Matrix of competences related to the medications for the nurse in the intensive care unit*

Matriz de competências relacionadas aos medicamentos para o enfermeiro em unidade de terapia intensiva

Matriz de competencias relacionadas a medicamentos para enfermeros de las unidades de cuidados intensivos

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Abstract: Objective: to build a matrix of competences related to medications for the nurse in the Intensive Care Unit (ICU). **Method:** a qualitative research study that employed the nominal group technique with 21 nurses working in the ICU of hospitals in Dourados, Mato Grosso do Sul, Brazil. Data collection took place in 2018. In order to support data analysis according to the concept of competences, the theoretical contribution of this research, a detailed reading of the reports, notebooks and the result of the technique was carried out comparing with the relevant literature. **Results:** seven competences were established in the construction of the matrix: professional autonomy, scientific knowledge, knowledge of drug indication, technical knowledge, continuing education, nine "rights" in the safe administration of medicines and responsibility. **Conclusion:** the competence matrix may support the implementation of future learning strategies with proposals for their development, both in the professional field and in teaching in its different spheres.
Descriptors: Professional competence; Intensive care unit; Nurses; Nursing care; Medication therapy management

Resumo: Objetivo: construir uma matriz de competências relacionadas aos medicamentos para o enfermeiro em unidade de terapia intensiva (UTI). **Método:** pesquisa qualitativa que empregou a técnica do grupo nominal com 21 enfermeiros que trabalham em UTI de hospitais de Dourados, Mato Grosso do Sul, Brasil. A coleta de dados ocorreu em 2018. Para subsidiar a análise dos dados de acordo com o conceito de competências, aporte teórico desta pesquisa, foi realizada leitura pormenorizada dos relatórios, blocos de anotações e resultado da técnica em comparação com a literatura pertinente. **Resultados:** na construção da matriz foram estabelecidas sete competências: autonomia profissional, conhecimentos científicos, conhecimentos da indicação do medicamento, conhecimentos técnicos, educação continuada, nove certos na administração segura de medicamentos e responsabilidade. **Conclusão:** a matriz de

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competências poderá subsidiar a implementação de futuras estratégias de aprendizagem com propostas de desenvolvimento das mesmas, tanto no campo profissional como no ensino em suas diferentes esferas.

Descritores: Competência profissional; Unidade de terapia intensiva; Enfermeiros; Cuidados de enfermagem; Conduta do tratamento medicamentoso

Resumen: Objetivo: construir una matriz de competencias relacionadas con medicamentos para enfermeros de las unidades de cuidados intensivos (UCI). **Método:** investigación cualitativa que utilizó la técnica del grupo nominal con 21 enfermeros que trabajan en las UCI de hospitales de Dourados, Mato Grosso do Sul, Brasil. La recolección de datos se llevó a cabo en 2018. Para instrumentar el análisis de los datos según el concepto de competencias, aporte teórico de esta investigación, se realizó una lectura detallada de los informes, notas y del resultado de la técnica considerando la literatura relevante. **Resultados:** en la construcción de la matriz se establecieron siete competencias: autonomía profesional, conocimiento científico, conocimiento de la indicación del medicamento, conocimiento técnico, educación continua, nueve pautas en la administración segura de medicamentos y responsabilidad. **Conclusión:** la matriz de competencias puede apoyar la implementación de futuras estrategias de aprendizaje con propuestas para su desarrollo, tanto en el ámbito profesional como en la docencia en sus diferentes ámbitos.

