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Importancia de la capacitación en lo toma adecuada del tamizaje metabólico neonatal por parte del personal de enfermería

Importance of training in the proper use of neonatal metabolic screening by nursing staff

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Palabras claves:
Conocimiento, Tamizaje Neonatal, Capacitación profesional, Enfermería, Enfermería Neonatal.

Resumen

Introducción: la capacitación, entrenamiento y especialización son aspectos inherentes a la profesión de enfermería, considerando los cambios científicos y tecnológicos que se dan de manera vertiginosa en las ciencias de la salud. **Objetivo:** evaluar el programa de capacitación a los profesionales de enfermería sobre la adecuada toma de la muestra de tamizaje metabólico neonatal. El grupo de estudio fueron 22 profesionales de enfermería de los centros de salud de la zona urbana de Tulcán. **Metodología:** se aplicó una encuesta validada por expertos de salud, donde se evaluaron 3 criterios, experiencia, actualización y procedimiento. Se creó además una escala de valoración para cada uno de los tres criterios. **Resultados:** se evidencian la necesidad que tiene el personal de enfermería de actualizar sus conocimientos sobre el programa de Tamizaje Metabólico Neonatal implementado por el Ministerio de Salud Pública. En cuanto a la actualización de conocimientos, se señala que los profesionales parecen recibir y asimilar las actualizaciones de manera más homogénea, lo cual podría ser resultado de programas de educación continua bien implementados o políticas regulares que promueven la actualización profesional. **Conclusiones:** un equilibrio entre la personalización y la estandarización es crucial para optimizar la calidad y la eficiencia de los servicios de salud proporcionados. **Área de estudio general:** Salud. **Área de estudio específica:** Enfermería. **Tipo de estudio:** Artículo original

Keywords:
Knowledge, neonatal screening, professional training, Nursing, Neonatal Nursing

Abstract

Introduction:training, training and specialization are inherent aspects of the nursing profession, considering the scientific and technological changes that occur at a dizzying pace in the health sciences. Objective: to evaluate the training program for nursing professionals on the appropriate collection of the neonatal metabolic screening sample. The study group consisted of 22 nursing professionals from health centers in the urban area of Tulcán. Methods: a survey validated by health experts was applied, where 3 criteria were evaluated: experience, updating and procedure. A rating scale was also created for each of the three criteria. Results: The need for nursing staff to update their knowledge about the Neonatal Metabolic Screening program implemented by the Ministry of Public Health is evident. Regarding

the updating of knowledge, it is noted that professionals seem to receive and assimilate updates in a more homogeneous way, which could be the result of well-implemented continuing education programs or regular policies that promote professional updating. Discussion: it is suggested that while procedural training seems standardized, it may be insufficient, so it could benefit from more structured and more intensive approaches. Conclusions: a balance between personalization and standardization is crucial to optimize the quality and efficiency of the health services provided.

Introduction

Training, coaching and specialization are inherent aspects of the nursing profession, considering the scientific and technological changes that occur rapidly in health sciences (1). Consequently, these processes should be active and permanent because they allow obtaining, maintaining, updating and strengthening the knowledge, skills and attitudes of nurses, to face their care role in a more competent way (2). Consequently, a trained and updated nurse can show a high job performance and contribute to the achievement of the objectives of the nursing service and the health institution where he or she works (3).

Continuous training in health institutions is very important because scientific and technological innovations in short periods of time, the knowledge and skills of health professionals lose validity, particularly nurses, making permanent updating necessary to ensure quality nursing practice (2). Continuous learning is a fundamental process that contributes to professional development by promoting self-improvement, autonomy and self-determination. This process not only involves acquiring new knowledge, but also applying it effectively in relevant contexts. Through continuous learning, professionals have the opportunity to stay up to date in their field, improve their skills and competencies, and adapt to changes in their work environment (4). This allows them to be more efficient and effective in their roles, in addition to fostering a sense of achievement and personal satisfaction. Authors define nursing and role as "the coverage of autonomous and collaborative care provided to people of all ages, families, groups and communities, sick or well and in all environments; that is, the role played by nursing staff (5). When relating the nursing care role with the National Neonatal Metabolic Screening Program, Ramirez indicates that the role; begins with the training and application of verbal informed consent on the national neonatal metabolic screening program to the mother, then the proper filling of the booklet based on the information provided that corresponds to the educator role; followed by the procedure in the sample collection with

its respective asepsis and antisepsis technique at the puncture site of the right heel and under the quality criteria of the blood sample placed on the filter paper, emphasizing the care role; after that, the registration of the data in the system, generating the test code with its respective envelope identification, corresponding to the administrative role; and finally the sending of the sample to the designated department culminating with the investigative role (6).

