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Barriers experienced by nurses in newborn screening: a integrative review

Barreiras vivenciadas pelo enfermeiro na realização do teste do pezinho: revisão integrativa

Kamila Silva de Miranda[1]
https://orcid.org/0000-0001-6975-3746

Isabella Cabral dos Santos[2]
https://orcid.org/0000-0002-0438-3075

Omar Pereira de Almeida Neto[3]
https://orcid.org/0000-0002-5361-284X

Tatiany Calegari[4]
https://orcid.org/0000-0001-7917-043X

Luana Araújo Macedo Scalia[5]
https://orcid.org/0000-0003-1000-8738

Abstract

Introduction: The newborn screening test is one of the tests that make up the Neonatal Screening Program, characterized by collecting blood samples from the newborn's heel, preferably between the third and fifth day of life, allowing the screening of six diseases. Nurses are fundamental for the success of neonatal screening, it is the competence of this professional to perform the technique, to provide guidance to parents about the procedure, the importance and benefits of screening. **Objectives**: To review in the literature scientific productions that investigated the role of nurses in carrying out the newborn screening test. **Materials and Methods**: The present study used the integrative literature review as a research method. For the selection of articles, the databases LILACS, MEDLINE, BDENF, SCIELO and PUBMED were used. After applying the inclusion and exclusion criteria, 12 studies were selected to compose a sample of this review. **Results**: The studies brought up themes such as the nurses 'lack of knowledge and technical skills in relation to the newborn screening test, the parents' insufficient knowledge about neonatal screening and the lack of information attributed to those responsible for the procedure. **Conclusion**: It is concluded that the nursing professional has important competences to be performed, however this should improve their skills, their scientific knowledge about the test and also intensify and expand the information provided to parents about this test since the period prenatal care.

Keywords: Neonatal Screening; Health Education; Nursing

Resumo

Introdução: O teste do pezinho é um dos exames que constitui o Programa de Triagem Neonatal, caracterizado por coletar amostras sanguíneas do neonato preferencialmente entre o terceiro e o quinto dia de vida, permitindo o rastreio de seis doenças. Os enfermeiros são fundamentais para o êxito da triagem neonatal, são competências deste profissional a execução da técnica, a orientação aos pais sobre como é o procedimento, a importância e os

[1] Universidade Federal de Uberlândia, Minas Gerais, Brasil. E-mail: kamilaamiranda9@gmail.com
[2] Universidade Federal de Uberlândia, Minas Gerais, Brasil. E-mail: bellasantos_@outlook.com
[3] Universidade Federal de Uberlândia, Minas Gerais, Brasil. E-mail: omarpneto@hotmail.com
[4] Universidade Federal de Uberlândia, Minas Gerais, Brasil. E-mail: taticalegari@yahoo.com.br
[5] Universidade Federal de Uberlândia, Minas Gerais, Brasil. E-mail: luanascalia@ufu.br

benefícios da triagem. **Objetivos**: Revisar na literatura as produções científicas nacionais e internacionais que investigaram o papel do enfermeiro na realização do teste do pezinho. **Materiais e Métodos:** O presente estudo utilizou como método de pesquisa a revisão integrativa da literatura. Para a seleção dos artigos foram utilizadas as bases de dados LILACS, MEDLINE, BDENF, SCIELO e PUBMED. Após aplicar os critérios de inclusão e exclusão, foram selecionados 12 estudos para compor amostra desta revisão. **Resultados**: Os estudos trouxeram temáticas como a falta de conhecimento e habilidades técnicas do enfermeiro em relação ao teste do pezinho, o conhecimento insuficiente dos pais sobre a triagem neonatal e a ausência de informações atribuídas aos responsáveis sobre o procedimento. **Conclusão**: Conclui-se que o profissional de enfermagem possui competências importantes a serem desempenhadas, no entanto este deve melhorar suas habilidades, o seu conhecimento científico sobre o teste do pezinho e também intensificar e ampliar as informações fornecidas aos pais sobre esse teste desde o período do pré-natal.

Palavras-chave: Triagem Neonatal; Educação em Saúde; Enfermagem

Introduction

Neonatal Heel Prick (NHP) is a laboratory exam part of the National Neonatal Screening Program, characterized by collecting blood samples from the newborn heel or peripheral blood by vein puncture, preferably between the third and fifth day of life[1]. This analysis allows the early diagnosis of infectious, genetic and metabolic diseases, and the introduction of therapeutic interventions before neurological sequels set in [2].