Descriptores: Competencia profesional; Unidad de cuidados intensivos; Enfermeros; Atención de enfermería; Tratamiento medicamentoso

Introduction

Higher education, based on the National Curriculum Guidelines (*Diretrizes Curriculares Nacionais*, DCNs), seeks to offer the student, within the course's pedagogical project, a general profile of competences for training. The professional competences of Nursing point to the development of individual and collective abilities to solve problems of a social, psychological, assistance or managerial nature in the work process.[1]

Institutional health demands, in turn, require professionals with increasingly complex and specific training. Thus, what is observed is the expansion of the demands of the health work fields requiring nurses to have the means to train and specialize, as an example, intensive Nursing.[2]

The necessary and relevant competences for nurses to work in the Intensive Care Unit (ICU) include the enhancement of technical and scientific knowledge, of leadership development.[3] Other competences identified are the following: situation management, decision making and teamwork.[4]

Drug therapy in the ICU is complex and medication errors, although avoidable, can occur, especially since they are patients with different degrees of criticality.[5] Thus, it is necessary that the nurse has specific knowledge about the medications.[6]

A study carried out with nurses working in the ICU revealed dissatisfaction regarding academic preparation, with regard to training in topics such as pharmacology,[7] being able to contribute and propitiate difficulties in acting with the patient and, consequently, increase the risk of errors. The knowledge factor gap[8] and the scarcity of opportunities to train and acquire competences related to medications were also mentioned.[9]

The mapping of competences can be obtained through a matrix with the purpose of supporting the planning of educational actions in the face of the teaching gaps.[2] The research study that carried out this strategy with nurses in emergency verified the potential of their use in being able to guide the professional practice at a level of excellence, providing guidance for the improvement of Nursing.[10]

Therefore, this study brings contributions to the nurse's training process in undergraduate, graduate and health services spaces, by establishing articulation between the professional practice and Nursing education. Nevertheless, this research was based on the following question: According to the nurse who works in the ICU, what are the competences considered relevant to ensure safe Nursing care related to medications? In order to elucidate the investigation, this research had the objective of building a matrix of competences related to medications for the nurse in the ICU.

Method

A qualitative research study that used the Nominal Group Technique (NGT) as methodological framework for data collection. The NGT is a consensus method for generating ideas that expands the possibility of face-to-face discussion in small groups made up by at least four individuals with at least

one trait in common. It is divided into four stages: silent generation (production of individual ideas), sharing of ideas (round robin), clarification (open discussion without judgment of values) and ranking (vote) and can be adapted to the realities in question.[11]

The concept of competence, adopted as a theoretical contribution, was the ability to perform tasks in a flexible, intelligent and resolute manner. These tasks are related to the specifications of an occupation or professional performance clearly defined in a real application context.[12] The matrix of this concept is the set of indicators that serve as a tool used in the teaching process to guide the expected learning objectives, in addition to enabling their performance and evaluation.[13]

Data collection was carried out with nurses working in ICUs in the municipality of Dourados, state of Mato Grosso do Sul (MS), Brazil, a reference macro-region in health care for the southern region of the state. At the time of the survey, the municipality had two public and four private hospitals that offered the general adult ICU service, accounting for a total of 68 beds and an eligible population of thirty-six nurses. Of these, it was not possible to carry out the research in two institutions, in one of them for not reaching the minimum number of nurses who agreed to participate in the study and, thus, enabling the application of the data collection technique, and in another for not accepting the conduct of research involving employees.

The participating hospitals were identified as: A, B, C and D, ensuring confidentiality and anonymity. Of these, the total number of nurses was twenty-four professionals, four from hospital A, six from B, six from C and another eight from D. All were formally invited to participate in the research through immediate management. For the choice of the participants, the intentional sampling technique was used, with a non-probabilistic sample. The study included nurses who worked in the adult care line in the ICUs, with a minimum performance time of three months in the sector. Thus, the participants included in this study were 21 nurses, four linked to hospital A, six to B, another six to C and five to D. Three nurses did not participate

since, at the time of data collection, they were away from their activities due to the following reasons: one due to leave and two due to vacation, this being the only exclusion criterion.

Data collection took place between October and December 2018. The NGT was applied in a single meeting per hospital, in the meeting room of the participants' service institutions, on previously agreed upon days and times. The mean duration of the meetings was one hour and thirty minutes and they were conducted by the coordinating researcher who also works as a nurse in one of the participating hospitals, which facilitated the discussions and maintaining the focus. Prior to the NGT, a questionnaire was applied with the following variables: age, qualification, training time, experience time in the ICU and number of employment contracts.