Within this context, neonatal metabolic screening is identified as the set of procedures and tests performed to separate apparently healthy newborns (NBs) from those with suspected metabolic diseases, known as congenital or inborn errors of metabolism, characterized by an innate inability to carry out a metabolic process due to the absence or inactivity of an enzyme (7). Unusual results in neonatal metabolic screening do not necessarily indicate the presence of a disease; it is essential to perform a complete evaluation of the newborn before confirming a diagnosis. Screening is considered the first step in detecting diseases before they become clinically manifest, allowing early treatment to be initiated to prevent complications, disabilities, and possibly disease-related death. It is important to note that although abnormal results are an indication of possible disease, additional tests are required to confirm a diagnosis (8).

In 1961, Dr. Robert Guthrie proposed the detection of phenylketonuria through drops of blood deposited on filter paper. Later, his technique was used to identify other metabolic abnormalities, and in 1963, neonatal screening was implemented in the United States of America (8). In Mexico, in 1973, the neonatal screening program for metabolic diseases was implemented with the detection of phenylketonuria, galactosemia, maple syrup urine disease, homocystinuria and tyrosinemia. The program was cancelled in 1977 and was reestablished in 1986, for congenital hypothyroidism and phenylketonuria. Later, in 1988, the Ministry of Health established mandatory screening in institutions with care for newborns. This neonatal screening is classified as basic and expanded according to the diseases that can be detected (9). In 2009 and 2010, the Manuela Espejo Solidarity Mission conducted the first biopsychosocial study in Ecuador, finding 294,166 people with disabilities, with a prevalence of 2.43 per 100,000 inhabitants. Of the total number of disabled people, 24.46% have intellectual disabilities and 75.54% have other types of disabilities. With the results of this study, on December 2, 2011, the Vice Presidency of the Public Network, together with the Ministry of Public Health (MSP) of Ecuador, implemented the National Neonatal Screening Program (TAMEN) with an approximate investment of 17 million dollars until 2014 (6 dollars for each child screened) and a saving of 10 million dollars per year for treatments in disabled patients. The objective of this Program is the early detection, prevention of intellectual disability, early death and management of ECM of four diseases: congenital adrenal hypertrophy (CAH), congenital hypothyroidism (CH), galactosemia and phenylketonuria (10).

The Ecuadorian government created a program called "With the right foot, the footprint of the future", the name given to the neonatal metabolic screening promoted by the Vice Presidency of the Republic of Ecuador to ensure that newborns in the future do not have complications such as intellectual disability and even death (10).

Within the operational process of this screening program, three basic stages have been proposed: (a) pre-analytical, which includes sample collection, drying, preservation and shipment; (b) analytical for processing, analysis and issuance of results in the laboratory; and (c) post-analytical stage, which includes everything from the delivery of results to the follow-up of suspected cases. All stages are crucial to ensure the effectiveness of the program. However, among the main causes of altered results and samples rejected as unsuitable for the laboratory, there are those related to the pre-analytical stage, which are interventions commonly performed by nurses working at the first level of health care (11, 12). With all of the above, the objective of the research was to "Evaluate the training program for nursing professionals on the proper collection of neonatal metabolic screening samples."

Methodology

This study was conducted in the following health centers: Center No. 1, San Francisco, Tulcán Sur, and Tajamar, belonging to the Tulcán Canton, Carchi Province, Ecuador. The study group was made up of twenty-two Nursing Staff. The research has a mixed, descriptive, and correlational approach. A validated survey was applied to the nursing staff of the 4 health centers. With the results obtained, the frequency of rejected tests, the average number of samples taken by the professionals, the frequency of training, and the knowledge about TAMEN were calculated. The survey was evaluated by criteria: Experience with a score of 15 - 20: Competent, 10 - 14: Intermediate, > 9: Low. Update with a score of 9 - 11: Updated, 6 - 8: Intermediate and > 9 Needs update. Procedure with a score of 7 – 8: Knows, 5 – 6: Partially knows and > 4: Does not know. A box diagram of the three criteria under study was made for the graphical representation of the data series. A one-way analysis of variance (ANOVA) was performed, in which the Study Criterion was considered as a factor and the 3 criteria as levels. A Pearson correlation test was performed to determine the relationship between the criteria.

