94.78%]; while the most-transferred aspect was respect for the members of the care team with 100%. It is fitting to note that the fourth-course students expressed 100% transferability in the integration of the care staff, communication among the care team, and recognition of teamwork in solving specific situations. Rather, in the third course the least valued items were communication and non-integration in the care team during the practice period, both with 96.70% [92.15%-100%]. Additionally, they stated that the simulations helped them to integrate strategies to improve this competence area by 60.70% [48.13%-73.18%].

Lastly, the *leadership* competence was only assessed in the fourth course, given that it is a competence area that is only worked on in said course, thereby, there was no comparison with previous courses. Said competence showed transference of 88.30% [82.89%-93.72%] of the knowledge learnt; the items with the highest scores were those related to the students' initiative to identify and solve situations and problems related with the staff or with the patients, with 100%, instead, the item with the lowest score was that related with not identifying the leader figure and not identifying orders with 87.13% [74.60%-99.60%]. Finally, the students reported that the simulations helped them to integrate recognition of the leader figure in 71.00% [54.04%-87.89%] and obtain the necessary knowledge to follow their orders in 67.77% [50.31%-85.17%]; for further information, see Table 2.

Table 2. Global transferability rate per hundred of the transversal competence areas worked on in the simulations

Course / area		Patient safety	Communication	Teamwork	Leadership
First (*n*=45)	%	85.20	97.30	.	.
	95% CI	80.72-89.68	95.63-99.04	.	.
Second (*n*=84)	%	75.40	95.50	.	.
	95% CI	71.88-78.95	93.52-97.43	.	.
Third (*n*=61)	%	83.60	94.10	90.50	.
	95% CI	79.09-88.12	92.07-96.13	86.94-94.04	.
Fourth (*n*=31)	%	85.10	94.80	95.50	88.30
	95% CI	79.56-90.58	91.97-97.71	92.45-98.52	82.89-93.72
Total (*n*=221)	N	221	221	92	31
	%	81.00	95.40	92.20	88.30
	95% CI	78.77-83.28	94.31-96.46	89.57-94.78	82.89-93.72

Reference is made to the second section of the survey "2nd Post-Practicum Survey" of the specific competence areas worked on in the simulations. The first-course students manifested a transfer rate in basic communication skills of 83.70% [73.37%-94.07%], with the simulation related with active listening having the highest transference value of 86.00% [75.26%-96.84%] and the lowest related with direct communication with different types of patients with care purposes, uncooperative or collaborative or nervous and with their family environment of 81.40% [69.28%-93.51%]. The second course expressed a transfer rate in the management of the nursing consultation in nutritional education of 85.50% [76.47%-94.50%], as for the highest value of 98.50% [95.46%-100%] in validating the patient's understanding of their nutritional plan and the lowest value of 85.50% [76.47%-94.50%] in offering appropriate dietary recommendations.

During the motivational interview, the students reported a transference of 80.00% [70.01%-89.99%], with the highest value in the application of the patient's emotional containment, as well as in techniques of emotional support and active listening with 98.50% [95.59%-100%] and the lowest value of 80.00% [70.01%-89.99%] in providing reinforcement and motivation for adherence to treatment. With respect to nursing care in cardiology care, there was a transfer rate of 69.33% [57.96%-80.73%], with the highest value of 93.30% [79.03%-100%] related with performing an electrocardiogram, and the lowest, of 68.20% [47.04%-89.32%] in the application of postoperative knowledge in pacemaker surgical interventions. Finally, in home nursing care they reported a transfer rate of 83.10% [73.71%-92.44%], with the highest value, of 91.10% [83.37%-98.78%] in relation with the nursing diagnosis, and the lowest value in relation with the registry of patient care and needs, with 82.50% [72.90%-92.18%]. The third course expressed a transfer rate of 66.70% [50.49%-82.84%] in nursing care with hematological alterations, regarding extraction of

blood samples, checking the blood groups, and performing blood transfusions. In immediate life support of 66.70% [28.23%-100%] conducting the ABCDE nursing assessment and in pediatric nursing care of 69.40% [56.01%-82.76%], with recommendations for breastfeeding, vaccination schedule, and administration of usual medication. The fourth course manifested a transfer rate in nursing care of chronic complex patients in primary care of 82.60% [65.85%-99.37%] with the performance of the nursing assessment and application of tests or functional scales. Regarding adult advanced life support of 80.00% [60.79%-99.21%] and pediatric life support of 100%, tracking algorithms, monitoring and identifying cardiac rhythms and administering medication during cardiorespiratory arrest. Finally, for the advanced practice nurse it was 75.00% [46.26%-100%] with the implementation of recommendations and follow-up guidelines.

Lastly, globally, students who were able to carry out simulation cases and apply them in care practices, reported that the simulations helped 76.66% [63.89%-89.59%]: with this being higher in the fourth course (85.90%) and lower in the third course (67.60%); they were also able to transfer knowledge from said simulations to their role as professional nurses in 81.70% [72.08%-91.90%]: being higher in the fourth course (95.60%) and lower in the third course (77.00%) (Table 3).

Table 3. Global transferability rate per hundred of the specific competence areas worked on in the simulations per course

Course / Question	*n*	%	95% CI
Have the simulations helped you?			
First	.	.	.
Second	78	79.60	72.81-86.49
Third	55	67.60	44.91-88.53
Fourth	27	85.90	70.70-100
Total	160	76.66	63.89- 89.59
Have you been able to apply knowledge / skills?			
Course	***N***	**%**	**95% CI**
First	43	83.70	73.37-94.07
Second	79	79.60	79.51-92.11
Third	55	77.00	85.21-93.34
Fourth	27	95.60	90.69-100
Total	204	81.70	72.08-91.9

Discussion

The findings herein regarding the effectiveness of the debriefing in the clinical simulation, according to the results obtained from the DASH, indicate a positive perception by the students. These results suggest that the instructors have the capacity to create a suitable environment for reflexive learning through organized sessions that promote profound discussions about the student's performance. Previous research in nursing programs have yielded results similar to the present project with

6.61 [6.56-6.65], ranging between 6 and 6.50; highlighting the need to improve the introduction at the beginning of the simulation activities (element 1), as well as the instructor's ability to maintain a participative learning environment (element 2).[14–19] Other studies focused on the formation of health professionals have also obtained similar assessments as the present study, suggesting that the debriefing was effective and of high quality.[20] The importance is underscored of maintaining a safe environment and promoting professional integrity during the simulation, recognizing its profound impact on health students.[21] Additionally, the crucial relevance of the experience and training of professors in clinical simulation to guarantee student satisfaction is highlighted.

With respect to knowledge transfer to the clinical practice, most students state that knowledge acquired during the clinical simulations applies effectively in the care practice. The data reveal that 81.00% of the students consider that what they learnt during the simulations on patient safety was transferred to the practice, with gloves and adequate introduction with name and professional category obtaining transferability rates close to 100%. Furthermore, it is highlighted that 95.40% of the students experienced high transference of communication skills, with active listening being a 100% universally transferred element. In teamwork, it is observed that 92.20% of the students experienced effective transference of abilities, highlighting respect for staff members as a 100% universally transferred aspect.

These findings coincide with prior scientific evidence[22] that support the effectiveness of the clinical simulations in the transference of skills to the clinical practice. Previous research [23,24] have demonstrated that clinical simulations offer a safe and controlled environment where students can practice and consolidate clinical skills before facing real situations with patients. In this sense, simulations not only serve as effective teaching tools, but also contribute significantly to the development of competencies crucial for quality care in real clinical settings.

Although different programs exist [25,26] in nursing based on simulation, this study provides the novelty of determining the differences in the perception of knowledge transfer and competence areas among the courses of the university nursing degree. For example, the data show that students from the first course have a high transferability rate in basic communication skills, such as active listening and empathy, which suggests effective Integration of these skills as of early training stages. This finding may be supported with prior studies[27] that highlight the importance of developing effective communication skills during the first years of nursing formation to establish a solid base for the clinical practice. In turn, the perception of lower transferability in aspects of patient safety by the students from the second course is also supported in the literature. Previous research[28] have identified deficiencies in knowledge and the application of patient safety protocols among nursing students during intermediate stages of their training. This suggests the need for specific educational interventions, like the Integration of simulation scenarios focused on patient safety, to address these critical areas of the clinical practice and improve the perception of transferability of knowledge in this group of students.

These data reinforce the importance of understanding the areas of greater and lesser knowledge transfer in the nursing formation.[22] According to the results presented, the areas with greater transference include the use of gloves, introduction with name and professional category, active listening, and respect toward the members of the healthcare staff. In contrast, the areas with lesser knowledge transfer include, among others, the use of railings with bedridden patients, bringing the bell closer to a dependent patient, and verification of allergies in students from the second course. It was found that communication and integration in the healthcare staff during the practices, and identification of the leader figure and the leader's

orders had lower transferability rates in students from the third and fourth courses, respectively.

Hence, adapting the clinical simulations to the specific needs of each cohort of students and competence area is justified not only due to the differences observed in the perception of transferability, but also by prior evidence[22] that supports the importance of addressing these specific areas of professional development during the nursing formation. These personalized strategies have the potential of both improving student confidence and competence, and can have a positive impact on the quality of patient care in real clinical settings.[21]

The study acknowledges certain limitations, such as the use of convenience sampling and dependence on the subjective perception of students. Future research should incorporate mixed methods to obtain fuller comprehension of how the debriefing in the clinical simulation impacts upon the care practice. In addition, strategies can be explored to improve knowledge transfer in areas where lower transferability rates are observed.

For decades, nursing literature has indicated the existence of a gap [29] between academic theory and practical application, with limited evidence of significant progress to reduce this disparity and this research emphasizes the simulation's potential as an educational strategy to approach this gap, given that the results show that this educational methodology is effective to increase the students' perception in their transition to clinical care practice. This project offers results that confirm the scientific evidence [30–32] that simulation of the clinical practice has transference of the learning by the nursing students, contributing to their knowledge, abilities, confidence, and judgement. Nonetheless, the study agrees with other studies[24,29] on the need to continue exploring this setting and the need is identified for more longitudinal research to further delve into the long-term learning results from simulation.

The debriefing, as a reflection and analysis process after the clinical simulation experiences, is universally recognized as an essential component to clarify and consolidate the knowledge acquired during these practices. The results of the DASH-based "1st Post Clinical Simulation Survey" provide evidence that the professors who facilitated the clinical simulation exhibited the necessary behavior to conduct an effective debriefing with our nursing students. Moreover, the "2nd Post-Practicum Survey" revealed that the students perceive that the clinical simulation allows them to transfer knowledge from transversal competence areas to the care practice, enhancing their capacity in patient safety, therapeutic communication, teamwork, and leadership. In this sense, the research offers a significant contribution to the field of nursing education upon identifying specific areas of greater and lesser knowledge transfer among students from different courses and competence areas. The findings establish that, although there is a solid integration of basic communication skills, such as active listening and empathy, from the initial stages of training, deficiencies persist in critical clinical practice areas, like patient safety and leadership in healthcare teams.

These results support continuing and strengthening learning based on clinical simulation for nursing students, given that this methodology provides an effective platform to apply essential concepts and abilities, thus, improving the quality of patient care and attention. Furthermore, these findings suggest that the simulations in the classroom help nursing students to close the gap between acquiring knowledge and applying them to patient care.

In conclusion, this study provides conclusive evidence about the effectiveness of debriefing in clinical simulation to facilitate knowledge transfer to the care practice among nursing students. The results emphasize the importance of a structured and reflexive debriefing to enhance

clinical competence and improve patient care in future nursing professionals. Likewise, these back the need to adapt clinical simulations to the particularities of each student group and competence area. This adaptation is sustained not only on the discrepancies identified in the perception of transferability, but on previous evidence that underscores the relevance of addressing specific areas of professional development during the nursing formation. These tailored strategies can increase student confidence and competence, generating a positive impact on the quality of patient care in real clinical settings.

To end, future research is considered necessary to address variations between educational programs and competence areas, as well as to continue optimizing the design and application of clinical simulations in nursing formation to guarantee its effectiveness and relevance within the context of the practice professional. These types of research could delve into identifying the best practices in debriefing and in the adaptation of simulations to the specific needs of each student cohort, which could contribute significantly to continuous improvement of formation in nursing and, lastly, to the offer of high-quality care to patients.

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Analysis of the Formation of Scientific Communities in the Journal *Research and Education in Nursing* (2010 - 2020) and its Disciplinary Influence: an Approach from Bibliometric Analysis, Network Analysis, and Natural Language Processing

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Analysis of the Formation of Scientific Communities in the Journal *Research and Education in Nursing* (2010 - 2020) and its Disciplinary Influence: an Approach from Bibliometric Analysis, Network Analysis, and Natural Language Processing

Abstract

Objectives. This work sought to identify the academic communities that have shown interest and participation in the Journal Research and Education in Nursing and analyze the scientific impact generated by said journal. **Methods.** A bibliometric analysis was carried out, as well as social network analysis and techniques of natural language processing to conduct the research. The data was gathered and analyzed during a specific study period, covering from 2010 - 2020, for articles published in the journal, and 2010 - 2022, for articles that cited the journal within Scopus. These methods permitted performing an exhaustive evaluation of the journal's influence and reach in diverse academic and geographic contexts. **Results.** During the analysis, it was noted that the journal *Research and Education in Nursing* has had significant influence in academic and scientific communities, both nationally and internationally. Collaboration networks were detected among diverse institutions and countries, which indicates active interaction in the field of nursing research. In addition, trends and emerging patterns were identified in this field, providing a more complete view of the discipline's evolution. **Conclusion.** Based on the results obtained, it is concluded that the journal *Research and Education in Nursing* has played un fundamental role in disseminating knowledge and promoting research in nursing. The combination of Bibliometric metrics, social network analysis, and natural language processing permitted utmost comprehension of its impact in the scientific and academic community globally.

Keywords: research and education in nursing; academic impact; bibliometric metrics; social network analysis; scientific collaboration; natural language processing.

Análisis de la formación de comunidades científicas en la revista *Investigación y Educación en Enfermería* (2010-2020) y su influencia disciplinar: Un enfoque desde el análisis bibliométrico, análisis de redes y procesamiento de lenguaje natural

Resumen

Objetivos. Identificar las comunidades académicas que han mostrado interés y participación en la revista *Investigación y Educación en Enfermería* y analizar el impacto científico generado por esta publicación. **Métodos.** Se realizó un análisis bibliométrico, así como análisis de redes sociales y técnicas de procesamiento de lenguaje natural para llevar a cabo la investigación. Los datos se recopilaron y analizaron durante un período de estudio específico, abarcando los años 2010-2020, para los artículos publicados en la revista, y 2010-2022, para los artículos que citaron la revista dentro de Scopus. Estos métodos permitieron realizar una evaluación exhaustiva de la influencia y alcance de la revista en diversos contextos académicos y geográficos. **Resultados.** Durante el análisis, se observó que la revista

Investigación y Educación en Enfermería ha ejercido una influencia significativa en las comunidades académicas y científicas, tanto a nivel nacional como internacional. Se detectaron redes de colaboración entre diversas instituciones y países, lo que indica una interacción activa en el ámbito de la investigación en enfermería. Además, se identificaron tendencias y patrones emergentes en este campo, proporcionando una visión más completa de la evolución de la disciplina. **Conclusión.** Basándose en los resultados obtenidos, se concluye que la revista *Investigación y Educación en Enfermería* ha desempeñado un papel fundamental en la difusión del conocimiento y la promoción de la investigación en enfermería. La combinación de métricas bibliométricas, análisis de redes sociales y procesamiento de lenguaje natural permitió una comprensión más completa de su impacto en la comunidad científica y académica a nivel global.

Descriptores: investigación y educación en enfermería; impacto académico; métricas bibliométricas; análisis de redes sociales; colaboración científica; procesamiento de lenguaje natural.

Análise da formação de comunidades científicas na revista *Nursing Research and Education* (2010-2020) e sua influência disciplinar: Uma abordagem a partir da análise bibliométrica, análise de redes e processamento de linguagem natural

Resumo

Objetivos. Identificar as comunidades acadêmicas que demonstraram interesse e participação na revista *Nursing Research and Education* e analisar o impacto científico gerado por esta publicação colombiana. **Métodos.** Foi realizada análise bibliométrica, análise de redes sociais e técnicas de processamento de linguagem natural para a realização da pesquisa. Os dados foram coletados e analisados durante um período específico de estudo, abrangendo os anos 2010-2020, para artigos publicados na revista, e 2010-2022, para artigos que citaram a revista dentro do Scopus. Esses métodos permitiram uma avaliação abrangente da influência e do alcance da revista em diversos contextos acadêmicos e geográficos. **Resultados.** Durante a análise, observou-se que a revista *Nursing Research and Education* tem exercido influência significativa nas comunidades acadêmica e científica, tanto nacional quanto internacionalmente. Foram detectadas redes de colaboração entre diversas instituições e países, o que indica interação ativa no campo da pesquisa em enfermagem. Além disso, foram identificadas tendências e padrões emergentes neste campo, proporcionando uma visão mais completa da evolução da disciplina. **Conclusão.** Com base nos resultados obtidos, conclui-se que a revista *Nursing Research and Education* tem desempenhado um papel fundamental na divulgação do conhecimento e na promoção da investigação em enfermagem. A combinação de métricas bibliométricas, análise de redes sociais e processamento de linguagem natural permitiu uma compreensão mais completa do seu impacto na comunidade científica e académica global.

Descritores: investigação e educação em enfermagem; impacto académico; métricas bibliométricas; análise de redes sociais; colaboração científica; processamento de linguagem natural.

Introduction

The journal *Research and Education in Nursing* has played a fundamental role for over four decades in disseminating research and promoting the progress of knowledge in the field of nursing. Its recognition is reflected in its indexing in prominent regional and international databases, like SciELO, Redalyc, PubMed, and Medline, as well as in its classification as Q2 in the 2023 *Scimago Journal Report*. This study centers on analyzing the academic and scientific impact generated by the journal *Research and Education in Nursing* in the disciplinary communities, especially in the field of nursing. The main objective was to identify the communities, whether institutions or countries, that have shown interest and participation in this publication. Likewise, the work seeks to trace, through the analysis of the citation impact, the academic networks that have been formed from the articles that cite the journal. To conduct this research, Bibliometric metrics, social network analysis, and natural language processing techniques were used. These tools permit carrying out an exhaustive evaluation of the journal's influence and reach in diverse academic and geographic contexts, thus, contributing to better understand its impact in the scientific and academic community globally.

The evaluation of the quality and influence of academic journals has been traditionally guided by conventional metrics that focus on the number of citations received and the journal's position in quartile rankings.[1,2] However, this simplified perspective may underestimate a journal's complexity and scope of influence, overlooking essential aspects of its contribution to the academic dialogue and to the construction of knowledge in its respective fields of study.[3] A trend also exists among metric studies of reexamining this evaluation paradigm, highlighting the utility of bibliometric analyses as more complete and sophisticated tools to understand the dynamics of academic publications.[4–6]

In the words of Newman and Girban[7] and Blondel *et al.,*[8] progress in computational and algorithmic capabilities have paved the road for the development of more sophisticated techniques to identify scientific communities. Among said progress, network analyses stand out, which permit identifying groupings of authors and institutions that share interests and collaborate in research.[9] In that sense, it is crucial to acknowledge that scientific journals act as vehicles for the creation and dissemination of knowledge, and their value goes beyond simply counting citations.