Before the NGT was carried out, the participants received support material for prior reading, via electronic mail, about the concept of competences, in order to provide conceptual clarity. For its application, the following guiding question was used: What competences must nurses have to ensure safe medication care in the ICU?

At the beginning of the NGT, the participants answered the guiding question in notebooks (silent generation); subsequently, the ideas were exposed to the group (sharing of ideas). Each participant had the opportunity to take a position on their ideas, explain and defend them (clarification). After this stage, all the competences chosen by the group were posted on a spreadsheet for voting (ranking), being selected for their degree of importance, making it possible, at the end of the application of the technique, to recognize the competences most voted by the group, defining the final ranking.

In addition to the data collected during the NGT, another two reports were prepared, one carried out by the coordinating researcher and the other by a support reporter who had the function of observing the meetings. In order to support data analysis, according to the concept of competence selected, a detailed reading of the reports, notebooks and the final result of the ranking was carried out, compared to the relevant literature. For each competence of the matrix,

their respective defining characteristics were listed and their attributes came from the discussions during the application of the NGT.

All the participants signed the Free and Informed Consent Form. Furthermore, it is indicated that the required ethical standards were met (Resolutions 466/2012 - 510/2016 - 580/2018, of the Ministry of Health). The research was submitted to the hospitals' authorization and to the Research Ethics Committee of the State University of MS, and approved under number: 2,940,380 and CAAE: 97936818.8.0000.8030

Results

Among the 21 participating nurses, eighteen were female and three were male, with ages ranging from 23 to 44 years old. Referring to their degrees, eight were intensive care nurses, and nine were attending some *lato sensu* graduate program. As for their training time, thirteen had graduated at least ten years ago and the time in the ICU ranged from a minimum of three months to a maximum of eleven years. As for the number of work contracts, five nurses had a second job, three in a public institution and two in a private institution.

During data collection, eleven competences were listed. Table 1 shows the three that made up the top of the ranking at each participating hospital. From the final ranking, the main competences and defining characteristics that made up the matrix are displayed in Table 2.

Table 1 - Final ranking for the nominal group technique

Hospital	Competence
A	1st - Knowledge on drug indication
	2nd - Responsibility
	3rd - Technical knowledge
B	1st - Scientific knowledge
	2nd - Technical knowledge
	3rd - Nine "rights" in the safe administration of medications
C	1st - Responsibility
	2nd - Professional autonomy

	3rd - Continuing education
D	1st - Nine "rights" in the safe administration of medications
	2nd - Continuing education
	3rd - Professional autonomy

Table 2 - Matrix of competences related to medications for the nurse in the intensive care unit

Competences	Defining characteristics
Professional autonomy	Decision-making based on scientific knowledge; -Refuse to do anything that puts the patient's life at risk; -Be critical; -Medication management.
Scientific knowledge	-Knowledge of pharmacology; -Knowledge of the most used medications: vasoactive drugs, sedatives; -Recognize to act in the face of adverse effects.
Knowledge of drug indication	-Correlate to the patient's clinical condition; -Know the medications that will be administered; -Know the different pathologies.
Technical knowledge	-Develop skills/correct technique; -Agility and self-control in the case of CPA*.
Continuing education	-Promote in-service education; -Train and guide the team whenever necessary; -Always seek to become updated.
Nine "rights" in the safe administration of medications	-Routes of administration; -Attention in the handling of medications -Handle infusion pumps; -Know the dilutions of the most used medications; -Double check on the preparation and administration of medications; -Carefully observe medical prescriptions; -Know the main medication administration devices used in the ICU.
Responsibility	-Guide the team; be proactive; -Know how to communicate with all members of the multi-professional team; -Reflect on the care provided to the patient: ethical conduct; -Assume errors; -Know how to work as a team.