Results

The results obtained show a notable variability in experience scores among health personnel, reflecting a wide range in the level of competence and professional career. This diversity may be attributed to differences in initial training, in the number of years of service or in exposure to different areas of clinical practice.

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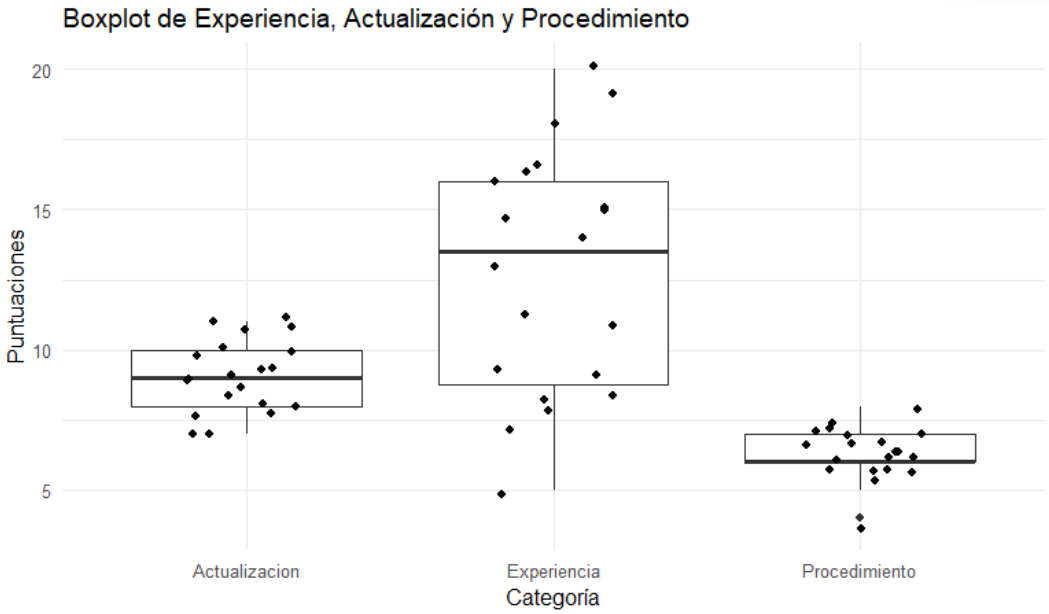

Figure 1.*Box plot for the criteria experience, update and procedure*

Regarding updating, the scores indicate a concentration of data around a stable median, suggesting that professionals are receiving and assimilating knowledge updates in a more homogeneous manner. This could be interpreted as a reflection of well-implemented continuing education programs or regular policies that promote professional updating. Regarding procedural skills, a uniformity in the scores is observed, with relatively low variability. However, the lower means compared to the other areas could point to a need for strengthening in this facet of training. The consistency in the procedural scores could be revealing a standardized, although potentially insufficient, level of training. The patterns observed in these box plots suggest specific areas for development and intervention. While expertise requires an individualized strategy that recognizes and utilizes the variability of staff skills and knowledge, updating and procedures may benefit from more structured and possibly more intensive training approaches. This balance between customization and standardization is crucial to optimize the quality and efficiency of the health services provided.

Table 1.*Results by evaluation criteria*

Criterion	Rating Scale	Score	Result (%)
Experience			
	Competent	15 – 20	40.91
	Intermediate	10 – 14	22.73
	Low	< 9	36,36
Update			
	Updated	9 – 11	63,64

	Intermediate	6 – 8	36,36
	Needs update	< 5	0.00
Procedure	Competent	7 – 8	45.45
	Intermediate	5 – 6.	50,00
	Not competent	< 4	4.55

Table 1 presents the criteria under evaluation, their rating scale, and the respective result. For the Experience criterion, most of those evaluated demonstrated to be highly competent, reflecting a high level of knowledge or skill in their respective areas. A considerable segment showed intermediate experience, suggesting a solidity in the experience base, but with room for growth. However, a significant group was found to have experience below the intermediate level, indicating a potential need for training or professional development. In the area of Updating, most professionals are up to date, which implies that they are current with the contemporary practices and knowledge necessary for their performance. A significant percentage is at an intermediate level of updating, indicating the possibility of improvement through various learning mechanisms. No professionals were registered with a critical need for updating. Regarding the Procedure criterion, almost half of those assessed were competent in performing specific procedures, while the other half were at an intermediate level, which could indicate that, although they have the ability to perform tasks, they could benefit from refinement in their skills. Only a small percentage were considered incompetent, which could require specific attention to improve their skill in the assessed procedures..