From this perspective, Gabriel Vélez highlights the importance of the term "brand" in the scientific context, derived from the systems theory proposed by Luhmann.[10] In scientific communication, brands operate as elements that allow interlocutors to orient themselves in the circulation and understanding

of information. Particularly, in the setting of science, these brands play a crucial role in the production of knowledge. Each scientific publication represents an event in which multiple brands are combined to grant uniqueness and individuality to each text and the journal. The production and reproduction of scientific articles is facilitated due to the standards generated by the community, which permit identifying any member through the presence or absence of an article. These brands provide significant information for the analysis, such as the title, affiliations, the corpus and references, elements that must be comprehensible for other colleagues as in the scientific community. Citations, although extratextual, also contain significant elements that can be analyzed in semantic terms, of co-occurrence and specialization, among other aspects, thus offering a more complete vision of the network of scientific knowledge.

The brands present in articles published by journals are key indicators that permit tracing and analyzing the evolution and nature of scientific communities. These brands function as digital footprints that reveal the interconnections among authors, institutions, and subject areas within the scope of academic literature.[11] By being identified and analyzed in systematic and quantifiable manner, these brands can provide significant signals about the structure and dynamics of the scientific collaboration network surrounding a particular journal.

In this sense, the bibliometric analysis, network analysis emerge as valuable tools that permit a more holistic evaluation of the influence and impact of a journal in the scientific community. By mapping the connections among institutions, countries, and research topics, it is possible to identify groups that share common interests and collaborate in the generation of knowledge.[5] This approach permits a more profound understanding of the structure and cohesion of the network of scientific collaboration, as well as the identification of central and peripheral nodes within the network. Additionally, we propose integrating thematic analyses based on Natural Language Processing (NLP) techniques to identify trends and emerging patterns in nursing research.[12] Upon applying NLP methods to the titles, abstracts, and keywords published, we can analyze systematically the themes and subthemes dealt with in the publication, which complemented with the bibliometric and network analyses provides a fuller understanding of the structure and dynamics of the field of nursing in the journal under discussion.

From the aforementioned, the principal objective of this study consisted in analyzing the scientific impact of the journal *Research and Education in Nursing* in nursing disciplinary communities. This Will be done by identifying the institutional and national communities that have been articulated around the journal's publication, as well as tracing the academic networks formed from the articles that cite it.

Methods

This study focuses on analyzing the journal *Research and Education in Nursing* (IEE, for the term in Spanish), published by the Faculty of Nursing at Universidad de Antioquia (UdeA) in Colombia, with ISSN (online): 2216-0280 and ISSN (print): 0120-5307. An exhaustive data collection was conducted from 2010 to 2020, identifying 779 articles published on the journal's OJS platform and, besides, in order to see the average scope of this period, in the citation impact section, the information from 2010 to 2022 was taken up, namely, 915 articles that cited the journal in Scopus. It is important to note that the journal has been indexed in this database since 2014. The objective was to understand the reach and impact of its articles published. In the selection of primary and secondary sources, criteria such as relevance, timeliness, and pertinence for the proposed analysis were considered.

For bibliometric analysis, detailed counts of various metrics were performed, such as the total number of articles, citations, journals, institutions, authors, countries. These bibliometric counts provided a quantitative view of the scientific production related with the journal and permitted identifying significant trends and patterns.

Moreover, data of affiliations and countries were analyzed with co-authorship network metrics through Community Detection analysis,[13,14] which permitted detecting densely connected groups of institutions or countries; the purpose of this study was to understand which communities have grown with and in the journal these years.

The data analysis used diverse tools and libraries in Python for counting, network analysis, and natural language processing. The Natural Language Toolkit (NLTK) library was used for natural language processing tasks, like tokenization and text analysis. In addition, libraries such as Pandas were used to manipulate and structure the data collected, Matplotlib for graphical visualization of data and metrics, and Networkx for network creation and analysis. To evidence the journal's evolution over the years, the results were divided into three periods, namely: 2010-2013, 2014-2017, and 2018-2020, and for citations: 2010-2014, 2015-2018, 2019-2022.

The results were structured into two distinct sections. Firstly, a detailed analysis was carried out on each of the three selected periods, where the accounts of the institutions and countries that contributed the most with publications in the journal were presented. Secondly, the most cohesive communities within the journal were identified, detected via co-authorship at the institutional and national levels, and predominant themes were explored by analyzing the most recurrent n-grams and bigrams.

Once the analysis was completed at the journal level, the articles that cited the journal were examined. Due to space limitations, counts were presented of the institutions that cited the journal in the three selected periods, highlighting those that appeared more than seven times. This approach permitted identifying the most influential institutions, as well as the most relevant countries, to understand the evolution over time regarding the acceptance and participation by the communities at institutional and geographic levels.

Results

The results of this study provide a detailed evaluation of the international level, impact, and influence of the journal *Research and Education in Nursing*. Through meticulous analysis of data collected between 2010 and 2020, significant trends in scientific production, institutional collaboration, and predominant themes within the field of nursing are outlined. Further, the journal's impact was examined from citation data in Scopus, which encompass from 2010 to 2022, evidencing its recognition in the international scientific community. These results not only clarify the journal's temporal evolution, but also shed light on its contribution to the academic and scientific discourse in the nursing discipline.

Analysis of collaboration and topics by period of publication

Period 2010 - 2013

Atop of institutions with the most articles in the journal during said period, there is Universidad de Antioquia (Colombia) with vast presence (n = 329), followed by Universidade de São Paulo (Brazil) (n = 39), Pontificia Universidad Católica de Chile (n = 29), Universidad Nacional de Colombia (n = 24), and ending with the Brazilian institution: Universidade Federal de Santa Catarina (n = 21); this denotes how during this period emphasis is on national universities; nevertheless, relevance of foreign universities exists, showing the journal's commitment to increase internationalization..

In the analysis of country distribution of participation in the journal (Table 1), Colombia leads with an outstanding presence of 497 appearances, followed by Brazil with 251. This characteristic highlights Colombia's influence and active participation in the journal. Brazil, despite having lower presence, continues being an important player. Countries like Chile (n = 56), Mexico (n = 46), and Spain (n = 36) also show considerable representation, together with others like Iran (n = 14), the United States (n = 14), and Portugal (n = 4), reflecting the journal's diversity and global reach in the international academic setting. Notwithstanding, it must be indicated how the journal has a high number of Colombian authors during this period, which is also observed in the network analysis.

Table 1. Distribution of articles published according to country and period

Country	2010-2013 (n=783)	2014-2017 (n=783)	2018-2020 (n=242)	Total (n=1808)
Colombia	497	272	76	845
Brazil	251	518	102	871
Iran	14	15	92	121
India	N/A	18	25	43
Mexico	44	28	24	96
Spain	36	47	21	104
Chile	56	18	20	94
Argentina	2	1	6	9
Ecuador	2	2	2	6
Indonesia	N/A	N/A	1	1
Portugal	4	6	1	11
Ireland	N/A	N/A	1	1
Switzerland	N/A	N/A	1	1
Canada	1	5	1	7

The study identified 77 collaboration communities, each comprised by institutions and organizations from different countries. Among the countries with greater representation in said communities, there are Brazil, with 14; Mexico, with 10; and Colombia, with 9. This evidences significant participation by these countries in international collaboration in the field of nursing during the period analyzed. Furthermore, diverse geographic distribution is observed encompassing Latin America, Europe, Asia, and North America, indicating wide internationalization of nursing research and practice promoted by the journal from Universidad de Antioquia. Strong participation is noted from health institutions, universities, and research organizations in these collaboration communities, which evidenced a multidisciplinary and multisector approach in the advancement of nursing knowledge and practice.

From 2010 – 2013, the journal generated 10 dense communities among countries, but only three of these articulate several countries, while the other seven are communities articulated under the same country, namely, Portugal, Venezuela, Panama, Cuba, Argentina, Australia,

and Canada. The other three communities show the relationship among authors with affiliations in different countries: the first community, composed of Colombia, Spain, Iran, Mexico, and Ecuador, suggests significant collaboration in Latin America and with Spain in the field of nursing; The second community, which includes Chile and the United States, evidences interaction between Latin America and the United States in this domain; the third community is made up by Peru and Brazil, which points to a specific collaboration between these two South American countries.

During the study period from 2010 - 2013 (Figure 1), the Nursing journal has addressed a vast variety of related topics, in essence, with its discipline. The topics addressed include nursing care and health practices, with research and reflections about care in different clinical and community settings, as well as strategies to improve the quality of care. In addition, nursing research has been explored, highlighting qualitative and quantitative approaches and the relationship between research methods and the professional practice. Education and teaching methods have been another focus of interest, with a detailed exam of contemporary educational approaches. Also, studies have been conducted focusing on health and medical conditions, addressing the prevalence of certain conditions, like arterial hypertension and its impact in different population groups. Lastly, the study has analyzed research and perceptions about caring for newborns, especially those cared for in neonatal units.

Figure 1. Word clouds of titles, abstracts, and keywords of articles published based on the three study periods

Period 2014-2017

During this period, Universidad de Antioquia continues at the forefront of participation in the journal with 164 articles. However, in the remaining top five, we observe Brazilian universities (n = 300), revealing growth in the construction of regional communities. In the top 20, we found only four Colombian institutions: Universidad de Antioquia (n=164), Universidad Nacional (n = 19), Universidad de Cartagena (n = 8), and the Colombian National Association of Nurses (n = 7); the rest are foreign institutions, mainly from Brazil, but also include institutions from Spain (n = 22) and the United States (n = 16). These findings underscore the journal's relevance for Brazilian institutions, which consider it a reliable channel to publish and disseminate nursing topics at Latin American level.

In collaboration by countries, Brazil (Table 1) shows participation with 518 appearances, in relation to 272 by Colombia, almost duplicated; followed by Spain, Mexico, Chile, India, Iran, the United States, and Portugal, which leaves no room for doubt of the level of the journal's internationalization role beyond the Latin American region. During the period from 2014 to 2017, the journal's co-authorship analysis revealed a vast collaboration network that encompasses 58 communities. When comparing this period with the previous (2010-2013), an increase in observed in the number of communities identified, suggesting increased international collaboration in the field of nursing.

Among the countries most represented in these institutional communities, there are Brazil, with 17 communities; Colombia, with six communities; and Mexico, with four communities. This distribution indicates continuous and significant participation by these institutions in nursing international collaboration. Geographic diversity is also observed in the communities identified, which encompass institutions from Latin America, Europe, Asia, and North America. For the period mentioned, at country level there are eight communities, and the last five are all within the same country. The countries involved are Mexico, Iran, Ecuador, Cuba, Argentina, and Sweden.

The first community where more than one country comes together, which includes Canada, Colombia, Portugal, Philippines, Spain, Mexico, and Brazil, reflects broad and diverse collaboration in different regions of the world. The second community, composed of the United States, Colombia, Costa Rica, the United Kingdom, and Chile indicates interaction among North America, Latin America, and Europe in this domain. Lastly, the third community, comprising Australia and India, suggests collaboration between Oceania and Asia in nursing research and education.

Analysis of n-grams and bigrams (Figure 1) of the journal *Research and Education in Nursing* for the period 2014-2017 reveals prevalent topics that reflect central thematic areas in nursing. The terms "nursing" and "care" emerge as central, underlining the importance of care and nursing care. At the same time, health is positioned as a fundamental thematic axis with terms, like "health", "patients", "mental health", and "health services", indicating a comprehensive approach that encompasses general health, mental health, and health services. Furthermore, there is a marked emphasis on research and study, as evidenced in terms, like "study", "research", "data", and "objective", indicating significant dedication to the generation and analysis of knowledge in nursing. Finally, the presence of terms, like "students" and "education" suggests interest in the formation and education of future nursing professionals, highlighting the importance of academic preparation and continuous training in the field.

Period 2018-2020

During el period analyzed, 2018-2020, Shiraz University stands out as the most active

institution in scientific collaboration, with 55 appearances, followed by the National Institute of Health (n = 22). In third place, Universidad de Antioquia (n = 17). Universidad Nacional (n = 11) and Universidade do Rio Grande (n = 11) show significant presence, although with lower frequency compared with leading institutions. This change reflects a change in scientific collaboration within the journal, with Shiraz University emerging as a prominent force in research during the study period.

In the country section, Brazil (Table 1) leads with 102 appearances, followed by Iran with 92 and Colombia with 76, which reflects strong research presence and contribution by these countries in the journal. India and Mexico also show notable presence with 25 and 24 appearances, respectively. Spain, Chile, and Argentina have significant contribution, although lower compared with the countries mentioned, with 21, 20, and 6 appearances, respectively. The presence by Ecuador, Indonesia, Portugal, Ireland, Switzerland, and Canada with one or two appearances indicates more limited, but relevant participation in the journal. Overall, said data underscore the geographic diversity of the journal's collaborators, highlighting active contribution by countries from different regions in nursing research and practice.

During the period from 2018 to 2020, the co-authorship analysis denoted a diverse and dynamic collaboration network involving 38 communities. Compared to prior periods (2010-2013 and 2014-2017), a drop is observed in the number of communities identified, suggesting a collaboration concentration during this period. Among the countries most represented in these institutional communities, there are Iran, with 13 communities; Brazil, with six communities; and Mexico, with five communities. This distribution reflects continuous and significant participation by these countries in international collaboration in nursing, stemming from Colombia as base country. Also, diversity is noted in areas of collaboration, ranging from universities and research centers to health services and local governments. This suggests a broad range research approaches and themes within the nursing field, as well as intersectoral collaboration in the generation and application of knowledge in this setting.

In summary, the co-authorship analysis during the period 2018 - 2020 evidences continued international collaboration, although concentrated in certain countries and a diversity of fields of collaboration. This suggests evolution in nursing collaboration over time. During this period, co-authorship networks spread to nine countries listed, revealing the high scientific collaboration permitted by the journal. More countries exist in co-authorship. The first community, which includes Canada, Spain, Chile, Switzerland, Colombia, Portugal, Mexico, and Ireland reflects diverse and broad collaboration among North America, Europe, and Latin America. The second community, composed by India, Iran, and Brazil, suggests collaboration among Asia, the Middle East, and South America in this domain. Moreover, the third community, represented by Argentina, indicates an individualized approach in nursing research and education in this South American country. Finally, the fourth community, formed by Ecuador, indicates a specific interest in nursing research and education in said country.

Analysis of n-grams and bigrams (Figure 1) for the period 2018 - 2020 of the journal *Research and Education in Nursing* highlights continuous attention on "nursing" and "care", reflecting the importance of nursing care. Renewed interest is observed in formation with "students" and "education", indicating an approach on the education of future professionals. Emphasis on health is kept with "health", "patients", and "intervention", evidencing dedication to clinical intervention and treatment. Research remains essential, with terms like "study" and "research" prevailing. Additionally, there is growing attention on social and support factors, like "social" and "support", and a focus on understanding "factors" and "control" in nursing.

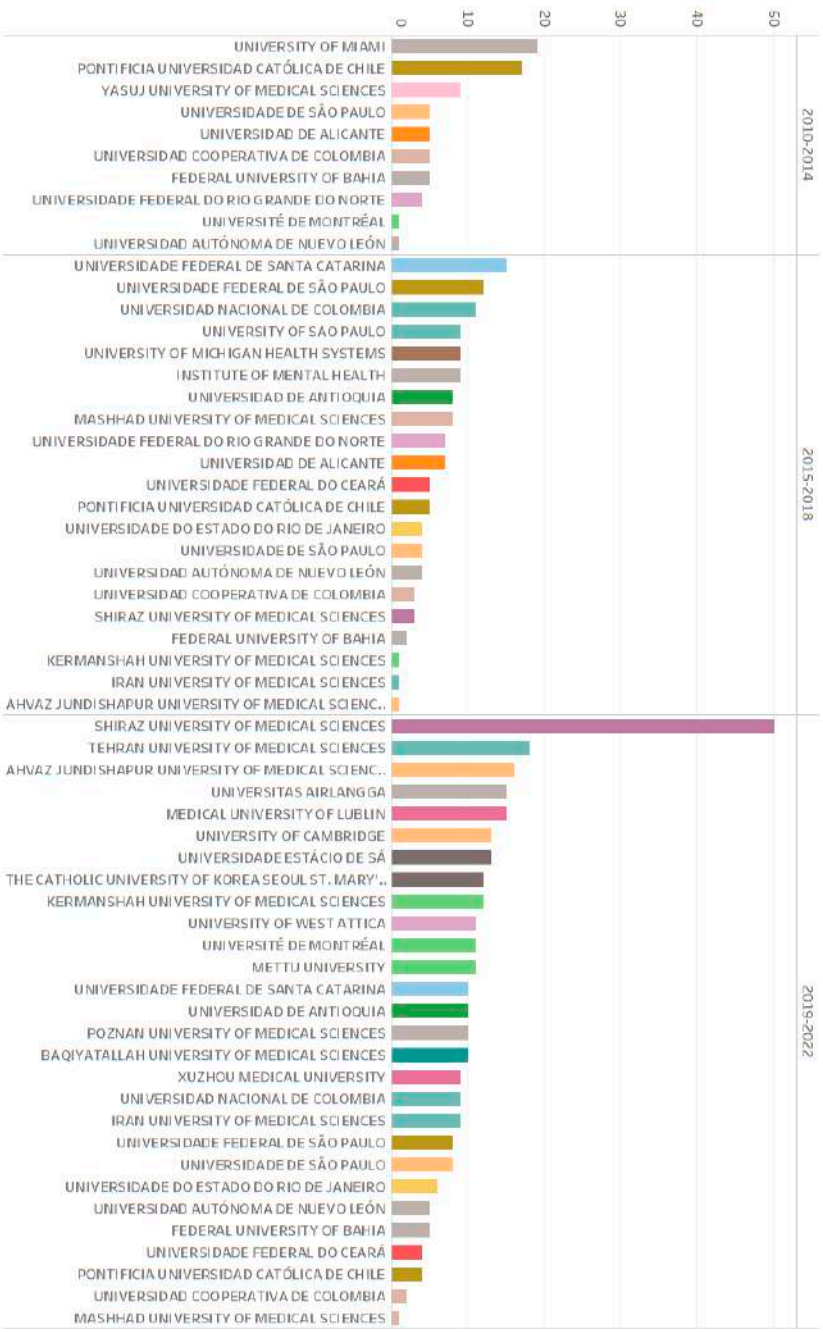
Briefly, the period 2018 - 2020 shows evolution in the journal central themes, maintaining its focus on nursing care, health, and research, while incorporating new focuses related with formation, social factors, and control in the field of nursing. These findings reflect emerging trends and priority areas in nursing research and practice during the period analyzed.

Academic recognition of the journal Research and Education in Nursing in Scopus during the period 2010 to 2022

The journal *Research and Education in Nursing* has shown notable growth in the recognition of its articles during the period evaluated. Starting with 122 documents that cited the journal from 2010 - 2014, to the increase to 139 from 2015 - 2018 and reaching a significant number of 354 articles cited during the period 2019 - 2022. In the first period, 194 institutions appeared; 249 in the second and 652 in the third.

As displayed in Graphic 1, which only shows institutions that appear more than seven times, we note that the first period focuses attention of its articles on five institutions, three national and four international, namely, University of Miami, Pontificia Universidad Católica de Chile, Yasuj University of Medical Sciences, *Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado* (Institute of Security and Social Services of State Workers), while only one national institution stands out, Universidad de Manizales, which shows lower reach in relation to the periods that follow it, but an impact beyond its own institution.