The exam was regulated in Brazil in 2001, by the Ordinance 822, allowing diagnosing four possible newborn diseases. By the year 2012, diagnosis of two more disturbances was included in the program, resulting in the diagnosis of hemoglobinopathies (Hb), cystic fribrosis (CF), phenylketonuria (PKU), congenital hypothyroidism (CH), congenital adrenal hyperplasia (CAH), and biotinidase deficiency (BD). Recently, in March 2020, through the Ordinance 7, the neonatal heel prick included detection of congenital toxoplasmosis, in the Public Health System (SUS) [2,3].

NHP is mandatory and the period for the exam should not be less than 48 hours of life nor post one month after birth. The blood samples are deposited in filter paper and sent for analysis. Collection procedure, parental guidance on how the exam is done, its importance and benefits, are responsibility of the nurse. This professional should provide early information to parents about the proper period for the exam and, mostly, to inform them about the risks of not making this exam [4].

SUS, besides providing NHP exam, which one of the diagnosis stage, also provides treatment and monitoring of children with positive results for any of the above mentioned maladies. Access to all these benefits can be provided to the newborn only with involvement and guidance to the parents and population at large, assuring adherence to NNSP and subsequent reduction of infant morbi-mortality indices [5].

Nurses are fundamental for the success of neonatal screening, since these professionals have greater interaction with mothers and their newborn. Through all levels of health attention, from pre-natal nurse consultations to maternities, nurses should inform about the exam, its purpose and when it should done. This information should be brought up again and any doubts about the procedure should be cleared. The information provided addresses health safety for their children, especially for first-time mothers. Moreover, proper parent guidance allows appropriate care of the newborn in its first week of life [6].

Considering that nurses play an important role in newborn management in their first week of life with parents or

responsible ones, this study demonstrates and evaluates nurse's competence for neonatal screening. Therefore, this study analyzed scientific publications on the nurse's role for the success of neonatal heel prick.

Material and methods

This study used an integrative literature review as the research method, which is one of the mechanisms allowing the incorporation of evidences in practical clinic. This research design allows gathering and synthesizing results of studies on a given theme or topic, promoting a deeper knowledge of the study area [7].

The following guiding research question was used: "What is the role of the nurse for in the implementation of the neonatal heel prick?", which was defined using PICO (acronym for Patient/Problem, Intervention, Comparison and Outcomes). This strategy allows the identification of keywords, which help finding relevant studies on that theme in the databases [8]. The first element of this strategy (P) was nurses, the second one (I) success in implementing the nurse's role in the application of the neonatal heel prick; the third element (C) nurses that perform their competences present better results than those that do not perform their competences properly; and the fourth one (O) success of the nurse in neonatal screening improves parental understanding and the application of the exam NHP.

The databases searched were LILACS, MEDLINE and Nursing Databank – Brazilian Bibliography (Banco de Dados em Enfermagem – Bibliografia Brasileira - BDENF), using the Virtual Library in Science (Biblioteca Virtual em Saúde - BVS). Other databases searched were *Scientific Electronic Library Online* (SciELO) and *National Library of Medicine* (PubMed). The keywords in Health Science (Descritores em Ciências da Saúde - DeCS) and their respective translations, according to MeSH terms (*Medical Subject Headings*) used were Neonatal Screening, Health Education, and Nurse. The keywords were combined in different orders were combined by the Boolean operator AND to better relate the keywords, keeping as the primary keyword Neonatal Screening.

Included studies were published between 2010 and 2020, in Portuguese, English or Spanish, and were open access. Studies that were not open access, published in proceedings of congresses, secondary studies published as literature reviews, experience reports, editorials, dissertations, theses, monographs, and letters to the editors were excluded.

Modified Ursi and Gavão's (2006) instrument was used for the collection of data in the selected studies. This instrument, besides compiling the publication (title, journal, authors, publication location, language and publication year), it records methodology, objectives, interventions implemented and results [9]. Moreover, it was used to prepare the review and the flowchart of PRISMA methodology, which improves reports of the reviews through a checklist with 27 items and a flowchart of four steps [10].

Exploratory reading of titles and abstracts of previously selected publications was done, according to the proposed objectives. Subsequently, detailed reading was done of the complete publication. Finally, after analytical and interpretative reading, 12 publications were included for this study.