The analysis of variance (ANOVA) decomposes the variability of experience, updating, and procedure into two components: one attributable to differences between the evaluation criteria and another due to variations within them. In terms of the Experience criterion, the F ratio of 0.354675 suggests that there are no significant differences between the experience levels in the different health centers, as confirmed by a probability value (p) that is not less than 0.05, guaranteeing a 95% statistical confidence level. Similarly, the Updating criterion shows an F ratio of 0.870287, which, together with a probability value (p) that exceeds the threshold of 0.05, indicates the absence of significant variations. In the Procedure criterion, an F ratio of 0.104188 and a probability value (p) that is not less than 0.05 reflect a consistency in the procedure averages between the evaluated health centers, at a confidence level of 95%. None of the 3 criteria present statistically significant differences.

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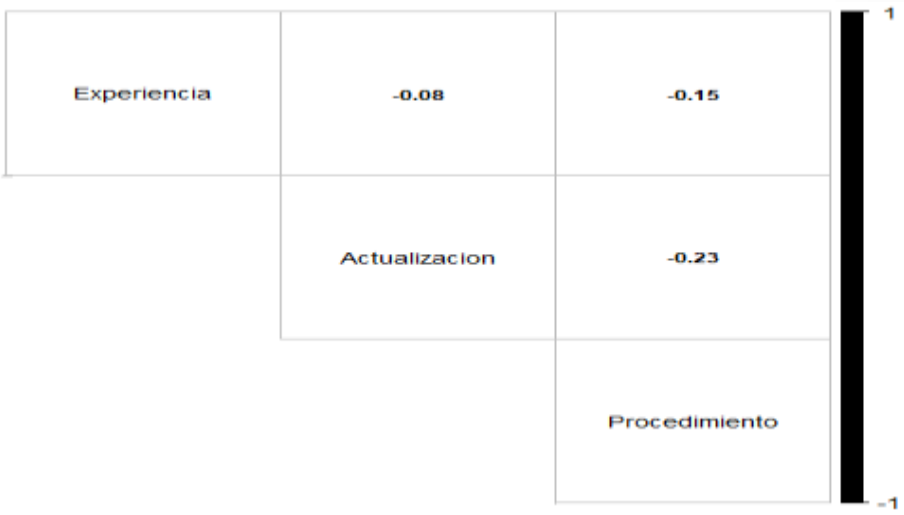

Figure 2.*Correlation analysis*

Figure 2 indicates the correlation analysis between the study criteria. The correlation between experience and updating is -0.08, indicating a very weak negative correlation between these variables. In an applied context, this suggests that there is no significant linear relationship between experience and the frequency of updating skills or knowledge. The correlation between experience and procedure is -0.15, which also denotes a weak negative correlation. This correlation suggests a slightly stronger trend than the previous one, although still weak, where an increase in experience could be slightly associated with a decrease in procedural skill, or vice versa. The correlation between updating and procedure is -0.23, indicating a weak to moderate negative correlation. This could be interpreted to mean that those who are more updated might have a lower mastery of the procedures assessed, or it could reflect that greater attention to professional updating does not necessarily translate into improved practical knowledge. The coefficients are relatively small, indicating that while there is some evidence of a linear relationship, these are not strong and might not be significant. Furthermore, it is essential to consider that correlation does not imply causality and that any interpretation must be supported by a theoretical and contextual understanding of the variables involved.

Educational strategies are of great help to emphasize a topic in the community and set clear guidelines, applying bases of discipline and behavior in order to obtain attention in teaching to obtain good results, facilitating the development of flexible and creative thinking. Resulting in the improvement of the effectiveness and efficiency of training and development programs (13).