During the second period, eleven institutions appear over seven times, but it is noted that of the first five institutions, four are international, only one is national, namely Universidad Nacional de Colombia. The opposite of the foregoing is noted in the third period, where 49 institutions appear more than seven times, most of them international. Among the notable institutions that have cited these journals, there are Iranian universities, like Shiraz University of Medical Sciences, the Tehran University of Medical Sciences, and the Ahvaz Jundishapur University of Medical Sciences. In addition, Brazilian institutions, such as Universidade de São Paulo and Universidade Federal de São Paulo, as well as Colombian universities, like Universidad Nacional de Colombia and Universidad de Antioquia, are also in the list. At international level, presence is noted of European institutions, like the Medical University of Lublin in Poland, the University of Cambridge in the United Kingdom, and Université de Montréal in Canada. Likewise, institutions from other continents, like Vanderbilt University School of Nursing in the United States, Central South University in China, and King Saud University in Saudi Arabia, among others, have also cited the journal. This panorama suggests that the journal is gaining ground in the international academic setting, reflecting the quality and growing impact of nursing research edited in Colombia.



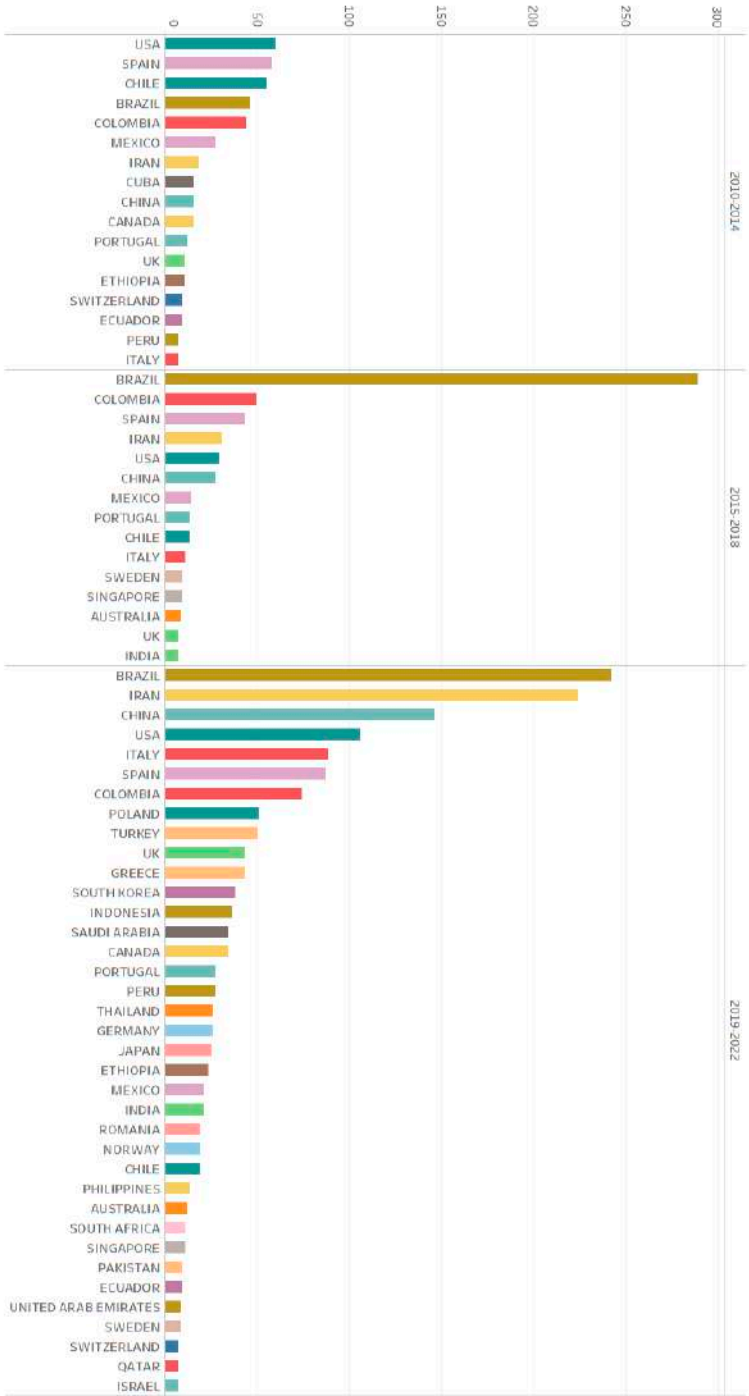
Graphic 1. Evolution of the international recognition by institutions of the journal *Research and Education in Nursing*: 2010-2022

Internationalization and global relevance of the journal Research and Education in Nursing in Scopus 2010-2022

Upon analyzing the appearances of countries (Graphic 2) from where the journal *Research and Education in Nursing* was cited, a notable increase is identified in the internationalization of its citations over the periods studied. During the period 2010-2014, the journal was cited from 32 countries. This figure experienced an increase, reaching 36 countries during the period 2015-2018. However, the period 2019-2022 registered a significant increase, with 62 countries from where the journal is cited.

Regarding the period 2010-2014 with the countries that cited the journal in more than seven occasions, the presence of the United States, Spain, Chile, and Brazil stands out as the most prominent. Colombia occupied the fifth place in this ranking, evidencing a growing relevance of international authors during this period. During the following period, 2015-2018, Brazil emerged strongly upon registering 289 appearances, surpassing by almost six times the 49 appearances by Colombia. This was followed by Spain, Iran, the United States, and China, indicating an expansion by the journal beyond the American regional setting toward countries, like Iran and China.

Finally, in the third period analyzed, 2019-2022, Brazil maintained significant presence with 242 citations, followed by Iran with 224, China and the United States with 106 each; and finally, Italy with 88 citations. These data underline the high level of internationalization reached by the journal's citations during this last period, consolidating its position as a publication of global relevance in the field of nursing.



Graphic 2. Evolution of the international recognition by countries of the journal *Research and Education in Nursing*: 2010-2022.

Discussion

Starting from an approach that investigates not only metrics as final indicators, but also the ability to track diverse scientific phenomena, such as the formation of disciplinary communities through the relationships they raise, permitted observing that the journal has undergone constant change over time. Its focus has centered mainly on issues related with the reflection about the nursing practice, education in this field, research methods, and the consideration of social aspects in nursing. This trend reflects a disciplinary need in relation to research topics that encompasses not only the communities of Colombia and the region, but also countries as distant as Iran and China.

This article's methodological approach has permitted detailing the evolution in terms of the expansion of authors who contribute to the journal, both in terms of quantity and in formation of formation of dense communities around it. Consolidation and enhancement have been observed over time, as demonstrated by the case of institutions from Brazil and from Iran. This consolidation is evidenced especially in articles that, over those 12 years, have referenced works previously published in the journal, which has contributed to the growth and in-depth discussions around certain topics.

The analysis of the evolution of the academic recognition of the journal *Research and Education in Nursing*, performed during the period analyzed, reveals a growth and consolidation trend at international level. Constant increase is observed in the good reception of the articles, with this being especially notable during the last period (2019-2022). This suggests growing recognition of the quality and relevance of the contents published in the journal.

These types of studies are not only relevant to understand the evolution and impact of an academic journal in particular, but also have significant value for the scientific community as a whole. By providing a detailed view of the internationalization, thematic diversity, and collaboration networks in a journal, these analyses not only serve to assess the quality and relevance of research in a specific field, but also offer valuable information for researchers, editors, and decision makers in the academic setting.

The importance of these types of studies lies in their capacity to identify emerging trends, highlight strong and weak areas, and guide future research and editorial policies. In addition, upon highlighting the global interconnection of the scientific community and the increasing collaboration among researchers from different countries and cultural contexts, these analyses foster the exchange of knowledge and the construction of collaborative work relations at an international level.

An important limitation of this study is its exclusive focus on the Scopus database, which could restrict full comprehension of the academic panorama in nursing. It would be beneficial in future research to conduct a comparative analysis that includes other important databases, like Web of Science (WoS) and PubMed to obtain a more complete and representative view of the journal's position in the academic setting.

This study concludes that it may be affirmed that the exhaustive analysis conducted on the journal *Research and Education in Nursing* has yielded significant results that underscore its growth and relevance in the international academic setting. Along the years studied, the journal has experienced notable expansion in terms of its international presence, the thematic diversity of its publications, and the academic recognition of its contents.

Our study confirms that the journal has managed to consolidate itself as a leading platform for the dissemination of high-quality research in the field of nursing, attracting attention and contributions

from academics from the entire world. Additionally, we have identified a clear trend toward the formation of international collaboration networks, which indicates shared commitment by the global scientific community global to advance in nursing knowledge and practice.

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Original article

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The Effect of the Team Members Teaching Design vs. Regular Lectures method on the Self-efficacy of the Multiple sclerosis Patients in Iran. Randomised Controlled Trial

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The Effect of the Team Members Teaching Design vs. Regular Lectures method on the Self-efficacy of the Multiple sclerosis Patients in Iran. Randomised Controlled Trial

Abstract

Objective. This study was conducted with the aim of the effect of team members teaching design (TMTD) vs. regular Lectures method on the self-efficacy of the multiple sclerosis patients. **Methods.** This research is a randomized controlled trial study. In this study, 48 multiple sclerosis persons of members of Jahrom MS Society participated. The persons were selected by simple random sampling and then divided into three groups of: TMTD (n=16), regular lecture method (n=16), and control (n=16), by

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random allocation method. In the intervention groups, six training sessions were held twice a week; control group did not receive education. Data was collected by the MS self-efficacy questionnaire of Rigby *et al*. in the before, immediately and one month after the intervention. **Results.** Patients in three intervention and control groups were similar in terms of demographic variables. The results of the repeated measurement test before, immediately and one month after the intervention showed that the mean of the all dimensions of self-efficacy in two intervention groups had increased significantly ($p<0.05$). While these changes were not significant in the control group ($p \geq 0.05$). Also, there was a significant difference in the mean of the all dimensions of self-efficacy between the intervention groups of TMTD and regular lectures. **Conclusion.** Based on the findings, TMTD compared to regular lectures method had a more significant effect on improving the self-efficacy of multiple sclerosis patients. Therefore, it is recommended that nursing use this educational approach to increase patients' self-efficacy.

Descriptors: education; self-care; team members teaching design; reading; self-efficacy; multiple sclerosis.

El efecto del diseño de enseñanza colaborativa frente al método de clases regulares sobre la autoeficacia de los pacientes con esclerosis múltiple en Irán. Ensayo Controlado Aleatorizado

Resumen

Objetivo. Determinar el efecto del diseño de la enseñanza colaborativa de los miembros del equipo (En inglés: Team Members Teaching Design -TMTD) frente al método de las clases regulares sobre la autoeficacia de los pacientes con esclerosis múltiple (EM). **Métodos.** Ensayo controlado aleatorizado realizado con la participación de 48 personas con esclerosis múltiple afiliados a la Sociedad de Esclerosis Múltiple de Jahrom (Iran), que fueron seleccionados por muestreo aleatorio simple y luego asignados en forma randomizada en tres grupos, dos de intervención: TMTD ($n=16$) y método de clases regulares ($n=16$), y un grupo control ($n=16$). En los grupos de intervención se impartieron seis sesiones educativas (dos por semana); mientras que el grupo control no recibió educación. Se empleó el cuestionario de autoeficacia en EM de Rigby *et al.* en los momentos: antes, inmediatamente después de terminada la intervención y un mes de finalizada la misma. **Resultados.** Los pacientes de los tres grupos de intervención y control eran similares en cuanto a variables demográficas. Los resultados de la prueba de medidas repetidas antes, inmediatamente y un mes después de la intervención mostraron que la media de todas las dimensiones de autoeficacia en los dos grupos de intervención había aumentado significativamente ($p<0.05$). Mientras que estos cambios no fueron significativos en el grupo de control ($p \geq 0.05$). Además, hubo

una diferencia significativa en la media de todas las dimensiones de autoeficacia entre los grupos de intervención de TMTD y clases regulare**s,** siendo mayor en TMTD**.** **Conclusión.** El TMTD comparado con el método de clases regulares, tuvo un mejor efecto en el aumento de la autoeficacia de los pacientes con EM. Por lo tanto, se sugiere a enfermería utilizar este enfoque educativo para aumentar la autoeficacia de los pacientes.

Descriptores: educación; autocuidado; miembros del equipo enseñando diseño; lectura; autoeficacia; esclerosis múltiple.

O efeito do design de ensino colaborativo versus método de aula regular na autoeficácia de pacientes com esclerose múltipla no Irã. Teste controlado e aleatório

Resumo

Objetivo. Determinar o efeito do desenho de ensino colaborativo dos membros da equipe (em inglês: *Team Members Teaching Design* -TMTD) comparado ao método de aulas regulares na autoeficácia de pacientes com esclerose múltipla (EM). **Métodos.** Ensaio controlado randomizado realizado com a participação de 48 pessoas com esclerose múltipla afiliadas à Sociedade de Esclerose Múltipla de Jahrom (Irã), que foram selecionadas por amostragem aleatória simples e depois distribuídas aleatoriamente em três grupos, dois grupos de intervenção: TMTD (n =16) e método de aula regular (n=16), e um grupo controle (n=16). Foram ministradas seis sessões educativas nos grupos de intervenção (duas por semana); enquanto o grupo de controle não recebeu educação. Foi utilizado o questionário de autoeficácia em SM de Rigby et al. nos momentos: antes, imediatamente após o término da intervenção e um mês após seu término. **Resultados.** Os pacientes dos três grupos intervenção e controle foram semelhantes em termos de variáveis demográficas. Os resultados do teste de medidas repetidas antes, imediatamente e um mês após a intervenção mostraram que a média de todas as dimensões da autoeficácia nos dois grupos de intervenção aumentou significativamente ($p<0.05$). Embora essas alterações não tenham sido significativas no grupo controle ($p \geq 0.05$). Além disso, houve diferença significativa na média de todas as dimensões de autoeficácia entre os grupos de intervenção TMTD e aulas regulares, sendo maior no TMTD. **Conclusão.** O TMTD comparado ao método de aula regular teve melhor efeito no aumento da autoeficácia dos pacientes com EM. Portanto, sugere-se que a enfermagem utilize essa abordagem educativa para aumentar a autoeficácia dos pacientes.

Descritores: educação; autocuidado; membros da equipe ensinando design; leitura; autoeficácia; esclerose múltipla.

Introduction

Multiple sclerosis (MS) is a chronic inflammatory and autoimmune disease of the central nervous system that affects a person's sensory and motor function.[1] This disease is one of the most common neurological diseases in humans and the second leading cause of disability in young adults after trauma. The most common age of the disease is 20 - 40 years. In fact, when a person is in the productive stage of life and can be effective for himself and society, he suffers from disability caused by this disease.[2] So that it is the third cause of disability in America.[3]

MS affects more than 2.8 million people worldwide. Approximately 500 000 people in the United States have MS, and 8000 new cases are diagnosed each year.[4] The prevalence of MS in Iran has been reported from 5.3 to 89 people per 100 000 people. According to the study of Azimi *et al*.[5] the prevalence of MS in Iranian women was estimated at 16.5 per 100 000 people and in Iranian men at 14.8 per 100 000 people. MS patients experience a wide range of physical symptoms such as fatigue, immobility, weakness, tremors, pain, spasms, visual and sexual disturbances and psychologically, they suffer from cognitive impairment, depression, anxiety, reduced social interaction and increased dependence on others.[6] Complications in MS are high and the most common side effects include psychological symptoms such as depression and anxiety and physical problems such as high blood pressure, hyperlipidemia, and chronic lung diseases.[7] The changes caused by the disease strongly affect the self-efficacy of these patients. Therefore, it is necessary to pay attention to the self-efficacy of MS patients, which directly affects daily performance, social interactions, professional status, and quality of life.[8] High self-efficacy increases the quality of life and general health and reduces pain, fatigue, depression and stress.[9] Self-efficacy is a person's belief in her abilities to organize and implement a set of activities necessary to achieve a specific outcome.[10] Wilski study showed that individual factors such as general self-efficacy and perception of treatment control are more correlated with self-management in MS patients than clinical variables such as severity, type and duration of the disease.[11]

Since MS patients experience a lower level of self-efficacy than other people due to physical limitations and mental pressures caused by the disease, therefore, the implementation of interventions that can be accompanied by the implementation of a self-management program in these patients will improve self-efficacy.[12] One of the interventions that can be implemented in the field of empowering patients to achieve self-management by the healthcare system is educational interventions. According to Naeemi *et al.,*[13] educational interventions can improve awareness and self-efficacy for pain control among MS patients. One of the educational methods used by nurses and other health care professions which improves the patient's health behavior is self-

care education. Self-care education explains why and how people should take care of themselves. Therefore, it is very important to use new methods in self-care education in order to improve the self-efficacy of patients to achieve the desired health behavior and control the complications of the disease. It is important to choose the appropriate educational method for self-care education.[14] Regarding MS disease, most of the educational programs that are provided to the patients are individual and in the form of pamphlets, guidance booklet and questions and answers.[15]

Often, due to the large number of patients in the MS Societies and the small number of trained personnel, the quality of educational programs is not very favorable and is not responsive to the patients. Often, trainings are presented in the lecture method, which results in quick forgetting of material, fatigue of learners, lack of opportunity for questions and answers, and lack of motivation in patients. This is despite the fact that today it is an effective education that is accompanied by positive activities of the learner and leads to the acquisition of constructive experiences in the patient.[16] One of the new educational approaches is the use of team and cooperative teaching methods. Team Members Teaching Design (TMTD) is one of the team-teaching methods. Two hypotheses form the basis of the TMTD; the first hypothesis is that each member of the team studies a different part of the subject. Second, each learner can teach her team members, so each member acts as both a teacher and a learner.[17] The TMTD in small groups can lead to the creation of an active learning environment for all learners. The National League for Nursing believes that if people are going to work with each other in a quality way, they should train with each other to understand their common goals. One of the methods of implementing cooperative training is to use the skills of working groups. The role of teamwork in nursing patients is very important. In the clinical environment, 70-80% of errors occurred due to human causes, which were associated with poor teamwork. Therefore, doing group work is one of the very important educational strategies in nursing education programs, which can create and strengthen the spirit of cooperation, acquire social skills, and improve the professional skills of nursing students and nurses.[17] Regarding the comparison of lecture and collaborative teaching methods such as TMTD, different and sometimes contradictory results have been obtained in the studies.[18] So that the results of Sharifzade study found the TMTD to be more effective than lecture,[19] and on the contrary, the study of Payami Bousari *et al*.[20] showed that lecture method more effective than TMTD.

Therefore, considering that use of collaborative method has been repeatedly emphasized in studies[20,21] and taking into account that different results have been obtained in the comparison between the lecture teaching method and TMTD and so far, the TMTD has not been used in the training of patients. Hence, this study was conducted with the aim of the effect of the TMTD vs. regular Lectures method on the self-efficacy of the multiple sclerosis patients.