*Cardiopulmonary arrest

Although the NGT occurred in 4 different hospitals, the matrix has 7 competences, with the intention of contemplating the largest possible number of competences that competed in the final

ranking during data collection. In the matrix, the whole set of defining characteristics communicate with each other for a continuous need to develop knowledge in relation to medications, in an effort to provide professional competences for accurate, safe and responsible decision-making.

Discussion

The predominance of women in this study results from a characteristic historically evidenced in Nursing. In addition, the research participants, in general, are in the stage of training and professional maturity, seeking to qualify in the world of work, obtaining experiences in specific sectors, such as the ICU and, thus, configure themselves more solidly in an area of expertise. In a study that analyzed the sociodemographic aspects of Nursing in Brazil, it was verified that 78.1% of the population of nurses studied is in these phases of the professional trajectory.[14]

The results made it possible to observe that the NGT contributed to convergence points to be highlighted, even in the face of a population with different age groups, training times and qualifications. Although they worked in different institutions, the participants' discussions permeated similar lines of reasoning and understanding, in relation to the professional competences of nurses in the ICU, regarding medications.

The participants considered the nurse's work to be highly representative and important in view of the complexity of the medications. Their role stands out for being responsible for coordinating care, scheduling medical prescriptions, providing guidelines to the Nursing team and administering medications in certain situations.[15]

Even in the similarities, it is possible to infer some particular characteristics of each institution. In Table 1, hospitals A and B follow scientific and technical thinking, focused on concrete knowledge (scientific knowledge, technical knowledge, nine "rights" in the safe

administration of medications, drug indication). Hospitals C and D are geared towards professional identity, the *ethos* of the nurse (autonomy, continuing education, responsibility).

Recognized in the matrix of this study, the professional autonomy competence, an essential component of the nurse's identity, is a daily achievement in the search for space, social recognition and privileges in professional domains.[16] This competence speaks about the empowerment of the profession, while it generates respect in the multi-professional team in relation to nurses, for their work, not free of their responsibilities. The professional must treat each patient and their care with the peculiarities that fit them, thus exercising their autonomy in the management of the administered drugs and, therefore, positioning themselves with a significant role in the prevention of errors and possible clinical consequences.[17]

The scientific knowledge competence was also listed in the matrix. This is an important requirement for nurses who are involved with medications.[18] Its absence can negatively reflect on the care of critical patients. The understanding of the pharmacology of medications is related to their mechanism of action and the nurse who acquires such knowledge, together with the specifics of the patient's clinical situation, will be able to plan and organize the execution of the Nursing care prescription.[19]

The development of the next competence mentioned is linked to the previous discussion and is called Knowledge of drug indication. Amid debates of this competence, the nurse's need to know the medication to be administered in a contextual reality was addressed, in view of the current clinical situation of the assisted patient.

The ICU nurse needs to have specific pharmacological knowledge of the medications, especially those of high surveillance, in addition to the patient's contextual clinical reasoning, which will have an impact on decision-making for the Nursing interventions.[20] This knowledge promotes adequate and quality care, aiming at the principles proposed for patient safety.[21]

The next competence is Technical Knowledge. The participants observed that, often, the procedures performed inadequately by the Nursing professionals, in relation to the handling of medications, can lead to risky assistance to the patient and the nurses themselves.

The observational study in the ICU, which evaluated patient safety practices during medication administration by Nursing, concluded that the professionals did not execute the protocoled strategies accordingly, compromising all the action performed. The justifications for non-adherence were the following: short time to perform tasks, forgetfulness, distance from the sink (in the case of hand hygiene), lack of observation of attitudes towards safe care, shortage of human resources, lack of knowledge.[22] In consonance, another survey identified that 98.8% of the professionals did not adhere to the hand hygiene procedure during the handling and administration of medications, as well as non-labeling of the medications to be administered.[5]

Of the defining characteristics that were mentioned in this competence, the following are worth a special note: knowledge on the dilutions of the most used medications in the ICU and close observation of the medical prescription. These are indicators that interfere with patient safety, whereas a wrong calculation can put the assistance provided at risk. A study that observed nurses from three Finnish hospitals showed that the competences in the calculation of medications are one of the main difficulties presented.[23]