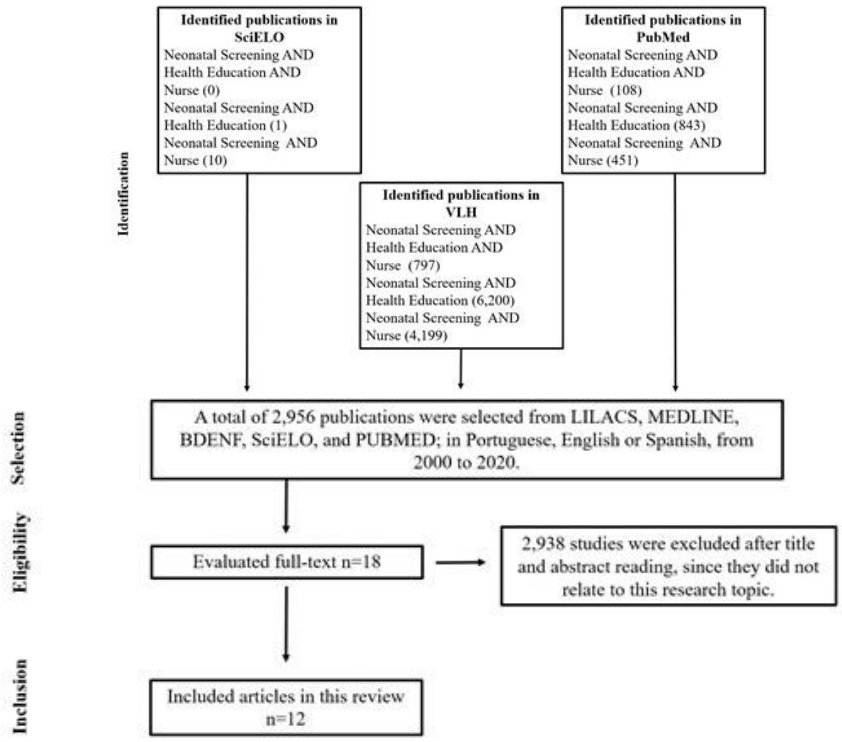
Two independent researchers synthesized the information contained in the selected papers. Whenever inconsistencies of results were found, there was a discussion between the investigators until a consensus was reached.

Results

The search in the databases BVS, SciELO and PubMed returned 11,196, 11 and 1,402 publications, respectively,

resulting in the selection of 2,956 papers. Eighteen publications were selected for further analysis, after the exploratory analysis of titles and abstracts (Figure 1).

Figure 1: Flowchart for the selection of publications for this study.



The final number of studies, after screening all publications retrieved from the databases, is shown in Table 1. Among the 12 selected publications, six (50%) were written by health professionals, with the objective of evaluating how much they knew about NHP, and the other six (50%) analyzed parents and responsible ones knowledge about the exam. Thus, two categories were created: (1) The nurse and neonatal heel prick, and (2) Knowledge of parents/responsible ones about the exam: the impact of nurse's work.

Table 1: Description of selected publications, according to authors, year, title, objectives and main results

Authors	Year	Title of publication	Objectives	Main Results
SANTOS et al. [9]	2011	Knowledge of puerperal about neonatal screening	To assess puerperal knowledge about the importance of neonatal screening	1) Puerperal insufficient understanding about the importance of screening; 2) Awareness of their children's screening; 3) Information about the test were provided by nurses at hospital discharge.
ABREU and BRAGUINI [10]	2011	Neonatal screening: mother's knowledge in a Maternity Ward in the State of Paraná countryside	To analyze population awareness of the purpose and importance of NHP and characterize it socio-demographically.	1) 65% (n= 26) knew the purpose of neonatal screening; 2) 35% reported not knowing its purpose; 3) 45% learned about NHP from health professionals of the