Methods

This research is a double-blind randomized controlled trial study with code IRCT20190127042506N1. The study was conducted in Jahrom MS Society in 2022. The inclusion criteria included definite diagnosis of MS, age 18-60 years, at least 6 weeks passed since the last relapse, self-care ability, and experience of MS for at least 2 years and willingness to participate in the study. Exclusion criteria included absence of more than 2 sessions during the intervention, occurrence of acute disease attacks during the intervention, and having heart, kidney, respiratory, digestive, and metabolic diseases. In order to select the patients to enter the study, first, among the patients who are members of the MS Society who met the criteria for entering the study, the samples were selected randomly, and then in the next step, using a computer, they were randomly allocated to two

intervention (TMTD and regular lecture method) and control groups (Figure 1). The sample size was calculated based on Omidi *et al.*[22] and considering $\alpha=0.05$ and $\beta=0.1$, the number of 14 patients in each group was calculated. Considering the possibility of dropping samples during the study, 20 people were considered for each group. The formula for calculating the sample size is given below.

$$n = \frac{S_{1^2} + S_{2^2}}{(\mu_2 - \mu_1)^2} F(\alpha, \beta) = \frac{345.9 + 384.16}{204.49} \times 10.5 = 14.3$$

Data collection tool

The tools used in this research were the questionnaire of demographic characteristics and the standard questionnaire of self-efficacy of MS patients. Demographic information questionnaire included age, sex, education, marriage, experience of disease, number of relapses and hospitalizations in the last year. MS self-efficacy questionnaire was developed by Rigby *et al*.[23] in 2003. This scale includes 14 items and four dimensions of independence and activity (5 items), concerns and interests (4 items), personal control (3 items) and social efficiency (2 items). The range of scores varies from 14 - 84. Higher scores mean more self-efficacy. The scoring of this scale is done on a 5-point Likert scale from completely disagree (score 1) to completely agree (score 5). This scale has been translated and validated in Iran by Tanhaye Reshvanlo and Soleimanian.[24] The number of items was reduced from 14 items to 11 items by removing 3 items due to the factor loading less than 0.3 and classified into 3 dimensions. Cronbach's alpha coefficient of the whole questionnaire is reported 0.90. Cronbach's alpha coefficients for three dimensions of independence and activity, personal control, concerns and interests were obtained 0.80, 0.78, and 0.72 respectively.

Intervention

Before starting the study, demographic information and MS self-efficacy questionnaire were completed by patients in all three groups. Then the educational intervention was held for the intervention groups in six educational sessions and twice a week (On Sundays, the regular lecture method and on Tuesdays, TMTD). The training sessions lasted for six weeks. The training in the regular lecture group included the presentation of materials in the lecture method by the researcher. The steps of TMTD were implemented as follows: In the first session, the patients were divided into four teams of 5 people (due to the non-participation of 4 patients in the training sessions, the sessions continued in four groups of 4 people). The researcher prepared content about self-care training and divided them into equal volumes and distributed them to all patients a week before, and from the patients were requested to read the content. On the day of the training session, according to the previous division of the members, the first members of each of the four teams in one category, the second members of each team in one category, the third members of each team in another category, and the fourth members of each team in another category were placed. In fact, four groups of four people were formed, and each group had to present a single topic in their main teams. Then the patients were asked to discuss, exchange opinions and understand the contents for 10 minutes with all four people who have the same content in each of the categories. After the completion of the first stage, all members returned to their original teams and for 10-15 minutes, each of them presented their respective content in their teams.[18] At the end, the researcher summarized the contents and answered the patients' questions.

The content of the six training sessions in both the regular Lectures method and TMTD was as follows: The first session: Familiarizing patients with each other, talking about self-care and its importance in controlling disease complications. The second session: Familiarizing patients with

the proper diet in MS and following a healthy diet and limiting certain foods. The third session: Familiarity with pain management methods and fatigue reduction and muscle relaxation methods. The fourth session: Familiarity with methods of improving urinary disorders in patients. The fifth session: Familiarity and coping with stress, anxiety and depression and the sixth session: Familiarity with exercise in MS disease (Table 1). After the completion of the educational sessions, the patients in the intervention groups were followed up for one month, and during this period, the researcher attended the MS Society and answered the patients' questions by phone and in person. Immediately and one month after the intervention, the self-efficacy questionnaire was completed by the patients of all three groups. Patients in the control group did not receive education.

Statistical analysis

Data analysis was done using SPSS 22. Homogenization of the samples in terms of demographic variables in the intervention and control groups was done using chi-square and independent t-test. Normality of the data was done using the Kolmogorov-Smirnov test. In order to compare the mean in the three intervention (lecture and TMTD) and control groups, the multivariable Analyze of covariance test (MANOVA) was used. For the compare the mean in the pre and post-intervention, the paired t-test was used. Also, in order to investigate the changes trend before, immediately and one month after the intervention in the three intervention and control groups, the repeated measures analysis was used. A significance level of 0.5 was considered.

Ethical Issues

This study was approved by the ethics committee of Jahrom University of Medical Sciences with ethics code IR.JUMS.REC.1397.152. A written informed consent form was completed by the patients. The research samples were assured about the anonymity of the questionnaire, privacy and confidentiality, and voluntary participation in the research. Also, the purpose of the study was explained to the patients in the intervention groups.

Table 1. Description of educational programs in the two intervention groups (TMTD and regular lecture methods)

Session	Location	Content	Duration of session
1	Conference room of MS Society	Familiarizing patients with each other, talking about self-care and its importance in controlling disease complications.	One hour
2	Conference room of MS Society	Familiarizing patients with the proper diet in MS and following a healthy diet and limiting certain foods.	One hour
3	Conference room of MS Society	Familiarity with pain management methods and fatigue reduction and muscle relaxation methods.	One hour
4	Conference room of MS Society	Familiarity with methods of improving urinary disorders in patients.	One hour
5	Conference room of MS Society	Familiarity and coping with stress, anxiety and depression.	One hour
6	Conference room of MS Society	Familiarity with exercise in MS disease.	One hour

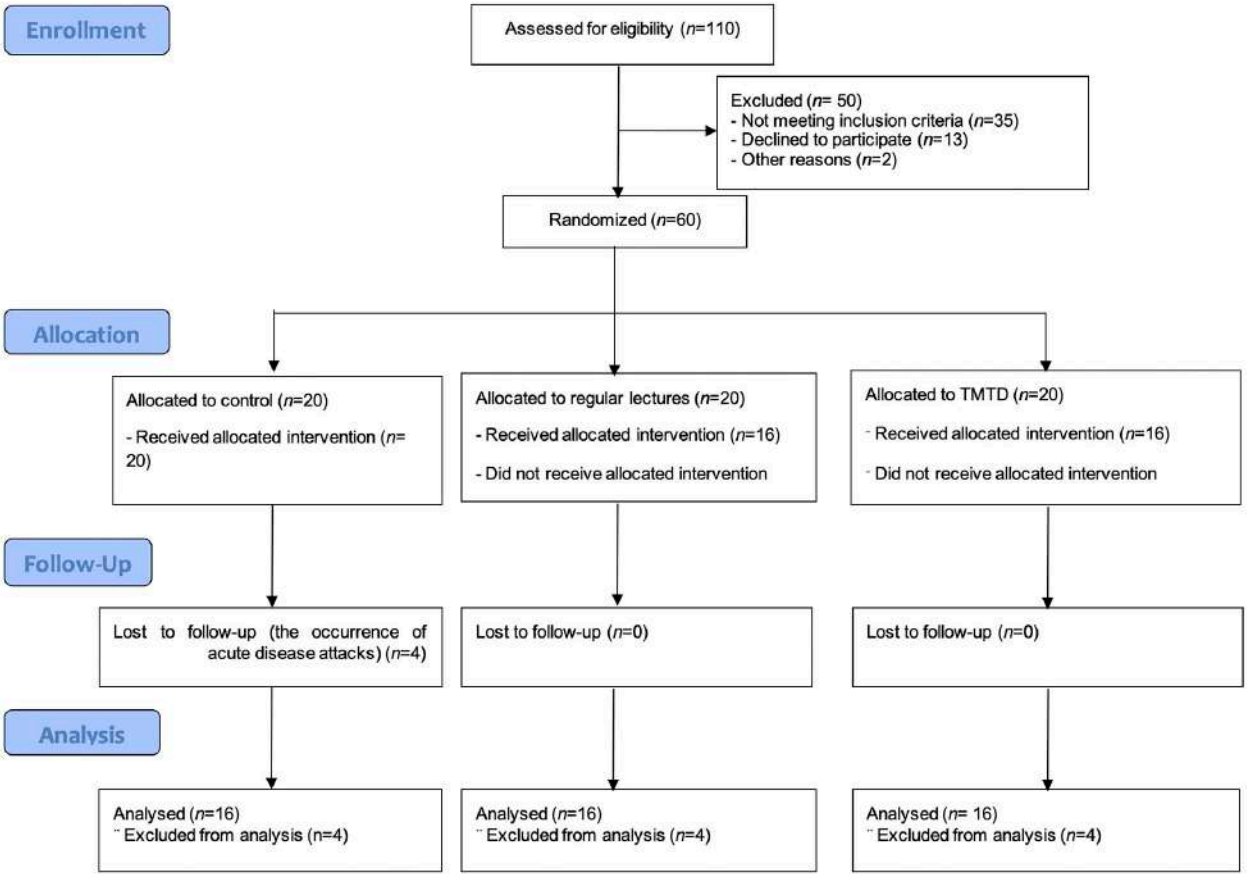

Figure 1. Flow diagram of the study

Results

12 patients (total of 60 patients) were excluded from the study due to reasons such as absence in the training sessions and occurrence of acute disease attacks. Therefore, the findings were analyzed with 16 patients in each group (48 patients in total). The analysis of the findings showed that the patients in the intervention and control groups were identical in terms of demographic variables. The average age of the patients in the TMTD group was 39 ± 12.143, the regular lecture group was 33.12 ± 10.38, and the control group was 38.62 ± 7.46, which had no significant difference. Other demographic characteristics are given in Table 2.

Table 2. Demographic characteristics of MS patients in intervention and control groups

Variable	Group	TMTD		Lecture		Control		*p*-value
		n	%	*n*	%	*n*	%	
Gender	Female	13	81.3	12	75	13	81.3	0.881
	Male	3	18.8	4	25	3	18.8	
Marriage	Single	4	25	3	18.8	4	25	0.889
	Married	12	75	13	81.3	12	75	
Education level	Under diploma	7	43.8	4	25	4	25	0.102
	Diploma	8	50	6	37.5	4	25	
	Upper diploma	1	6.3	6	37.5	8	50	
Job	Housewife	13	81.3	11	68.8	9	56.3	0.521
	Employee	0	0	1	6.3	2	12.5	
	Freelance	3	18.8	4	25	5	31.3	
The frequency of disease recurrence in the past year	No recurrence	6	37.5	7	43.8	8	50	0.281
	One	6	37.5	5	31.3	3	18.8	
	Two	1	6.3	3	18.8	5	31.3	
	More than two	3	18.8	1	6.3	0	0	
Number of hospitalizations in the past year	0	8	50	6	37.5	9	56.3	0.162
	1	1	6.3	5	31.3	3	18.8	
	2	3	18.8	5	31.3	3	18.8	
	≥3	4	25	0	0	1	6.3	
Age (years)		Mean ± SD		Mean ± SD		Mean ± SD		
		39 ± 12.143		33.12 ± 10.38		38.62 ± 7.46		0.216
The experience of disease		9.25 ± 6.64		8 ± 7.54		8.68 ± 5.95		0.554

The results of the Kolmogorov Smirnov test showed that the data in the intervention and control groups had a normal distribution before, immediately and one month after the intervention. Therefore, parametric tests of multivariable analyze of covariance, paired t-test and repeated measurement test were used to analyze the data. The results of the repeated measurements showed that the mean of the self-efficacy and its dimensions in both TMTD and regular lectures methods immediately and one month after the intervention had a significant increase compared to before the intervention, while no such change was observed in the control group (Table 3).

Table 3. Comparison of mean and standard deviation of scores of self-efficacy dimensions in intervention and control groups in three-time stages before, immediately and one month after the intervention

Group Self – efficacy dimensions		TMTD		Lecture		Control		*p*-value
		Mean	SD	Mean	SD	Mean	SD	
Independence and activity	Before intervention	13.12	2.89	13.43	4.61	12.75	2.89	0.08
	Immediately after the intervention	15.93	2.01	14.68	3.64	12.5	2.70	0.04
	One month after the intervention	16.25	1.43	15	3.28	12.37	2.80	0.001
	p-value**	0.001		0.02		0.12		-
Personal control	Before intervention	10.93	2.59	10.87	2.36	9.68	1.85	0.1
	Immediately after the intervention	12.43	2.09	11.43	2.12	9.12	1.96	0.02
	One month after the intervention	13.18	0.83	11.87	1.62	8.87	1.40	0.002
	p-value**	0.01		0.002		0.08		-
Concerns and interests	Before intervention	13	3.84	14	3.89	13.62	3.68	0.12
	Immediately after the intervention	16.37	2.18	15.06	3.27	13.37	3.66	0.001
	One month after the intervention	16.43	1.86	15.43	3.40	13.37	3.68	0.002
	p-value**	0.002		0.02		0.11		-
Overall self-efficacy score	Before intervention	37.06	6.77	38.31	10.37	36.06	6.87	0.06
	Immediately after the intervention	44.75	4.10	41.18	8.35	35	6.19	0.01
	One month after the intervention	45.87	2.68	42.3	7.34	34.62	5.71	0.002
	p-value**	0.001		0.002		0.102		-

*Multivariable Analyze of covariance, **Repeated measures analysis

A comparison of the changes in the intervention and control groups in the self-efficacy variable showed that there is a significant difference between the change trend of the control group and TMTD. There is a significant difference between the change trend of the control group and the lecture group. Also, there is a significant difference between the change trend of lecture groups and TMTD. Examining the difference between the mean scores before and after the intervention of intervention groups, TMTD and lectures with the scores of the control group, indicates the effectiveness of self-care training in both teaching methods of TMTD and lectures on patients' self-efficacy. Considering that there is a significant difference between the intervention groups of TMTD and lectures; therefore, the superiority of self-care training is determined with the TMTD over the lecture method (Table 4).

Table 4. Comparison of changes in self-efficacy variable among groups

Variables	Compared groups	Average difference	Standard error	p-value
Self - efficacy	Control-TMTD	-10.275	1.40	0.001
	Control - Lecture	-5.621	1.44	0.001
	Lecture - TMTD	4.65	1.44	0.002

Discussion

In this research, a comparative study of the effect of self-care training based on the TMTD and lectures on the self-efficacy of MS patients was done. The trend of changes in the mean of self-efficacy before, immediately and one month after the intervention showed that the mean of self-efficacy in the TMTD and lectures were significant in a positive direction. The significance of the trend of changes in the TMTD and lectures indicates the continuation of self-care training during the period of one month and it shows that the effects of training have not disappeared with the passage of time, but with the follow-up and implementation of training in the activities and daily life of the patients, self-efficacy has been improved within a month after the completion of the training sessions. The studies of Maslakpak and Raiesi,[25] Daniali *et al*.[26] Boosman *et al*.[27] and Jongen *et al.*[28] confirm the findings of the present study.

The results of Maslakpak and Raiesi study showed that the implementation of self-management program along with regular follow-up has increased self-efficacy in MS patients.[25] Part of the self-management program used in this study, such as diet, stress and anxiety control, and physical activity, is consistent with the educational programs of the present study. The results of Jongen *et al*.[28] showed that six months after a wellness program, MS patients with a relapse or low disability may experience improved self-efficacy and higher health-related quality of life. Therefore, with the patient's participation in self-care and supporting the patient in the implementation of health plans in the follow-ups carried out by the nurse and other health professionals, the patient can be helped to achieve independence and personal control.

Also, the findings of this study showed that the TMTD had a more significant effect on the self-efficacy of MS patients compared to the lecture

method. The results of the study by Borzou *et al.*[29] about the comparison of individual and peer training on the quality of life of patients with heart failure showed that both training methods lead to an increase in the quality of life, but the effect of peer education is greater in the long term. The results of the study by Dehghani also showed that the lecture method and peer education both lead to the improvement of health literacy in MS patients. However, peer education compared to lectures has a more significant effect on the health literacy of MS patients,[30] which is in line with the findings of the present study. In both methods of peer education and TMTD, there are common aspects such as patient participation in learning, provision of education by patients themselves to group members. In the study of Borzou *et al.*[29] the results regarding the comparison of peer education with the face-to-face individual education showed that in individual education such as lecture method, the patient has a passive role in the learning process. In this regard, the results of Sharifzade study showed that the TMTD can effectively increase learning compared to the usual lecture method which is consistent with the findings of the present study.[19]

The results of a study conducted by Hassanzadeh *et al.*[31] showed that the use of cooperative methods is more effective than passive and traditional teaching methods such as lectures. The results of Rahimian *et al.*[32] Also showed that two months after the educational intervention, the mean of self-efficacy and its areas in the peer education group was higher than the lecture group. Considering the similarity of the peer education method with TMTD and also the chronicity of the disease of the participants in Rahimian *et al.* [32] and the current research, perhaps the participation of patients in the method of peer education and TMTD compared to lectures has led to improved self-efficacy and self-care in patients.

According to the findings of the study, it is possible to familiarize nurses with the self-care training program in a team form by using methods such as holding a workshop and use team training methods in the subject of patient education, especially chronic diseases. On the other hand, the main goal in clinical nursing is to provide services to patients and help them improve, and education plays a significant role in this field. Therefore, it is possible to use the team training approach that leads to simple and reliable learning and increase the motivation and improvement of health behaviors of patients, as a valuable tool to improve, treat and control the physical and mental complications of patients in medical centers. Also, due to the shortage of nursing staff, the lack of time of nurses to provide care, patients' acceptance of learning through team teaching methods, and entrusting the process of education to patients with chronic diseases, it is possible to help them learn better by teaching team methods.[18,33]

The above studies showed that the educational programs proposed by the TMTD and cooperative education can more effectively encourage people to selection of appropriate health behaviors. [18,33,34] Also, these findings can be due to the fact that in the TMTD, patients belong to the same social group and people believe that they are of similar ability, so it can have a more important effect on learning. Another reason for the findings of the present study could be the different teaching methods in the two intervention groups. For example, in the TMTD, there are more group discussions, question and answer, and interpersonal interactions. While in the other intervention group, only the lecture method was used. Therefore, the learning is higher in patient-centered educational methods such as the TMTD compared to lectures, which is one of the advantages of active and patient-centered educational methods compared to traditional teaching methods such as lectures. [35] The drop in the number of samples present in the intervention and control groups, short-term follow-up after the intervention, differences in the personality characteristics and culture of the patients in accepting educational content are among the limitations of the present study.

Conclusion. The results of this study showed that the TMTD can increase self-efficacy among MS patients. Also, the findings of this study showed that the TMTD has a more significant role in improving the self-efficacy of MS patients compared to lectures. Therefore, the TMTD can be used as a beneficial educational-supportive method for MS patients.

Availability of data and material. Data is not and will not be made available elsewhere. Further data set could be obtained on request if required through corresponding author with email: ali.dehghani2000@ gmail.com.

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Educational technology to promote self-efficacy in newborn care: a validation study

Original article

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Educational technology to promote self-efficacy in newborn care: a validation study

Abstract

Objective. To build and validate an educational technology consisting of a flipchart to promote self-efficacy in newborn care. **Methods.** A methodological study was carried out in two stages: (i) creation of the flipchart and (ii) validation by 25 experts and 50 people who could be the target audience (pregnant women, mothers or family members of newborns). Clarity, language, practical relevance and theoretical relevance were reviewed using the Suitability Assessment of Materials (SAM) instrument. The Content Validity Index and the Flesch Readability Index were calculated. **Results.** The serial album "Can you take care of your baby" consists of 30 pages. The overall Content Validity Index was 0.93 among experts and 1.0 among the target audience. The flipchart was considered superior quality material, reaching an agreement percentage of 94.9, indicating that it is suitable as an educational technology. Participants suggested adjustments, incorporated into the material for printed production. **Conclusions.** The flipchart developed and with content validated by experts is suitable for use in health education activities that aim to promote self-efficacy in caring for newborns.