Educational actions within the work process are important[6] and are in consonance with the next competence of the matrix: continuing education. In the discussions, the participants commented on the concern with the need for updates and specializations in the hospital area. This data is similar to those from other studies carried out with nurses working in the ICU and who consider it an essential competence.[18-19]

Continuing education emerges in the discussions, placing nurses in a prominent position, since they are responsible for identifying the team's needs, creating educational strategies and sharing their knowledge. A survey that reveals the repercussions of continuing

education in the ICU concluded that this action is capable of generating important changes in the work process and constitutes an opportunity for training and updating, providing improvement in quality of care and patient safety.[24]

A study that sought to understand the training of nurses working in the ICU demonstrated, by the respondents, how much they understand the importance of this process of education at work. The data showed the values of well-being, satisfaction and motivation of nurses in seeking to improve their professional performance.[25]

The nine "rights" in the safe administration of medications were considered as one of the competences of this matrix, since Nursing acts directly in the administration of medications, requiring from its professionals maximum attention on this procedure, with the objective of preventing medication errors in this stage.[8] This sequence of strategies seeks to minimize the risks of medication errors, namely: right patient, right medication, right way, right time, right dose, right record, right action, right way and right answer. Following them can become the potential barrier to unwanted events.[26]

Responsibility, chosen as a competence, was cited in all groups of nurses interviewed, with several characteristics described in the matrix. All of them are considered to intertwine and mutually depend to complement each other. It was observed in the testimonies that responsibility goes beyond being a nurse, but a professional responsible for a team, in which they need to exercise their leadership role, with good communication, to be ethical in the face of different situations that may occur in their work time.

Leadership is a required competence for every nurse and, although it is not part of the matrix of this study, it was a theme that permeated the discussions during data collection.[17] Just as good communication is also identified as a daily competence in Nursing care, by this action, it translates into safety and comfort for the patient, as well as the entire professional team.[21,27] A survey concluded that knowing and involving the patient in their care with clear and consistent

information is a safety strategy in the administration of medications.[28] Actions like this increase the value of the patient as co-responsible for their care.[29]

The good relationship with the multi-professional team exposed in the present study as one of the defining characteristics of the responsibility competence, aims, collaboratively, to serve as a barrier to medication errors. This power of interdisciplinary involvement to improve drug safety is reported.[29-30]

Regarding the ethical performance of the behavior of nurses in relation to the medications, in cases of error events occurred in their administration, a study demonstrated measures to be adopted, including decision-making in relation to complications with the patient (assessing and controlling adverse effects); educational actions with the nursing team; and error log.[6] In the available literature, other competences of the nurse who works in the ICU are mentioned: teamwork, interpersonal relationships, planning, organization, emotional balance, situation management.[3-4]

As a limitation of the research, the fact that the study was carried out in services of a local reality is presented, and it is recommended to carry out research studies in other cities and regions. The diverse evidence in this research, from the competence matrix, will provide contributions to the teaching of Nursing, by providing theoretical subsidies for the discussions on improvement, both in the processes of professional improvement, as in the training and introduction of these elements in the curriculum of Nursing students.

Conclusion

The matrix was established with seven competences: professional autonomy, scientific knowledge, knowledge of drug indication, technical knowledge, continuing education, nine "rights" in the safe administration of medications and responsibility. Despite presenting results from a specific group, the competence matrix related to medications for the nurse in the ICU

provides opportunities for self-reflection and reframing professional responsibility, according to local and regional demands.

The construction of this competence matrix can support the implementation of teaching and learning strategies, either in the professional field through permanent education in health, or in undergraduate and graduate courses related to Nursing education. As this is a research study carried out in intensive care services for adult patients in a city and with specific groups of nurses, its findings are limited to the local reality. Research studies in other spaces are recommended to delimit in general perspectives the competences related to medications for the nurse in the ICU.

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Conception or design of the study/research, data analysis and/or interpretation, final review with critical and intellectual participation in the manuscript

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