				hospital, when they gave birth to older children.
ACOSTA et al. [5]	2013	Neonatal screening: (re)thinking nursing practice	To know the information about neonatal screening shared by nurses with parents of newborn babies.	1) Interviewed nurses were conscious about using teaching-learning strategies for individual learning, considering previous knowledge of parents; 2) Only a few nurses reported using strategies to favor understanding of parents about the importance of NHP, despite the advantages of doing so since pre-natal consultations.
STREFLING et al. [11]	2014	Knowledge about neonatal screening and its implementation.	To describe nurse's awareness of neonatal screening program and its implementation.	1) Nurses were aware of the objectives of neonatal screening, the ideal window for collection, the technique used for doing so, diseases diagnosed, and the ones the State is prepared to provide treatment.
ARDUINI et al. [2]	2017	Awareness of puerperal about NHP	To identify awareness of puerperal about NHP	1) 62.7% (n= 75) of puerperal reported the need for more information about every aspect of NHP, especially about the ideal period for the collection; 2) Most of them (72%) did not know which diseases were screened in the State of Minas Gerais and did not know their etiology; 3) Mothers with more schooling demonstrated more knowledge about the purpose and importance of the test.
SILVA et al. [4]	2017	Newborn Heel Prick: perception of pregnant women about orientation in prenatal care	To investigate perception of pregnant women about NHP and assess how this theme is addressed in prenatal care.	1) 75% (n= 160) did not know the diseases screened; 2) 82% needed more information; 3) only 36% of the pregnant women knew the ideal period for collection; 4) 53.1% reported not having received information about NHP in prenatal care.
MESQUITA et al. [12]	2017	Neonatal Screening and Professionals of Basic Health Care Units	To describe knowledge of health professional about neonatal screening.	1) 43.1% (n= 122) of the professional mentioned congenital adrenal hyperplasia as a disease screened by the test, while only 24.4% cited biotinidase

				deficiency; 2) About 90% stated the ideal collection period as between the third and seventh day of newborn's life, and its purpose is the detection of treatable diseases.
CARDOSO and MARÍN [13]	2018	*Gaps in the knowledge and skills of Portuguese mothers associated with newborn health care*	To characterize the level of knowledge and ability associated to parent competence: promoting and overseeing child health in the first six months of life, and characterizing the profile of better prepared mothers	1) 65% of the mothers were not aware when NHP should be done.
BATISTTI et al. [14]	2018	Nurse's knowledge about the importance and implementation of Neonatal Screening Program	To describe nurse's knowledge about the importance and implementation of National Neonatal Screening Program (NNSP).	1) The nurse presented simple responses about NNSP, demonstrating a lack of assurance and a shallow theoretical knowledge.
LUCENA et al. [15]	2018	First Week Holistic Health of the newborn: activities of nurses in the Family Health Strategy	To describe the activities of nurses at ESF about the First Week Holistic Health in NB care.	1) Guidelines given to mothers by the nurses were incomplete and outdated; 2) The activities were not done in the ideal period.
GOMES et al. [16]	2019	Knowledge about neonatal screening: discourses of mothers and fathers of newborns	To describe the discourse of fathers and mothers about the conceptions and knowledge about neonatal screening.	1) Parents understand the purpose of NHP; 2) They had limitations in relation to diseases screened.
NISSELLE et al. [17]	2019	Lessons learnt from implementing change in newborn bloodspot screening processes over more than a decade: Midwives, genetics and education	To explore the role of midwives and the educational requirements for newborn screening (NBS) for genetic conditions, as programs and educational support evolve in time.	1) Midwives were not well trained about the diseases screened by NHP.

Discussion

Nurses are responsible for proper and timely neonatal heel prick exam, in order to achieve its intended purpose. This professional should be well prepared and especially trained for this procedure and to provide guidance to the responsible ones prior and after the exam is done [11]. Together with a multidisciplinary team, the nurse should provide orientation to the parents about the blood collection, diseases

detected and treatment for these diseases in cases of positive diagnosis [11].

Five of the studies done with health professionals pointed that nurses demonstrated lack of knowledge about neonatal heel prick and did not use educational strategies that favored understanding of the information provided to pregnant women and newborn parents [5,15,17,18,20].

Acosta et al. (2013), in a study with 13 nurses, found a misunderstanding in relation to the proper time for material collection for the exam and lack of knowledge about its purpose [5]. Moreover, few of them were concerned about using effective teaching-learning strategies for mother's better understanding about neonatal heel prick. The authors confirmed the educational role of the nurse, as responsible for providing information to parents about all the steps of neonatal screening, using a clear objective and easily understandable approach. Thus, there will be an understanding of the exam as something necessary and beneficial, and not only one more mandatory test imposed by the health services [5].

Lucena et al. (2018) emphasized this educational aspect of nurses in their first house visit to the newborn (NB). The Ministry of Health strongly recommends a visit to the NB between the third and fifth day of life, and it is a duty of the nurse to talk about NB care and emphasize the tests of Neonatal Screening. However, several nurses did not even know the recommended days for the visit, demonstrating failures in the assistance to the NB [18].

The study done by Batistti et al. (2018) highlighted the difficulty that nurses had on defining NHP. Moreover, one half of the interviewed nurses did not know the correct technique for the exam. Only four of the participants could mention at least four of the six diseases diagnosed by the NHP, highlighting the shallow theoretical basis of the participants of the study [17].