Descriptors: educational technology; validation study; newborn; health education; nursing.

Tecnología educativa para promover la autoeficacia en los cuidados neonatales: un estudio de validación

Resumen

Objetivo. Construir y validar una tecnología educativa consistente en un rotafolio para promover la autoeficacia en el cuidado del recién nacido. **Métodos.** Se realizó un estudio metodológico en dos etapas: (i) creación del rotafolio y (ii) validación por parte de 25 expertos y 50 personas que podrían ser el público objetivo (mujeres embarazadas, madres o familiares de recién nacidos). La claridad, el lenguaje, la relevancia práctica y la relevancia teórica se revisaron utilizando el instrumento de Evaluación de idoneidad de materiales (SAM). Se calcularon el Índice de Validez de Contenido y el Índice de Legibilidad de Flesch. **Resultados.** El rotafolio "¿Puedes

cuidar a tu bebé?" tuvo un Índice de Validez de Contenido general de 0.93 entre los expertos y de 1.0 entre el público objetivo. Este rotafolio fue considerado como material educativo de calidad superior, alcanzando un porcentaje de acuerdo de 94.9%, indicando que es apto como tecnología educativa. Los participantes sugirieron ajustes que fueron, incorporados al material para la producción impresa. **Conclusiones.** El rotafolio desarrollado y con contenido validado por expertos es apto para su uso en actividades de educación en salud que tengan como objetivo promover la autoeficacia en el cuidado del recién nacido.

Descriptores: tecnologia educacional; estudios de validación; recién nacido; educación para la salud; enfermería.

Tecnologia educacional para promover a autoeficácia em cuidados neonatais: um estudo de validação

Resumo

Introdução. Construir e validar uma tecnologia educativa composta por álbum seriado para promover a autoeficácia no cuidado ao recém-nascido. **Métodos.** Foi realizado um estudo metodológico em duas etapas: (i) criação do álbum seriado e (ii) validação por 25 especialistas e 50 pessoas que poderiam ser o público-alvo (gestantes, mães ou familiares de recém-nascidos). A clareza, a linguagem, a relevância prática e a relevância teórica foram revisadas por meio do instrumento Suitability Assessment of Materials (SAM). Foram calculados o Índice de Validade de Conteúdo e o Índice de Legibilidade de Flesch. **Resultados.** O álbum seriado "Você consegue cuidar do seu bebê" consiste em 30 páginas. O Índice de Validade de Conteúdo geral foi de 0.93 entre os especialistas e de 1.0 entre o público-alvo. O álbum seriado foi considerado um material de qualidade superior, atingindo percentual de concordância de 94.9, indicando que é adequado como tecnologia educativa. Os participantes sugeriram ajustes, incorporados ao material para a produção impressa. **Conclusões.** O álbum seriado desenvolvido e com conteúdo validado por especialistas é adequado para utilização em atividades de educação em saúde que visam promover a autoeficácia no cuidado ao recém-nascido.

Descritores: tecnologia educacional; estudos de validação; recém-nascido; educação em saúde; enfermagem.

Introduction

In 2022, the neonatal mortality rate in Brazil reached the mark of 8600 live births. Despite this, there are inequalities in the trends of preventable neonatal mortality rates in the Brazilian states, so they remain higher in the North and Northeast regions, demonstrating the need to improve access and quality of maternal and child health care.[1] Educational interventions prioritizing improvements in care for the neonatal public, such as printed educational technologies, are necessary. The development of this type of technology allows contacting the patient dynamically and attractively, capable of awakening the patient's attention to important situations, stimulating discussions, resolving doubts, recognizing risks, and establishing achievable goals.[2]

Album-type printed technologies developed with methodological rigor, and well-formulated content can raise user awareness, encourage self-care, and improve the quality of clinical care, especially in primary health care.[3,4] A participatory, communicative, and collective approach is necessary for creating any educational material.[5] Thus, this type of technology allows for greater integrity between the educator and learner and can enhance health education carried out by professionals.[6] Health professionals who use this type of technology can direct the sequence of exposition of the script, resume any information already presented, and mark the most important points in the script sheets. Besides, flipcharts are a portable alternative that can be used in different healthcare settings.[6]

In the context of newborn care, mothers, fathers, and family members generally feel insecure and unprepared when the newborn arrives home.[7] To this end, incorporating the concept of self-efficacy in educational interventions and technologies raises the individuals' beliefs about their abilities to successfully carry out the intended actions.[8] High levels of self-efficacy can help in promoting health and therapeutic adherence, leading to better clinical results, reducing processes of exacerbation or aggravation, and demonstrating benefits in the short, medium, and long term for the patient, the family, and the health system, even in the face of adverse conditions.[9] As a technology applied by health professionals, the flipchart encourages interaction between the professional and the target audience, helping to exchange knowledge and strengthen relationships. For reliable use, such educational materials must be submitted to a rigorous validation process by researchers, health professionals, and the target audience. The objective of this study was to build and validate an educational technology consisting of a flipchart to promote self-efficacy in newborn care.

Methods

A methodological study was conducted in two stages: (i) the creation of the flipchart and (ii) content and appearance validation by experts and target audiences. The construction and validation stage took place from October 2020 to February 2022, in municipalities of the state of Ceará, Brazil. The study was described according to the SQUIRE 2.0 (Equator Network) guidelines. Once constructed, the flipchart was validated by a committee composed of an expert in neonatal health, child health, family/community/public health, and technical experts. All experts met at least two requirements: having knowledge/skills acquired through experience and special knowledge/skills in a certain type of study on the subject.[10]

The sample size was defined using a formula that considers the final proportion of experts concerning a dichotomous variable and the maximum acceptable difference in this proportion: $n = Z\alpha^2.P.(1-P)/d^2$, where Zα refers to the confidence level (95%), P is the minimum proportion of individuals who agree with the pertinence of the items (85%), and d is the difference in proportion considered acceptable (5%).[11] The final calculation resulted in a sample of 22 experts; however, it is noteworthy that an odd number of experts is essential to avoid ties.[12] A larger number of experts was recruited to avoid losses, and 25 experts participated in the study and returned the instruments.

The validation step was conducted with a convenience sample whose size respected the recommendation of recruiting 25 to 50 subjects to validate technologies/instruments.[13] Thus, 50 pregnant women, mothers, and family members participated. The following inclusion criteria were adopted: being a pregnant woman, a recent mother or a father of a child aged up to 28 days, or a close relative (such as the child's grandmother or aunt/uncle). Participants with difficulty understanding were excluded, as pregnant women, mothers, and relatives of premature newborns, since the flipchart addresses caring routines for full-term newborns.

During the development of the flipchart, a literature review was conducted in October 2020 in Cumulative Index to Nursing and Allied Health Literature (CINAHL), US National Library of Medicine (PubMed), Web of Science, and Latin American and Caribbean Literature in Health Sciences (LILACS) databases. The following guiding question was established: What are the main nursing practices in newborn health care? For this purpose, the descriptors "newborn", "health education", and "nursing" were used combined by the Boolean operator "AND". Thirty-eight studies were selected that addressed themes related to the care provided to the newborn, namely: breastfeeding, sleep, colic management, pain control, sunbathing, immunization, neonatal screening, umbilical stump care, hygiene, interpersonal bonding, and identification of alarm signals.

A professional designer was hired to elaborate the flipchart's figures and layout using the Adobe InDesign image editing software. As the illustrations were initially made in paper drawings, the researchers approved or suggested changes to improve clarity and representativeness so that the illustrator could transfer the figures to Adobe InDesign. It should be noted that the flipchart was built based on validated technologies, namely: the Self-efficacy Scale for the Promotion of Care to Term Newborns (SSPCTN)[14] and the educational video entitled "Taking care of your baby".[15]

The recruitment of experts for the content validation stage was done through the Lattes Platform of the Brazilian National Council for Scientific and Technological Development (CNPq). The experts who met the eligibility criteria received an invitation letter by e-mail explaining the purpose of the research, together with a request to indicate other specialists who met the selection criteria (snowball technique). Thirty-nine experts were invited, 25 returned

the e-mail, 11 were teaching experts, 11 were assistant experts, and 3 were technical experts. Data collection took place using the Google Forms tool, via e-mail, with the following documents: ICF, a questionnaire for the characterization of the experts, including academic and professional data, an instrument assessing the appearance and content of figures and script sheets, and the first version of the flipchart.

The validation instrument was a Likert-type scale with five points, ranging from "poor" to "excellent", allowing the assessment of the images and script sheets based on the following criteria: clarity of language, practical relevance, and theoretical relevance. In addition, there was a space for the experts' suggestions. The instrument used for the evaluation was the Suitability Assessment of Materials (SAM), which contained variables on the following domains: content, appropriate language for the population, graphic illustrations, lists, tables and graphs, layout and typography, stimulation for learning, and motivation, and cultural adequacy.[16] SAM scores are evaluated as "superior", meaning 2 points; "adequate" 1 point; and "inadequate", 0 points, according to objective criteria included in the instrument that enable both the calculation of the average values and the analysis percentage.The SAM questionnaire rates "superior" materials as those that reach a final score of 70% to 100%. Scores from 40% to 69% indicate an "adequate" material, and scores from 0% to 39% indicate an "inadequate" material.[16]

An analysis was performed using Microsoft OfficeWord version 2010 to the interpretation of the values obtained with the Readability Index, considering the following assumptions: 75 – 100% (very easy), 50 - 75% (easy), 25 – 50% (difficult), and 0 – 25% (very difficult).[17] The participants' responses regarding clarity and relevance were used for appearance validation, considering the cut-off agreement of 75%.[18] The deadline for returning the instruments was 30 days.

After validation and evaluation of the flipchart, all suggestions were analyzed, and a new contact was made with the technical professional responsible for the illustration and layout so that modifications and adjustments could be made according to the experts' recommendations. In addition, some texts were modified according to the experts' suggestions, and then the Flesch Readability Index was applied to assess the text's reading level. This analysis considers that adequate instruments should present a value equal to or greater than 40% concerning the total scores.[17]

After improving the images and texts, the target audience individually validated and evaluated the flipchart. Data collection for this stage consisted of applying the ICF, applying the flipchart and, subsequently, answering a questionnaire consisting of four parts: 1) sociodemographic characterization; 2) evaluation of the domains of the adapted questionnaire by Doak, Doak, and Root (organization, understanding, attractiveness, self-efficacy, cultural acceptability, and persuasion);[16] 3) Individual assessment of each image in the flipchart, using a checklist to assess clarity, relevance, and degree of relevance; and 4) Additional suggestions regarding the flipchart.

The data obtained were organized, processed, and analyzed using the Statistical Package for the Social Sciences (SPSS) version 20.0 and the R software. The Content Validity Index (CVI) was used to analyze the content validity. It is recommended that the CVI adopted as valid be equal to or greater than 0.80 and that values greater than 0.90 ensure excellence in content validity.[19] In the present study, an agreement of 80% was adopted among the participants.[20] The study was approved by the Research Ethics Committee (CAAE: 29622220.4.0000.5576). All research participants signed the Informed Consent Form, after being verbally informed about the objectives and procedures of the study.

Results

The first version of the flipchart entitled "You are capable of taking care of your baby" contained 28 pages and was divided into 12 themes: (1) Sleep, (2) Bath, (3) Changing diapers, (4) Umbilical stump hygiene, (5) Cloth hygiene, (6) Immunization, (7) Sunbathing, (8) Breastfeeding, (9) Cramps, (10) Heel-stick test, (11) Warning signs, and (12) Choking. Regarding the content of the material, it was considered that the family context is usually composed of a mother, a father, a grandmother, and the newborn, in addition to the nurse, an important actor who helps with doubts related to the care of the newborn. It was decided to include other family members, such as the child's father and grandmother, to show that care should and can be performed by all family members, not just the mother.

In addition, we sought to use simple and direct language in the care guidelines described in each script sheet, bringing the illustrations closer to the cultural reality of the target audience. Thus, based on the subject description, the readability test was applied in 39 (100%) paragraphs/sentences from the flipchart. Of these, 11 (28.2%) were considered "very easy", 20 (51.3%) were considered "easy", 6 (15.4%) were considered "difficult," and 3 (7.7%) were considered "very difficult". Regarding the classification by theme, of the 12 themes, 10 obtained an "easy" classification, and 2 obtained a "difficult" classification, namely, '9/ colic' and '11/warning signs'. In the analysis of the complete flipchart, the test revealed an index of 60.4%, classifying the material as easy to read and understand.

The first version was validated by 25 experts divided into 3 categories: 11 professors, 11 assistants, and 3 technicians. All professor experts were female, with academic training in nursing (90.9%), specialization training (45.5%), master's degree (90.1%), or doctoral degree (81.8%). Concerning care experts, all were female, with academic training in nursing (90.9%), and two had completed specializations training (78.2%). As for the technical experts, 66.7% were female, with an average of four years of experience producing educational materials. The CVI of each page was calculated considering the clarity of the language, the practical pertinence, and theoretical relevance, and, subsequently, the overall CVI (Table 1).

Table 1. Distribution of the CVI of each page, according to the analysis of the content experts

Page/Subject	Clarity of language	Practical relevance	Theoretical relevance
Front cover	0.90	0.90	0.91
Page 5/ Sleep	0.90	0.94	0.94
Page 7 Bath	0.86	0.90	0.92
Page 9/ Changing diapers	0.92	0.96	0.96
Page 11/ Umbilical stump hygiene	0.93	0.98	0.95
Page 13/ Cloth hygiene	0.93	0.91	0.92
Page 15/ Immunization	0.84	0.96	0.93
Page 17/ Sunbathing	0.92	0.94	0.93
Page 19/ Breastfeeding	0.95	0.95	0.97
Page 21/ Cramps	0.92	0.92	0.93
Page 23/ Heel-stick test	0.95	0.95	0.94
Page 25/ Warning signs	0.90	0.91	0.92
Page 27/ Choking	0.90	0.96	0.97
Global CVI	0.91	0.94	0.94

As for language clarity, all pages had a CVI greater than or equal to 0.84. Concerning practical pertinence

and theoretical relevance, all pages had a CVI greater than or equal to 0.90. The three categories obtained a total above 0.90, and the global CVI was 0.93, indicating an excellent level of approval and agreement. The experts also evaluated the flipchart using the SAM instrument. The flipchart was considered a superior quality material, reaching a percentage of agreement of 94.9. (Table 2).

Table 2. Flipchart evaluation by content and technical of 25 experts

Domains	Superior n (%)	Adequate n (%)	Inadequate n (%)	Total Agreement (%)
Content				
The purpose is evident	25 (100)	0	0	100
The content addresses behaviors	24 (96)	1 (4)	0	98
The proposal is limited	24 (96)	1 (4)	0	98
Summary or review	22 (88)	3 (12)	0	94
Appropriate language for the population				
Reading level	15 (60)	7 (28)	3 (12)	74
Active voice style	16 (54)	8 (32)	1 (4)	80
Use of common words	21 (84)	3 (12)	1 (4)	90
First, the context	23 (92)	1 (4)	1 (3)	94
Advanced sign-mediated learning	24 (96)	1 (4)	0	98
Graphic illustrations, lists, and tables				
Front cover	22 (88)	3 (6)	0	94
Type of illustration	24 (96)	1 (4)	0	98
Relevance of lustrations	22 (88)	3 (12)	0	94
Lists, tables, charts, and shapes	25 (100)	0	0	
Captions	23 (92)	2 (8)	0	96
Layout and typography				
Layout factors	24 (96)	1 (4)	0	98
Typography	22 (88)	3 (12)	0	94
Subtitles	25 (100)	0	0	100
Stimulation for learning and motivation				
Interaction is included in the text and/or figures	24 (96)	1 (4)	0	98
Desired behavior patterns are modeled or shown through specific terms	24 (96)	1 (4)	0	98
Motivation/self-efficacy	25 (100)	0	0	100
Cultural adequacy				
Cultural game – logic, language, and experience (LLE)	24 (96)	1 (4)	0	98
Cultural image and examples	22 (88)	3 (12)	0	94
Total	**500 (90.9)**	**44 (8)**	**6 (1.1)**	**94.9**

The experts validated the flipchart, and with the adjustments already made, the second version of the flipchart was evaluated by the target audience represented by pregnant women, puerperal women, and family members attending primary healthcare centers in the municipalities of Redenção, Acarape, and Canindé. These participants had an average age of 27 years; most of them lived with a partner (70%) and had completed high school (68%). The target audience assessed the relevance of the appearance of the pictures on each page of the flipchart.The material presented a global CVI of 1.0, indicating a high level of agreement among the participants. In addition, the participants evaluated the domains of organization, understanding, attractiveness, and cultural acceptability positively and satisfactorily. All participants (n=50;100%) agreed that: (i) The cover presents the flipchart's subject and is attractive, (ii) The colors are adequate, and the figures help to understand the subject, and (iii) The flipchart addresses the actions to be conducted and feel like talking about the topic. Finally, the participants did not find any part of the material bad or aggressive.

Most participants reported not knowing all the care actions necessary for newborn care (64%). However, all were predisposed and believed that they could follow the guidelines and would inform other people about the care for the newborn, as shown in the album, attesting to the power of self-efficacy and persuasiveness of the material. Finally, the target audience's suggestions were accepted, and the final version of the flipchart was created, including a picture and a script sheet on the aspects of the newborn's feces. Thus, the final version of the flipchart entitled "You are capable of taking care of your baby" consisted of 30 pages, including a cover, presentation, technical sheet (informing that the material was created by a master's student, a supervisor, and a graphic designer), 26 figures with the respective script sheets for the 13 subjects, and acknowledgments (Figure 1). The material is accessible through the following address: https://drive.google.com/file/d/1rUY_c7IQoZgvhvgjwmhzhIMgtYgYar1N/view?usp=sharing

Figure 1. Illustrations from the flipchart "You are capable of taking care of your baby"

Discussion

The validation of the flipchart's content resulted in a high CVI, with an excellent level of agreement among the experts, indicating that the flipchart is representative of the proposed content (newborn care). Validating educational technologies with experts is a relevant step, as the expertise of these professionals is taken into consideration through their opinions and comments, ensuring that the materials have adequate information. [21] It is important to consider both the judgment of academic researchers and the expertise of professionals working in the healthcare field.