Flowers-Oakset al. (7), in a study conducted in a public institution, observed that the predominant type of nursing staff was the bachelor's degree, 60.9%; by type of position, general nursing 51.5%, specialist 5%; non-participation in continuing education courses was 1.5%; attendance at courses was 37%. 51% of this staff considers that the courses are

useful for their current work. When correlating years of seniority with the number of courses taken, the authors did not find a statistically significant difference, this information differs from that found in our study.

This study agrees with the description of several motivational factors of nursing staff that affect their participation in continuing education courses. These factors include lack of time, lack of dissemination of the courses, working more than one work day, lack of personal interest in studying and lack of financial resources.

It is important to mention that the nursing professional lacks an updated protocol for screening, which makes its execution difficult. In addition, the lack of adequate training and experience in the right heel prick technique contributes to errors in sample collection. The shortage of personnel leads to the hiring of new health personnel, including newly recruited professionals and personnel in their rural health year. This has resulted in an increase in the incidence of poorly collected samples, due to problems such as the quality of the blood drops on the filter paper, environmental contamination and excessive drying time. In some cases, mothers are not willing to repeat the neonatal metabolic screening procedure, and the difficulty in locating users due to incorrect address information or wrong telephone numbers also hinders the process.

In a study carried out in Mexico City, the topic of which was "Participation of nursing staff in neonatal screening for the detection of congenital hypothyroidism" (14), it is mentioned that the key to a health team is the participation of nursing staff from the collection of data from the newborn, the execution of the sample collection to the direct training of parents. In turn, among its objectives is to show how since 1990, nursing staff was directly involved in the Neonatal Screening Program for the detection of HC at the National Institute of Perinatology (INPer) until the year 2000. Regarding the findings of this study, an increase in the coverage of metabolic screening is observed during the years analyzed. In addition, there is evidence of an improvement in the effectiveness and efficiency of the nursing staff in the correct execution of the puncture technique, as well as in the quality of the drop of blood obtained and in the collection of accurate data, which facilitates the location of cases with altered screening results (15).

On the other hand, the need for health centers in the country to have training personnel is very relevant. "The transformation in nursing education requires new processes to focus training from a more comprehensive perspective. This demands changes in the organizational structure of training programs, as well as the orientation of the curriculum toward the competencies that these professionals must develop to solve the most relevant problems (16). In this sense, various studies have highlighted the importance of adopting new educational processes that allow nursing professionals to be trained in a comprehensive manner. For example, an article published in the Journal of Professional

Nursing emphasizes the need to implement changes in training programs to promote a more holistic approach in nursing education (17).

The study of clinical nursing practice allowed the discovery and description of the knowledge that underpinned nursing practice, establishing the difference between practical knowledge and theoretical knowledge. One of the first theoretical distinctions that Benner et al. (17) established was the difference between practice and theoretical knowledge. He stated that the development of knowledge in a practical discipline "consists of expanding practical knowledge (practical know-how) through scientific research based on theory and through the exploration of existing practical knowledge developed through clinical experience in the practice of this discipline" (p. 120).

Conclusions

- The data and results obtained in this research highlight the need for continuing education among health professionals working in various healthcare settings. Continuing education is essential to stay up-to-date in knowledge and skills within the professional field, and must be supported by sound pedagogical theories that facilitate the construction and consolidation of knowledge. It is important to understand that continuing education is not limited to the acquisition of new information, but also involves the modification of attitudes, behaviors, and habits to improve professional performance and eliminate outdated practices. The application of pedagogical theories such as constructivism and meaningful learning can be especially beneficial, as they promote the participation of the professional in the construction of his or her own knowledge, which can lead to deeper changes in professional practice. It is also important to update the TAMEN sampling protocol and to continuously train staff to avoid future sampling errors and, therefore, prevent disability and premature death among children who receive care at health facilities in the city of Tulcán.

Conflict of interest

The authors declare that they have no conflict of interest in relation to the submitted article.

Authors' contribution statement

- **Ana Milena Lozano Borja:**Conception and design of the study, data collection, analysis and interpretation of results; drafting of the manuscript; approval of the final version of the manuscript; responsible for all aspects of the manuscript, writing of the manuscript; responsible for all aspects of the manuscript ensuring accuracy and integrity.

- **Juan Alberto Gaibor Chavez:**Analysis and interpretation of results; critical review of content; approval of final version of manuscript; responsible for all aspects of manuscript ensuring veracity and integrity.

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