Throughout the content validation, most experts judged the album's language and illustrations as appropriate and easy to understand. These two elements are fundamental to ensure that audiences with different levels of education will be able to understand and assimilate the content. [22]

Regarding the SAM score, it was observed that the flipchart achieved a score higher than the established cut-off, demonstrating the agreement of the experts. Although the material was well evaluated, the experts' observations and recommendations helped reformulate some textual information, modify illustrations, and

revise and replace words. These changes were essential to improve the quality of the educational material. The scientific reliability of the information passed on is important. Besides, the constructed material must be easier for the target audience to understand.[23]

Validating the appearance of educational materials with individuals who experience or have experienced the theme addressed is an important activity since they are the focus of the activity to be conducted.[21] In this study, the flipchart was positively evaluated by the target audience concerning clarity, language, and relevance, corroborating the advantages of using educational materials validated by the population, including enhanced interactivity, attractiveness, use of appropriate language, and provision of relevant and contextualized activities, allowing the exchange of experiences and presenting quality information.[24] Given the above, there was a concern about making the suggested adjustments to achieve an understanding of the illustrations and the subjects addressed in the flipchart. One of the participants' suggestions was about diarrhea. Therefore, a figure and script sheet was added addressing the aspect of the feces of the newborn. The recommendation was considered as the presence of liquid stools several times a day in an infant can lead the mother or caregiver to think that he or she has diarrhea.The importance of using educational materials to prevent problems is evident since most participants reported not knowing all the precautions covered in the flipchart. There were reports that "drying clothes in the sun would cause illnesses", a lack of knowledge about the pathologies that the heel-stick identifies, and using teas with onions and herbs to clean the umbilical stump. Therefore, it is possible to verify that the flipchart has relevant content, easy language, and illustrations that facilitate understanding, promoting self-efficacy. Thus, it is hoped that after reading the flipchart, people will feel able to follow the information and provide care for their newborns.

No participant reported being offended or seeing anything aggressive in the album. In view of this, it is important to highlight the identification of facilitators and hindrances (social, cultural and epidemiological) so that educational strategies can be implemented aimed at the person's reality, with the outlining and reframing of new modes of care.[25] Therefore, a technology such as a flipchart is a very interesting visual resource that can be used in different situations, such as health educational activities, respecting the cultural context in which the participants live.

Regarding the self-efficacy of the educational material, the participants stated that they intended to follow the guidelines presented in the album, and that if they had to inform another woman how to carry out the care, they would inform as shown. This confirms the fact that the serial album was constructed and applied following the four sources of self-efficacy, which play a role in the origin and development of self-efficacy beliefs, they are: experience of success; vicarious or modeling experience; verbal persuasion; and physiological states.[8]

In this sense, the serial album presents itself as a health promotion instrument that facilitates educational process. To this end, its purpose is to guide the dialogue between the health professional and individuals, as it allows cooperation between those involved in the knowledge construction process. Therefore, this resource, with its easy language and presence of images associated with the experience, provides an increase in understanding of the content presented.[22] Furthermore, educational materials such as flipcharts must provide interactivity, be attractive, have language appropriate to the target audience, provide relevant and contextualized activities, allow the exchange of experiences and present quality information.[24]

As a conclusion of the study, the flipchart "You are capable of taking care of your baby" was considered adequate regarding content and appearance,

promoting the self-efficacy of pregnant women, puerperal women, and family members for newborn care. The flipchart achieved a global CVI equal to 0.93 among the experts and 1.0 among the target audience. The flipchart was considered superior based on the final SAM score of 94.9%. The album is relevant as it is an educational resource for health education activities, providing clear information that ensures the assimilation of knowledge and decision-making by families about the most appropriate newborn care practices.

The flipchart can be used by health professionals, especially nurses carrying out educational interventions to promote self-efficacy in full-term newborn care. This educational technology is expected to be widely disseminated and used by nurses to empower the family for newborn care. As a limitation of the study, it is pointed out that the material was evaluated only by the target audience assisted in the public health network, which may differ from the reality of private institutions. However, it is believed that the flipchart will also be comprehensible for individuals with higher education, as it contains clear information and a good assessment of the degree of readability. In addition, the results may also differ from the reality of other Brazilian states.

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Advancement in knowledge and skills of nursing students in operation theatre procedures with mobile based learning

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Advancement in knowledge and skills of nursing students in operation theatre procedures with mobile based learning

Abstract

Objective. To evaluate the effectiveness of mobile -based learning (MBL) in improving nursing students' knowledge and skills when performing procedures in the operating room. **Methods.** A quasi-experimental study with control group, pre- and post-intervention assessment was conducted. A total of 128 nursing students from India were recruited by purposive sampling and randomly assigned to the intervention (use of a telephone application containing videos on hand washing, surgical gown donning, gloving, and assisting during intubation) and conventional education groups. A validated Structured Knowledge Questionnaire and an Objective Structured Clinical Examination (OSCE) scale was used to assess nursing students' competencies in relation to operating room procedures and a mobile-based learning satisfaction opinion questionnaire was

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administered. **Results.** The findings showed that the improvement in the mean knowledge and skills score was greater in the intervention group than in the control group ($p<0.001$). The administration of the MBL was rated as highly satisfactory by 93.8% of the students exposed to this learning method. **Conclusion.** The MBL intervention was effective in improving nursing students' knowledge and skills in the evaluated operating room procedures.

Descriptors: learning; knowledge; clinical competence; smartphone; operating rooms; students, nursing.

Mejoramiento de los conocimientos y habilidades de los estudiantes de enfermería en los procedimientos de quirófano con el aprendizaje basado en dispositivos móviles

Resumen

Objetivo. Evaluar la eficacia del aprendizaje basado en dispositivos móviles (MBL) para mejorar los conocimientos y habilidades de los estudiantes de enfermería a la hora de realizar procedimientos en el quirófano**. Método.** Se realizó un estudio cuasiexperimental con grupo de control y evaluación previa y posterior a la intervención. Un total de 128 estudiantes de enfermería de la India fueron reclutados mediante muestreo intencional y asignados aleatoriamente a los grupos de intervención (uso de una aplicación telefónica que contenía vídeos sobre el lavado de manos, la colocación de la bata quirúrgica, la colocación de guantes y la asistencia durante la intubación) y de educación convencional. Se utilizó un cuestionario validado de conocimientos estructurados y una escala de examen clínico estructurado objetivo (OSCE) para evaluar las competencias de los estudiantes de enfermería en relación con los procedimientos de quirófano, y se administró un cuestionario de opinión sobre la satisfacción del aprendizaje basado en el móvil. **Resultados.** Los resultados mostraron que la mejora en la puntuación media de conocimientos y habilidades fue mayor en el grupo de intervención que en el grupo de control ($p<0.001$). La administración del MBL fue calificada como altamente satisfactoria por el 93.8% de los estudiantes expuestos a este método de aprendizaje. **Conclusión.** La intervención

MBL fue eficaz para mejorar los conocimientos y habilidades de los estudiantes de enfermería en los procedimientos de quirófano evaluados.

Descriptores: aprendizaje; conocimiento; competencia clínica; teléfono inteligente; quirófanos; estudiantes de enfermería.

Melhorar o conhecimento e as habilidades dos estudantes de enfermagem em procedimentos de sala de cirurgia com aprendizagem baseada em dispositivos móveis

Resumo

Objetivo. Avaliar a eficácia da aprendizagem baseada em dispositivos móveis (MBL) na melhoria do conhecimento e das habilidades dos estudantes de enfermagem ao realizar procedimentos na sala de cirurgia. **Métodos.** Foi realizado um estudo quase experimental com grupo controle, com avaliação antes e após a intervenção. 128 estudantes de enfermagem de Ambala (Índia) foram recrutados por amostragem proposital e distribuídos aleatoriamente nos grupos de intervenção (uso de um aplicativo telefônico que continha vídeos sobre: lavagem das mãos, como colocar a bata cirúrgica, luvas e assistência durante a intubação) e educação convencional. A escala OSCE (*Objective Structured Clinical Examination*, em inglês) foi utilizada para avaliar as competências dos estudantes de enfermagem em relação aos procedimentos do centro cirúrgico e foi aplicado um questionário de opinião sobre a satisfação de aprender com base em dispositivos móveis. **Resultados.** Os resultados mostraram que a melhoria na pontuação média de conhecimentos e habilidades foi maior no grupo de intervenção do que no grupo de controle ($p<0.001$). A aplicação do MBL foi avaliada como altamente satisfatória por 93.8% dos alunos expostos a esse método de aprendizagem. **Conclusão.** A intervenção baseada no MBL foi eficaz na melhoria do conhecimento e das habilidades dos estudantes de enfermagem nos procedimentos avaliados na sala de cirurgia.

Descritores: aprendizagem; conhecimento; competência clínica; smartphone; salas cirúrgicas; estudantes de enfermagem.

Introduction

The significance of clinical nursing practice is on par with that of theoretical nursing education. In recent years, there has been a development of various nursing practice contents aimed at providing nursing students with indirect exposure to clinical situations.[1] Mobile-based learning is anticipated to have a significant impact on collaborative learning due to its widespread appeal. The ubiquity of mobile phones has facilitated seamless connectivity among users, hence fostering interactive learning experiences. The utilization of educational technology, such as Mobile Based Learning, is widely acknowledged as a means to enhance theoretical knowledge and foster skill development.[2] The operation theatre complex is considered the key component of any significant surgical facility, where various procedures and surgeries are performed. In the United Kingdom, operation theatres were named so because they historically featured semi-circular amphitheaters that enabled students to observe medical and nursing procedures.[3]

The specialized operating room nursing officer is commonly acknowledged as the sole healthcare professional possessing the requisite expertise to oversee asepsis, instruments, infections, complications, as well as the control and management of biological specimens in the context of surgical procedures. In order to provide nursing care during surgical procedures in the operating theatre, operation theatre nurses must possess specialized knowledge and skills. The competence of operating theatre nurses is essential to guarantee patient safety during surgical procedures.[4] The nurses working in the operation theatre complex (as a scrub/ circulating nurse) are required to perform four essential technical competencies, including gowning and gloving, setting up instruments prior to surgery, ensuring that the patient is draped appropriately, and that sterility is well maintained in the sterilized area throughout the procedure.[5] The surgical and anesthetic team members involved in a perioperative intervention or procedure perform these procedures. Scrubbing, donning a gown, and donning gloves should occur immediately after surgical hand antisepsis. The application of antiseptic hand wash prior to donning sterile garments before a surgical procedure is referred to as surgical hand antisepsis.[6]

According to estimates, a significant number of individuals, ranging from 4.5 to 5.7 billion, experience SSI annually as a result of inadequate aseptic technique measures in hospitals. A study reported that around 9% of hospital patients in India develop healthcare-associated infections, particularly post-operative infections, leading to an estimated 5,000-15,000 deaths annually. The significance of enhancing the understanding and implementation of aseptic technique among theatre nurses was also suggested.[7] The removal of personal protective equipment (PPE) by healthcare personnel can lead to

contamination of their skin and clothing, which increases the likelihood of infection and the dissemination of pathogens. It has been found that educational interventions have the potential to improve the aseptic technique and the donning and doffing of surgical gown, which can ultimately lead to a reduction in contamination.[8]

Mobile phones are anticipated to have a significant impact on collaborative learning due to their widespread use and ability to keep users connected, leading to increased opportunities for interactive learning. Furthermore, mobile phones possess educational potential in facilitating discussions pertaining to teaching and learning methodologies.[9] Internet prevalence is increasing daily, which increases the potential for online study in a direct or indirect manner.[10] In the age of technology, the educational system is evolving and transforming towards experiential and comprehensive learning aids.[11] Mobile-based education has the potential to offer a self-directed learning environment, particularly to the student nurses, enabling them to access information anytime, anywhere and also practice skills repeatedly, without any constraints of space and time.[12] It also has the potential to offer a non-judgmental learning environment, allowing students to engage in repeated practice sessions without feeling apprehensive about making mistakes.[9] It is possible that nursing students experience stress when acquiring and implementing nursing techniques in a laboratory or medical settings.[13] Additional factors that have been reported to contribute to non-adherence with standard precautions are inadequate comprehension and awareness among healthcare personnel regarding the appropriate usage of protective barriers and insufficient training.[14] Nowadays, technology-enhanced learning, particularly using mobile devices, has the potential to be a valuable tool in educating younger generations.[15]

Although there are procedures for scrubbing, donning a gown, and donning gloves, there appears to be a great deal of deviation among the operating room staff, which may be the result of individual training/ experience, workload, time constraint or lack of reinforcement for adherence to protocols. To maintain standardized operating procedures across the surgical team, continuous research on this topic is necessary.[16] Students are enthusiastic about m-learning interventions in a study on the use of portable electronic gadgets for teaching. M-learning and the web give learners an "open-door policy" to learning resources, allowing them to access these resources from any location and at any time zone, which they can utilize repeatedly.[17] Although there are numerous benefits of utilizing Mobile Based Learning in terms of education, there is a paucity of research on this pedagogical approach, particularly in nursing education, when it comes to teaching skills related to operation theatre. Hence, the objective of this research was to find out how effective is Mobile based learning in augmenting the knowledge and skills of nursing students in performing operation theatre procedures.

Methods

The research employed a Quasi-Experimental design with a non-equivalent control group and pre-test, post-test measurements. The study was carried out at M.M College of Nursing and M.M. Super-specialty Hospital located in Mullana, Ambala, Haryana between 2020-2021. A total of 128 study participants (64 in each group) were recruited using purposive sampling. A power analysis was conducted using the Cohen's d formula based on previous research evidences for intervention studies among nursing students. Since the number of students in both the programs i.e., B.Sc. Nursing and Post Basic B.Sc. Nursing differ, quota sampling was used to ascertain the number of students from both programs in order to increase the representativeness of groups. In addition, the random assignment of nursing students was performed using a computer-generated random number method. On day one, after the pre-assessment of knowledge via google form and skills by OSCE, MBL was introduced

to the experimental group. OSCE was conducted by peer experts after pre-briefing sessions with them and establishing reliability for evaluating the procedures. The researcher assisted the students in installing the application on their mobile devices and demonstrated how to access the application's content and view videos. Any uncertainties or questions were resolved. The experimental set of students had an access to the application for two weeks. (Figure 1) The students in the conventional group received no intervention but were exposed to regular classes and demonstrations regarding OT procedures. Post-test was taken on 15th day after the intervention in both the groups. Satisfaction regarding MBL was assessed using a semantic differential scale shared via google form.

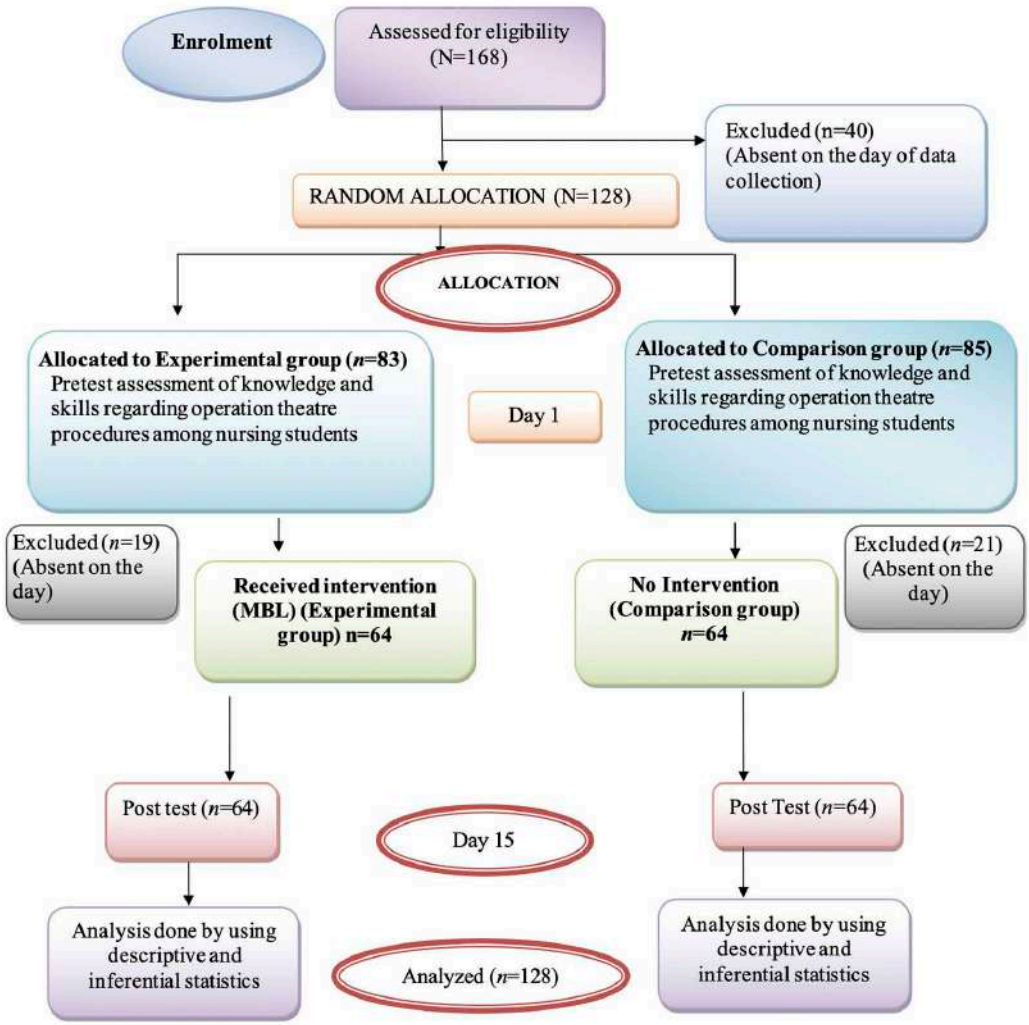

Figure 1. CONSORT diagram for sample selection

Inclusion & Exclusion criteria. The study included those nursing students who were willing to participate, having their own Smartphone and available during data collection. The nursing students who were absent on three consecutive days and those who did not receive the allocated intervention were excluded from the study.

Ethical consideration. To conduct the final investigation, ethical approval was obtained from the Institutional Ethical Committee (IEC-1506). Prior permission from the principals of respective nursing colleges was taken for the final study. Participants were recruited in the study only after receiving written informed consent and assurances that their responses would be kept confidential.

Development of Intervention

Mobile Based Learning. Mobile Based Learning, which was developed as an intervention in this study, was created considering the learning requirements of nursing students. The application contains various sections, including videos, images, and electronic notes. (Figure 2-4) The following Mobile Based Learning on Operation Theatre techniques were chosen for this study: (i) **Scrubbing:** Introduction, purposes of scrubbing, and scrubbing procedures. The video is 3 minutes and 51 seconds in length; (ii) **Gowning:** Introduction, required gowning materials, gowning steps, and removal of personal protective equipment (PPE). The video lasts a total of 3 minutes and 17 seconds; **(iii) Gloving:** The introduction to gloving, the stages of gloving, and the removal of gloving. The video's duration is 2 minutes and 52 seconds; and **(iv) Assisting ET Intubation:** Introduction, purposes, procedures of Assisting ET Intubation, ET tube size, and how to secure ET tube. This video is 6 minutes and 19 seconds long. The researcher performed and recorded all procedure videos and then uploaded them to the application. The URL to the application was distributed to the nursing students' WhatsApp group.

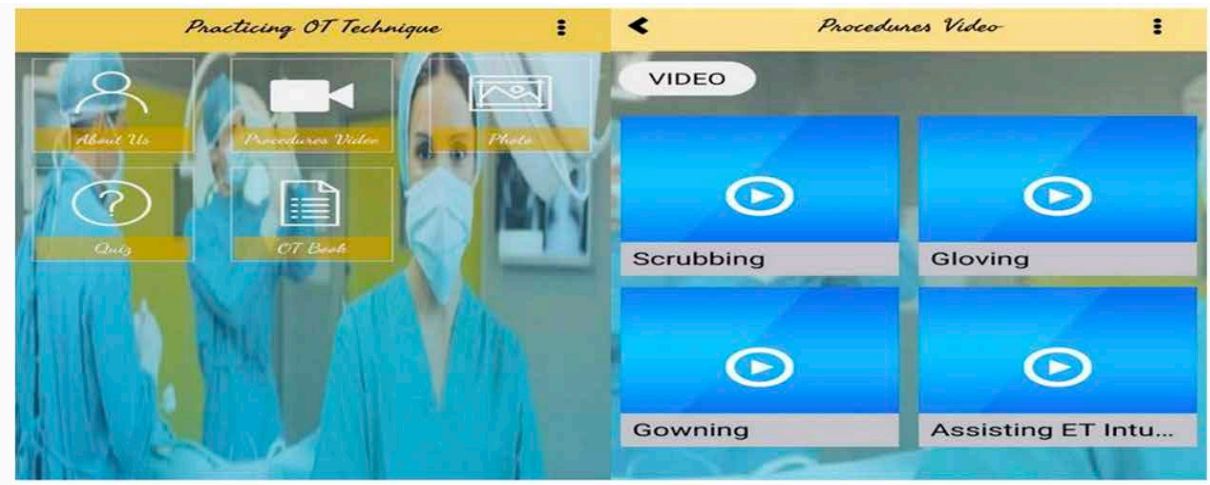

Figure 2. Interface of the mobile application

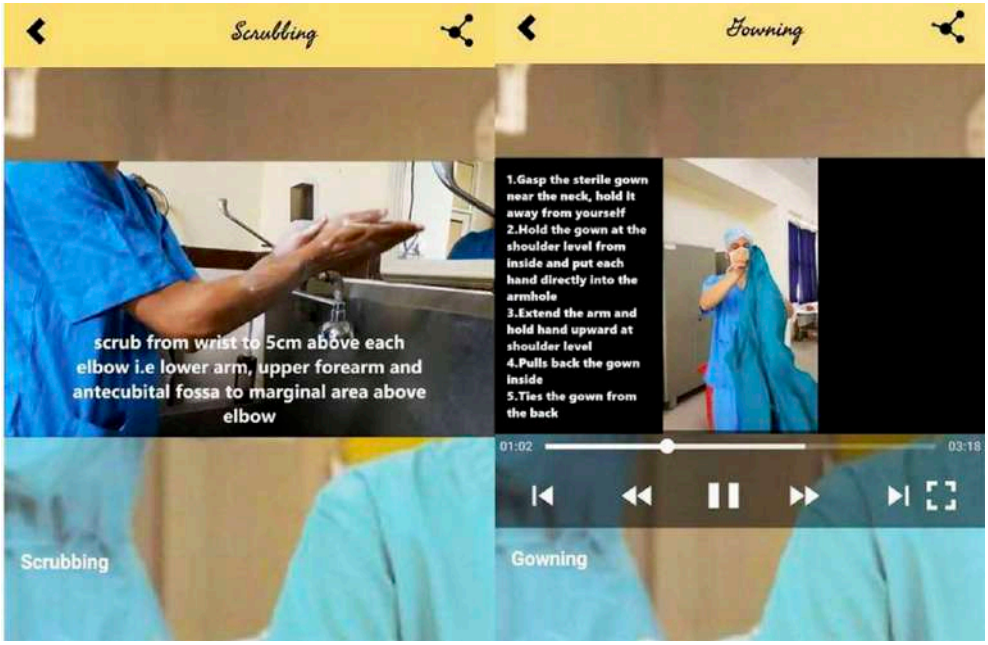

Figure 3. Screenshot of procedure videos (scrubbing and gowning)

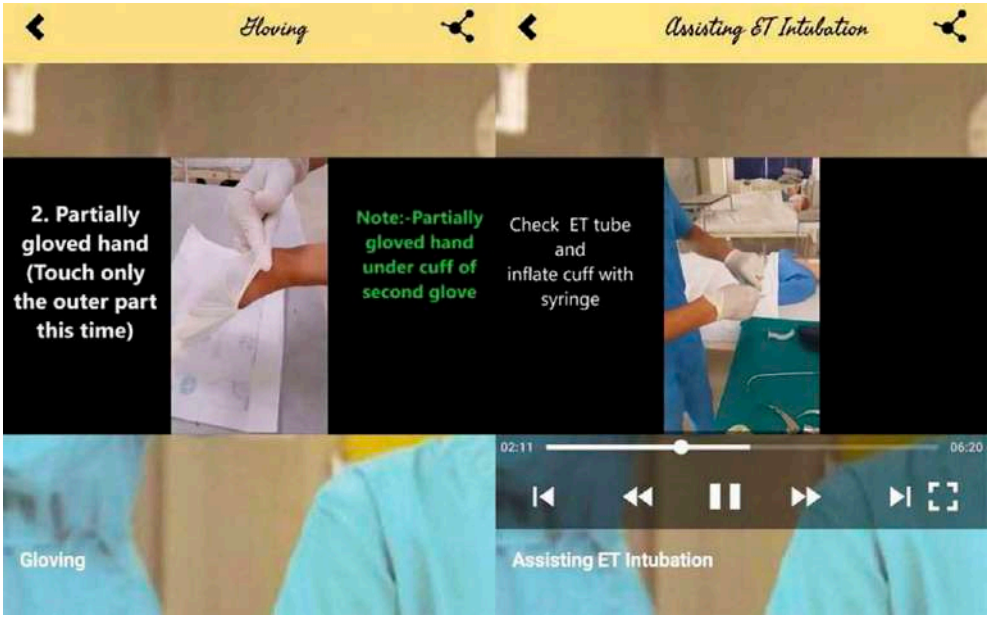

Figure 4. Screenshot of procedure videos (gloving and assisting in ET intubation)

For data collection, instruments were created and divided into four sections. The first section consists of seven questions regarding selected variables of nursing students, including age, gender, interests, family income, residence, OT assignment, and prior E-Learning experience. The second section devised a structured questionnaire to assess nursing students' knowledge of procedures related to Operation Theatre. It comprised of 30 items (multiple choice questions) with each item having a single correct answer. Every correct answer was awarded a score of one and every wrong answer was awarded zero mark. The maximum and minimum possible score was 30 and zero respectively. The third section, Objective Structured Clinical Examination (OSCE) Questionnaire with observation checklist, was designed to evaluate the skills of nursing students in relation to operating room procedures. There were four OSCE stations of Scrubbing, Gowning, Gloving & Assisting in ET Intubation. There was a total of 46 items (Scrubbing: 15, Gowning: 11, Gloving: 10 and Assisting in ET Intubation: 10) on the observation checklist with a 3-point grading system. The maximum score for skills was 72 and minimum was zero. The Semantic Differential Scale Opinionnaire with ten items having alternative responses was designed to gauge nursing students' perspectives on the Satisfaction of Mobile-based Learning. The instrument's content validity was evaluated by a panel of nine experts from the field of Medical Surgical Nursing, Anesthesiology, Nursing Educators and a Software Expert for its accuracy and applicability, and to solicit their feedback and recommendations. The CVI of tools were 0.8, 0.82 and 0.9 respectively for structured knowledge questionnaire, OSCE questionnaire and semantic differential scale. In addition, using Kuder-Richardson-20,[18] the reliability of the structured knowledge questionnaire was 0.84. Inter-rater reliability for the OSCE questionnaire with observation checklist was 0.90 and Cronbach's alpha [19] for satisfaction scale was 0.81.

Data Analysis. The data was analyzed for different parameters including descriptive statistics such as frequency, mean, standard deviation and inferential statistics including t-test, Mann Whitney U-test and Wilcoxon Signed Rank Tests. The normality of data was checked by Kolmogorov–Smirnov test. SPSS 20.00 software was used for data analysis.

Results

Since the data was normally distributed in terms of knowledge scores but not normally distributed for skills scores, thus both parametric and non-parametric tests were used for analysis.

Participant Demographics. Most students in both the experimental and comparison groups were between the ages of 18-20 years, with 89.10% and 75%, respectively. Both the groups consisted primarily of females (85.90 and 73.40 percent, respectively). The percentage of nursing students who read for pleasure was lower than 50% in both the comparison (34.4%) and experimental (29.70%) groups. The median household income of the experimental group was 51.9 thousand rupees (708.56 USD), while that of the comparison group was 29.7 thousand (356.68 USD). In the comparison group, only 46.90% of the nursing students live at home, whereas 53.10% of the experimental group lives in a hostel. Sixty-nine percent of the nursing students both in comparison and experimental groups have not completed OT placement.

Knowledge. The mean knowledge score of the nursing students was 13.03±3.285 in the experimental group, while in the comparison group it was 13.77±2.915, prior to the implementation of Mobile-based learning. In the post-test, the mean knowledge scores were found higher both in the experimental group (19.23±5.377; mean difference=-6.203) and in the comparison group (14.11±3.36; with a mean difference of 0.344). A paired "t" test was performed to compare the average knowledge scores within the two groups. The calculated "t" value of 8.337 in the experimental group was found to be statistically significant ($t(63) = 2.000$; $p<0.001$) at the 0.05

level of significance; in contrast, the calculated "t" value of 0.59 in the comparison group was not statistically significant (t (63) = 2.000; p=0.551). For comparing the mean difference between the experimental and comparison group, unpaired t-test was applied, and the calculated t value of 6.46 (t (126) =1.98; p<0.001) was found to be statistically significant in the post-test. (Table 1)

Table 1. Comparison of Knowledge of Nursing students

Variable	Experimental Group (n=64)	Comparison group (n=64)	t-value	df	*p*-value
Pre-test Knowledge	13.03±3.28	13.77±2.91	1.338	126	0.191
Post-test Knowledge	19.23±5.37	14.11±3.36	6.46	126	<0.001
t-value	8.337	0.59			
DF	63	63			
p-value	<0.001	0.551			

Skills. To compare the skills of nursing students between the groups, Mann-Whitney U test was applied and the results revealed that the mean ranks of skills of students in the experimental group were significantly higher in all areas i.e., Scrubbing, Gowning, Gloving and for Assisting in ET Intubation. (Table 2)

Table 2. Comparison of nursing students in terms of level of skills after administration of mobile based learning

Skills	Group	Mean rank	Mann-Whitney U	Z-value	*p*-value
Scrubbing	Experimental (*n*=64)	94.57	123.500	-9.192	<0.001
	Comparison (n=64)	34.43			
Gowning	Experimental (*n*=64)	91.92	293.000	-8.400	<0.001
	Comparison (n=64)	37.08			
Gloving	Experimental (*n*=64)	78.59	1146.000	-4.325	<0.001
	Comparison (n=64)	50.41			
Assisting ET Intubation	Experimental (*n*=64)	73.91	1445.500	-2.882	0.004
	Comparison (n=64)	55.09			

The Wilcoxon Signed Rank test was used to determine the rank, rank sum, and Z value of nursing students in the experimental group's pre- and post-test scores on competencies relevant to operating room procedures. The Post-test scores for the skills of Scrubbing (20.52), Gowning (16.70), Gloving (13.77), and assisting in ET Intubation (10.58) were all significantly higher after the administration

of mobile based learning. The mean ranks for Scrubbing (33.95), Gowning (33.77), Gloving (33.57), and Assisting ET Intubation (32.74) were all found to be significant ($p<0.001$). (Table 3)

The satisfaction of nursing students regarding mobile based learning was mostly high (93.7%), and the rest was moderate (6.3%).

Table 3. Comparison of nursing students in terms of level of skills before and after administration of Mobile Based Learning

Skills	Group	Mean ±SD	Mean rank	Z-value	*p*-value
Scrubbing	Pre-test	11.69±4.18	33.95	-6.725	<0.001
	Post-test	20.52±3.30			
Gowning	Pre-test	11.84±3.02	33.77	-6.421	<0.001
	Post-test	16.70±2.64			
Gloving	Pre-test	9.66±3.86	33.57	-4.726	<0.001
	Post-test	13.77±3.45			
Assisting ET Intubation	Pre-test	6.30±4.77	32.74	-4.841	<0.001
	Post-test	10.58±4.51			

Discussion

The mean knowledge and skills scores of nursing students were significantly higher after the administration of Mobile Based Learning. Moreover, learning on mobile application gave the students an opportunity to repeat the steps or skills whenever and wherever they want to. When these results were analyzed with previous researches, consistency in results were shown in the studies[9,20] which demonstrated that the mean knowledge and skills scores were significantly higher after the intervention than before it. In another study conducted on the blood pressure measurement skills of nursing students, the mobile application was found to be effective in improving the skills.[21] Furthermore, it was noted in multiple studies that the utilization of mobile devices and videos resulted in an enhancement of nursing students' knowledge and skills.[22–24]

In the present study, there were significant differences between pre-test and post-test knowledge and skills scores among nursing students. This was consistent with the results of a study where it was discovered that the knowledge score and skills score of students increased after the administration of intervention.[21] In contrast, it was found in another study that nursing students' knowledge increased, but it was not statistically significant ($p=0.379$).[12] Although, the difference is knowledge scores was not significant, but there was a positive trend focusing on the development of theoretical understanding as well. This could be attributed to certain factors like baseline knowledge level, and the nature of intervention emphasizing on skill acquisition. A substantial difference was observed in the scores of pre-test knowledge and post-test knowledge as well as in the scores of scrubbing skills, gowning skills, gloving skills and assisting in ET intubation in the experimental group before and after the administration of Mobile Based Learning. In accordance with another study's findings, there was a highly statistically significant difference between pre and post knowledge scores

($t = 8.845$, $p<0.001$) and skills scores ($t = 7.471$, $p<0.001$) before and after the administration of the Intervention.[15]

The nursing students in the present study were highly satisfied with the mobile based learning intervention owing to the fact that they were able to access the procedures on the application at their own time and could watch the videos any number of times without any restriction. Other studies carried out using mobile technology have found similar results where the students found it more comfortable learning the skill-based procedures through technology.[25–27]

One of the limitations of this study was that the researchers did not monitor the number of times, students watched the videos, which might have an effect on their scores. Another one is, since the mobile application is exclusively compatible with android phones, the study included only those students who possessed a phone with this system. In future, similar application with enhanced compatibility with all devices may be developed. Other significant nursing procedures may also be taught through these kinds of applications making a comfortable learning environment for the students as well as for new nurses. The findings have implications in every facet of nursing be it education, practice, administration, or research. A certain percentage of every nursing course shall be delivered through mobile based learning approach. Nurses or nursing students can make informed decisions by utilizing knowledge obtained from either the textbooks or the mobile app. And these days, utilizing the applications on mobiles is more accessible and gives a flexible platform for learning, and is thus preferred by most of the students.

Conclusion. The results of present study conclude that Mobile Based Learning is an effective method for improving both knowledge and skills of nursing students. Therefore, the use of mobile based learning is strongly recommended to assist the learners in improving their abilities besides knowledge about significant procedures.

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Application of Objective Structured Teaching Examination (OSTE) in Assessing Classroom Teaching Skills for Nursing undergraduates: A Quasi-experimental Study

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Application of Objective Structured Teaching Examination (OSTE) in Assessing Classroom Teaching Skills for Nursing Undergraduates: A Quasi-experimental Study

Abstrac

Objective. To evaluate the pedagogical skills of third-year nursing students at Yangzhou University (China). **Methods.** A multisite quasi-experimental design was used in this study. Fifty-five participants were selected by convenience sampling. The Objective Structured Teaching Evaluation (OSTE) scale was used to assess teaching skills. The evaluation included four different stages: Teaching Background Analysis (E1), Lesson Plan Presentation (E2),

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Mock Class (E3) and Teaching Reflection (E4). Prior to the assessment, the teachers assigned homework to the students to complete at the four station**s.** **Results.** Fifty-five nursing students with an average age of 21.3±0.7 years participated in the study, with a predominance of female students (78.2%). The highest mean score was achieved in E1 (83.1), followed by E2 and E3 (82.5 and 82.3 respectively), while the lowest mean score was found in E4 (79.6). In E3, instructors gave lower scores for class organisation, class characteristics and overall performance compared to the self-reported scores of the standardised students ($p<0.05$). More than 80% of the students strongly agreed and recommended the OSTE as the primary method for assessing teaching skills in the classroom. **Conclusion.** Deficits in teaching skills were identified in the participating students; this information will allow specific interventions to improve the situation. The OSTE instrument was a useful method for assessing the pedagogical skills of undergraduate nursing students.

Descriptors: teaching; students, nursing; valuation of research programs and tools.

Evaluación de las habilidades docentes en el aula de los estudiantes universitarios de enfermería con el instrumento OSTE: Un estudio cuasiexperimental

Resumen

Objetivo. Evaluar las habilidades pedagógicas de los estudiantes de tercer curso de enfermería de la Universidad de Yangzhou (China). **Métodos.** En este estudio se empleó un diseño cuasi-experimental multisitio. Por muestreo por conveniencia se seleccionaron 55 participantes. Se empleó la escala Examen Objetivo Estructurado de la enseñanza (OSTE- Objective Structured Teaching Evaluation, en inglés) para evaluar las habilidades pedagógicas. La evaluación abarcó cuatro estaciones distintas: Análisis de los antecedentes de la enseñanza (E1), Presentación del plan de la lección (E2), Clase simulada (E3) y Reflexión sobre la enseñanza (E4). Antes de la evaluación, los instructores asignaron tareas a los estudiantes que debían realizar en las cuatro estaciones. **Resultados.** Participaron en la investigación 55 estudiantes de enfermería con un promedio de edad fue de 21.3±0.7 años y predominó el sexo femenino (78.2%). La puntuación media más alta se alcanzó en la E1 (83.1), seguida por E2 y E3 (82.5 y 82.3, respectivamente, mientras que la puntuación media más baja se registró en la E4 (79.6). En la E3 los instructores asignaron puntuaciones más bajas en comparación a las autorreportadas por los estudiantes estandarizados en términos de organización de la enseñanza, características de la enseñanza y rendimiento general ($p<0.05$). Más del 80% de los estudiantes se mostraron totalmente de acuerdo y recomendaron el OSTE como método principal

para evaluar las habilidades docentes en el aula. **Conclusión.** Se identificaron en los estudiantes participantes las deficiencias en las habilidades pedagógicas; esta información permitirá realizar intervenciones específicas para mejorar situaciones específicas de la situación encontrada. El instrumento OSTE fue un método útil para la valoración de las habilidades pedagógicas de los estudiantes universitarios de enfermería.

Descriptores: enseñanza; estudiantes de enfermería; evaluación de programas e instrumentos de investigación.

Avaliação das competências docentes em sala de aula de estudantes universitários de enfermagem com o instrumento OSTE: um estudo quase-experimental

Resumo

Objetivo. Avaliar as competências pedagógicas dos estudantes do terceiro ano de enfermagem da Universidade de Yangzhou (China). **Métodos.** Um desenho quase-experimental multisite foi utilizado neste estudo. Por amostragem de conveniência, foram selecionados 55 participantes. A escala *Objective Structured Teaching Evaluation* (OSTE) foi utilizada para avaliar as competências pedagógicas. A avaliação abrangeu quatro estações distintas: Análise do percurso docente (E1), Apresentação do plano de aula (E2), Aula simulada (E3) e Reflexão sobre o ensino (E4). Antes da avaliação, os instrutores atribuíram tarefas aos alunos, que deveriam completar as quatro estações consecutivamente. **Resultados.** Participaram da pesquisa 55 estudantes de enfermagem com idade média de 21.3±0.7 anos e predominou o sexo feminino (78.2%). A maior pontuação média foi alcançada em E1 (83.1), seguida de E2 e E3 (82.5 e 82.3, respectivamente, enquanto a menor pontuação média foi registrada em E4 (79.6). Em E3 os instrutores atribuíram pontuações mais autorrelatado por alunos padronizados em termos de organização do ensino, características de ensino e desempenho geral ($p<0.05$). Mais de 80% dos alunos concordaram fortemente e recomendaram o OSTE como principal método para avaliar habilidades de ensino em sala de aula. **Conclusão.** Foram identificadas deficiências nas competências pedagógicas dos alunos; esta informação permitirá realizar intervenções específicas para melhorar situações específicas da situação encontrada. O instrumento OSTE foi um método útil para avaliar as competências pedagógicas de estudantes universitários de enfermagem.

Descritores: ensino; estudantes de enfermagem; avaliação de programas e instrumentos de pesquisa.

Introduction

Conventional assessment techniques are inadequate in accurately gauging students' teaching skills. As the demand for healthcare continues to increase, the role of nurses is constantly evolving to encompass not only providing care, organization, and management, but also educational responsibilities.[1,2] In China, the development of preliminary teaching competence has become a key objective in the education of undergraduate nursing students. Many nursing schools in the country offer courses in nursing education and have implemented teaching reforms, such as the use of flipped classrooms.[3,4] However, the commonly utilized assessment methods, both domestically and internationally, have relied on closed-book exams, which primarily focus on theoretical knowledge and do not directly assess students' teaching abilities. Consequently, there is considerable debate and a pressing need to establish a structured and standardized approach for evaluating students' teaching skills.

OSTE is commonly utilized for assessing clinical teaching competencies. OSTE, an acronym for Objective Structured Teaching Evaluation, encompasses a range of methodologies centered on standardized students, standardized clinical teaching scenarios, multisite assessment, and objective evaluation with the goal of enhancing the instructional capabilities of clinical educators.[5] The concept originated from the Objective Structured Clinical Examination (OSCE), with Simpson *et al.*[6] adapting a similar approach to OSTE by employing Standardized Students (SS) to simulate standardized ambulatory teaching situations (SATS) to aid educators in improving their observation and feedback skills. Alternative interpretations for the "E" in OSTE, such as "encounter"[7] or "examination",[8] have been proposed by scholars. However, OSTE has emerged as the primary method for evaluating clinical teaching competence. Wilkes *et al*.[9] developed a three-year training program aimed at enhancing community faculty teaching skills, doctor-patient communication abilities, and clinical handling skills, with over 70% of the community faculty expressing belief in the efficacy of this assessment method for enhancing teaching abilities.

A systematic review by Trowbridge in 2011, covering 22 studies on OSTE from 1975 to 2010, concluded that there was moderate evidence to support the use of OSTE as a method for assessing the teaching abilities of clinical educators.[10] Subsequently, OSTE has been adapted and applied in various contexts within health professional education.[11-13] Mahoney *et al*.[5] utilized OSTE for the training and assessment of resident teaching skills, with results indicating strong acceptance of OSTE by participants and a demonstration of robust teaching self-efficacy. This suggests that OSTE is a scientifically valid and feasible tool for evaluating students' teaching skills.

The OSCE is anticipated to serve as a valuable method for evaluating students' proficiency in teaching. OSTE does not represent a distinct assessment approach; rather, it presents an objective, structured, and organized assessment framework. Within this framework, each assessment unit has the capacity to integrate suitable assessment content and methods in accordance with its teaching and examination guidelines. OSTE provides objectivity, standardization, and adaptability in the evaluation of teaching skills. Consequently, this investigation explores the utilization of OSTE in appraising teaching competencies within the context of the Nursing Education course, with the objective of comprehending students' teaching capabilities and investigating the potential implementation of this approach.

Methods

Research Design. (i) *Assembling a research team*. The research team is composed of three instructors from the Nursing Education course, three nursing professors, and three students. Their primary responsibility is to supervise the quality and advancement of the study; (ii) *Crafting the research plan*. The research team collaborates to develop an OSTE implementation plan, with a primary focus on identifying research sites and organizing task assignments for each stage of assessment. OSTE is not a specific assessment method, but rather a structured and organized assessment framework. Within this framework, appropriate assessment content and methods can be included based on teaching and exam guidelines. Boendermaker *et al.*[14] conducted interviews with general education faculty and identified six core skills related to teaching abilities: effective feedback skills, willingness to provide feedback, critical thinking about the learning process, good communication, respect for students, and stimulating students' thinking. To more accurately evaluate students' abilities in these areas, China's national conditions and teacher experiences were integrated. Following two expert meetings, four stations were designed, and scoring tools were developed for each station (refer to Table 1 for further details); (iii) *Establishing an assessment environment*. This study arranges three rooms and four assessment stations. Standardized students are recruited from across the university to participate in the study and are provided with training before the assessment.

Table 1. Station descriptions

Station	Case name	Station descriptions	Assessment Competence	Standardised student
1	Teaching Background Analysis	The assessors present an overview of the students' learning situation using slide presentations	Cognitive Ability Analytical Ability	No
2	Lesson Plan Presentation	The assessors submit their lesson plans to the main examiner on the day of the assessment	Analytical Ability Design Ability	No
3	Simulated Classroom	The assessors, acting as students-turned-teachers, deliver the lesson and handle any unexpected teaching incidents.	Communication Ability Organizational Ability Interpersonal Ability	Yes
4	Teaching Reflection	The assessors provide a teaching reflection report and answer questions from the examiners after the simulated classroom session	Cognitive Ability Analytical Ability	No

Note: The assessment content, format, examination stations, and scoring criteria will be announced two weeks prior to the assessment.

Study Participants. In April 2023, this study utilized a cluster sampling method to select a cohort of third-year undergraduate nursing students from Yangzhou University in Yangzhou, China.

OSTE Assessment Content and Methods. (i) *Site Design*. The evaluation comprises four components. *The first station*, *Teaching Background Analysis*, involves assessors presenting an overview of the students' learning situation through slide presentations. *At the second station, assessors submit their lesson plans* to the main examiner on the day of the assessment in a Lesson Plan Presentation. *The third station features a Simulated Classroom*, where standardized students (SS) are recruited to create an authentic teaching scenario. Assessors, acting as students turned teachers, deliver the lesson and manage any unexpected teaching incidents. *The fourth station*, *Teaching Reflection*, requires assessors to provide a teaching reflection report and respond to questions from the examiners following the simulated classroom session. (For further details, please refer to Table 1); (ii) *The scoring tables* at each station are developed by the research team. The assessment criteria for the four stations are as follows: The first station's assessment table for student analysis primarily includes five dimensions: learning ability (20 points), starting point of learning (20 points), learning status (20 points), class situation analysis (20 points), and textbook analysis (20 points). The second station's assessment table for lesson presentation mainly encompasses six dimensions: objective design (20 points), content analysis (10 points), instructional process design (40 points), extension design (10 points), document standardization (10 points), and innovative design (10 points). The third station's assessment table for simulated classroom consists mainly of five dimensions: teaching content (20 points), pedagogical organization (40 points), linguistic pedagogy (20 points), teaching characteristics (10 points), and courseware development (10 points). The fourth station's assessment table for teaching reflection covers four dimensions: teaching objectives (25 points), teaching philosophy (25 points), teaching methods (25 points), and teaching process (25 points); (iii) *Examiners*. Two assessors are designated to each station for this evaluation. In the third phase, standardized students (SS) participate in the assessment process. A total of 57 students were enlisted from the school for this evaluation.

Evaluation Process. Two weeks prior to the assessment, a briefing session is held with students to familiarize them with the OSTE process and furnish them with relevant instructions. The assessment content, format, examination stations, and scoring criteria will be announced at this time. On the day of evaluation, students undertake the assessment at each station under the supervision of examination personnel. With the exception of the third station, which spans 15 minutes, all other stations are brief, lasting only 3 minutes.

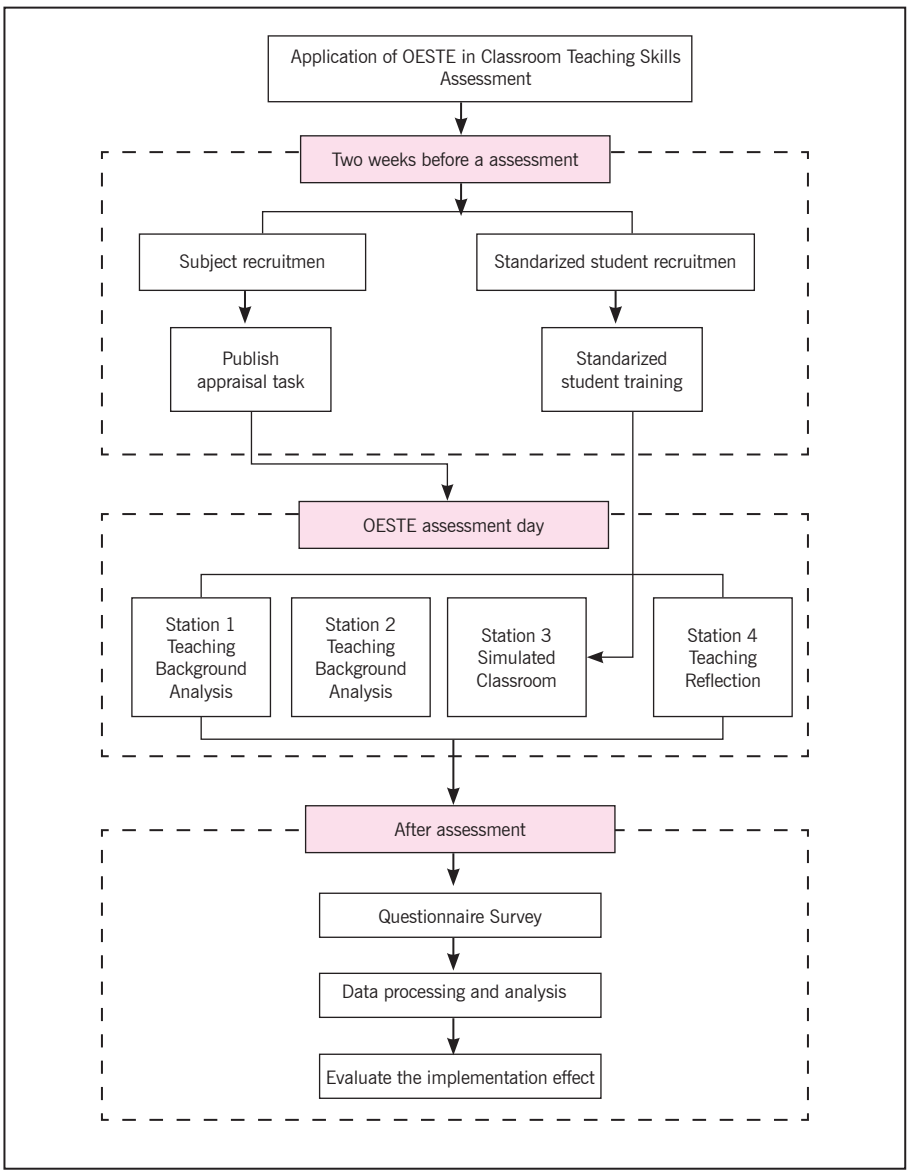
Quality Control. The research team is in charge of creating the implementation strategy for this OSTE. Both examiners and senior staff are knowledgeable about the assessment process, scoring criteria, and their specific duties. Examiners are tasked with scoring the first, second, and fourth stations, while the third station is assessed by both examiners and all senior staff, and the average score is used as the final score for each station.

Ethical Issues. The study has obtained informed consent from the participants. This study has been approved by the Ethics Committee of the Nursing College of Yangzhou University (Ethical number: YZUHL20220122).

Questionnaire Survey. The research team developped a survey to collect feedback from students who participated in the assessment. The survey includes four areas to assess the overall situation of OSTE: "The innovative assessment format," "Adaptability to this type of assessment," "Enhancement of teaching abilities during the

assessment," and "Effective demonstration of teaching abilities through this format." The rating scale has five levels: "Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree." Additionally, the survey asks if participants would recommend using OSTE as the primary method for assessing teaching abilities in nursing education courses, with options including "Definitely Not Recommend," "Not Recommend," "Neutral," "Recommend," and "Strongly Recommend." The survey is administered after students have completed all assessment stations.

Statistical Methods. We used SPSS Statistics 28 (IBM Corp, Armonk, NY) to perform statistical analyses. The independent samples t-test was used to compare means between groups, resulting in a significant *p*-value of 0.05.



Results

General Information. A study involved 55 undergraduate nursing students, with an average age of 21.3±0.7 years, of these, 43 (78.2%) were female. Additionally, 57 SS students from different fields such as education and horticulture participated, with an average age of 20.67 ± 1.03 years. Among them, 33 (57.89%) were female and 24 (42.11%) were male.

OSTE Scores and Comparisons. The Student Teaching Background Analysis station had the highest score of 83.1±10.6, while the Teaching Reflection station had the lowest score of 79.7±10.3. In the simulated classroom stations, teachers received lower scores than standardized students in teaching organization, teaching characteristics, and overall performance. Conversely, standardized students scored lower than teachers in language and teaching demeanor, and these differences were statistically significant ($p<0.05$). (Table 2).

Table 2. OSTE Scores and Comparison

Station	Dimension 1	Dimension 2	Dimension 3	Dimension 4	Dimension 5	Dimension 6	Total Score
Station 1	*Learning ability*	*Starting Point of Learning*	*Learning status*	*Class situation analysis*	*Textbook Analysis*	-	83.1±10.6
Mean ± SD	16.1±3.4	16.4±3.1	16.8±2.6	16.4±3.4	17.3±2.5	-	
MD	15	16.3	17.5	16.3	16.2		87.5
Station 2	*Objective Design*	*Content Analysis*	*Instructional Process Design*	*Extension Design*	*Document Standards*	*Design Innovation*	82.5±9.9
Mean ± SD	15.9±3.3	8.7±1.5	32.5±4.8	8.3±1.3	8. 7±1.2	8.4±1.3	
MD	15	9.37	35	7.5	8.8	7.5	82.6
Station 3	*Teaching Content*	*Pedagogical Organization*	*Linguistic Pedagogy*	*Teaching Characteristics*	*Courseware Development*	-	
Mean ± SD	17.0±3.1	31.3±4.7	17.5±2.4	8.1±1.1	8.4±1.3	-	82.3±9.1
#MD	16.3	30	17.5	8.12	7.5		83.1
Mean ± SD	*16.6±3.7	32.8±7.9	16.6±3.9	8.2±2.0	8.4±1.9	-	82.6±17.0
MD	15	30	15	7.5	7.5		85
t-test	t=0.424 *p*=0.331	t=0.796 *p*=0.002	t=0.920 *p*=0.002	t=0.078 *p*=0.009	t=0.158 *p*=0.125		t=0.060 *p*=0.002
Station 4	*Teaching Objectives*	*Pedagogical Philosophy*	*Teaching Methods*	*Teaching Process*	-	-	
Mean ± SD	19.5±3.3	18.0±2.7	21.5±3.6	20.7±4.3	-	-	79.7±10.3
MD	18.8	18.8	21.9	20.3			81.3

Note:"#" This line represents the standardized student's rating; "-" indicates that the dimension is not applicable to this site, and "*" in one line represents standardizing student scoring in Station 3.

Assessment Score Sheet Following Evaluation. The assessment format received strong approval from over 80% of students, who highly recommend it as the main method for evaluating classroom teaching abilities.

Table 3. Assessment Score Sheet After Evaluation (*n*=55)

Indicator	Strongly Agree *n* (%)	Agree *n* (%)	Neutral *n* (%)	Disagree *n* (%)	Strongly Disagree *n* (%)
The assessment format is innovative	46 (83.6)	6 (10.9)	3 (5.5)	0	0
Being able to adapt to this type of assessment	45 (81.8)	10 (18.2)	0	0	0
Being able to adapt to this type of assessment," "Improvement of teaching abilities while undergoing the assessment	47 (85.5)	8 (14.5)	0	0	0
Effective demonstration of teaching abilities through this format	46 (83.6)	9 (16.4)	0	0	0
whether the participants would "recommend using OSTE as the primary method for assessing teaching abilities in nursing education courses."	44 (80)	8 (14.5)	3 (5.5)	0	0

Discussion

OSTE demonstrates a high level of acceptance in evaluating the teaching abilities of students. In traditional terms, OSTE is a framework utilized to assess the teaching capabilities of clinical educators in the training of clinical educators or residents (15-17). However, its use has expanded beyond the medical field to include evaluating doctoral supervisors in the basic sciences, dental and pharmacy faculty, faculty portfolio coaches for medical students, medical student peer tutors, and Health Professions Education program graduates.[13,18-20] OSTE has become a widely used method for assessing teaching skills in health professional education.[21,22] Our study aimed to examine the effectiveness of using an enhanced OSTE to evaluate classroom teaching skills in nursing education. Four stations were created to evaluate students' cognitive, analytical, design, communication, organizational, and interpersonal skills, and overall, more than 80% of the students found the assessment form acceptable and recommended it as the primary method for evaluating classroom teaching skills.

tilizing the OSTE offers a relatively comprehensive means of assessing students' pedagogical abilities. Previous research has placed less emphasis on assessing students' teaching skills, but the OSTE has been proven to significantly improve the clinical skill perception and confidence of test takers,[23] enhance the skills of attending physicians 17, and improve the clinical teaching ability of educators.[24] Bajwa *et al*.[25] created a four-station OSTE assessment to evaluate participants' clinical teaching skills, with results showing that those in the coaching group displayed superior performance in various teaching aspects. Our findings reveal that students performed best in the Teaching Background Analysis station, while their lowest scores were in the Teaching Reflection station, indicating stronger cognitive and analytical skills compared to immediate feedback abilities. The simulation teaching station was rated as average, with teachers scoring lower than standardized students in teaching organization, characteristics, and overall scores. Standardized students scored lower than teachers in language style grading, showing that teachers were more stringent in evaluating teaching organization and

characteristics, while students focused more on language and style of instruction delivery. Overall, the OSTE is a widely accepted and comprehensive method for evaluating students' classroom teaching ability, offering a promising and objective approach for assessing nursing students' professional skills. This study demonstrates the feasibility and acceptance of OSTE.

Strengths and Limitations. Our research has two key strengths. Firstly, we utilized the OSTE examination format, known for its objectivity and comprehensiveness. Additionally, we incorporated teaching ability components into OSTE to create a new assessment aligned with classroom teaching content. The assessment of teaching ability is thorough. However, the study's sample size is relatively small and derived from a single school dataset, which may limit its representativeness. Additionally, small sample studies often have lower statistical power, making it challenging to detect genuine differences. Furthermore, while OSTE can capture data at a specific point, it cannot consider longitudinal data within the nursing pedagogy process, limiting its ability to provide a comprehensive understanding of changes in teaching skills among nursing graduates.

Conclusions. The current research incorporates the evaluation of teaching skills in nursing education, with over 80% of students expressing support for this assessment method. This indicates that implementing OSTE enables students to recognize teaching skill weaknesses, leading to targeted interventions and improvements. However, the study has limitations. Firstly, the small sample size of students, examiners, and simulation scenarios made it challenging to detect statistically significant differences. Additionally, the limited number of OSTE sites may impact the assessment of students' teaching abilities. To obtain more reliable results, it is essential to refine the OSTE assessment content, increase the sample size, and expand the number of OSTE sites in future research. The study also proposes the development of OSTE-based training programs and the integration of OSTE coaching methods into instructional practices to enhance students' teaching abilities more effectively.

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