Similarly, most of the 57 nurses interviewed in Basic Health Units in the State of Minas Gerais did not know which diseases were screened by NHP. Uma quantidade considerável afirmou que doenças como HIV e Síndrome de Turner podiam ser diagnosticadas pelo teste de triagem neonatal. In contrast, the majority of the nurses interviewed responded clearly about the ideal window for blood collection.

According to Nisselle et al. (2019), knowledge of obstetrician nurses about neonatal screening increased in comparison to other studies done in the previous decade; however, this study highlighted that misconceptions still persist about the diseases identified by NH, procedures for sample storage, forwarding the sample for processing in the laboratory, and the procedures to be implemented after the results of the test are returned [20]. These studies reinforce the need for continued education for nurses, which would help in scientific updating, decreasing flaws and miscommunication with the population [15].

In contrast, in another study analyzed, all 13 nurses of seven health units in the state of Rio Grande do Sul knew about the procedures of NHP. The interviewed nurses knew the purpose of neonatal screening, the ideal collection window, diseases diagnosed, and proper technique. Despite that, those authors highlighted the importance of continued education of health professionals, to keep them updated and prepared to provide suitable guidance to newborn parents [14].

Analysis of the six publications related to parents or responsible ones, clearly demonstrated their need for information, or a vague awareness of NHP and its importance for the newborn health.

Silva et al. (2017) interviewed pregnant women and most of them (75%) did not know which diseases were diagnosed by neonatal screening. Moreover, 2.5% of them had not tested their first children because they were not aware of its importance, because they

thought it was painful, or did not have the time to do it. Eighty two percent of the participants believed they needed more information about this test [4].

Arduini et al. (2017), corroborating with the previous study, demonstrated that the interviewed mothers (62.7%) desired more information about neonatal heel prick. Puerperal women stated that they would like to more information about the exam window and diseases screened. Such results were also found by Cardoso and Marín (2013), in which 65% of interviewed mothers reported not knowing the proper time for NHP. These brings up the point that many babies are not screened or that screening is done out the recommended period, highlighting an omission in the nurse's role, who is responsible for providing this information to pregnant and puerperal women.

Mothers, besides not knowing the diseases screened by NHP, they do not know how the exam is performed. Santos et al. (2011) reported that some interviewed puerperal mistook NHP for a foot print of the newborn. This mistake can lead to refusing the exam because they believe is had already been done when they see the foot "stamp" in the child's record book and live birth certificate [12]. Two of the six studies confirmed that most parents understood the purpose of neonatal heel prick and how it is done. However, both studies reported a lack of knowledge in relation to diseases diagnosed by the test [13,19].

Nurses have a fundamental role in providing guidance to parents about NHP and its purpose, advantages, which diseases are identified and the risks the newborn will be exposed to in case the procedure is not done. Another important role of nurses is to supervise the work team in order to provide adequate assistance to pregnant women and NB. Failure to provide important information from pregnancy to birth can lead to failure in doing NHP, resulting in damage to the child's health, increasing children morbi-mortality rate.

Nurses are the first line of assistance to pregnant women, mothers and newborns, and the health education process is their responsibility in every aspect of newborn care. Thus, he is the education agent of the awareness of NHP essentiality for society [21].

An alarming situation was found after this review, it portrays nurses' lack of knowledge about neonatal heel prick, which directly reflects how this information is passed to the public. It is a reminder to public administrators about the need to provide more opportunities for qualification of heath professional, because qualified labor is important for the provision of better services and decrease of children morbi-mortality.

Conclusions

NHP is important, in the context of Brazilian Public Health System (SUS), in promoting screening of six relevant health disturbances, resulting in early diagnosis, which allows prevention of cognitive deficits and reduces infant mortality. The nurse is responsible for blood collection for the exam, for training his team for the collection, and providing parents with all the information related to this procedure.

This integrative literature review achieved the proposed objectives – the studies analyzed allowed to assess nurse's role in NHP screening; also, it identified barriers, such as the proportion of professionals with incomplete knowledge about the test, and the lack of skills for this procedure, as well as deficiencies in providing information and guidance to parents. This was observed in the studies demonstrating lack of knowledge about NHP by mothers, confirming the lack of orientation and supervision of families. Thus, nurses need continuous education in such a way that the provided assistance will be of greater quality and meets the needs of the intended public, in order to

promote the best interventions, based on scientific evidences and effective health promotion strategies.

The main difficulty for this study was finding publications about the selected theme in the systematic search platforms. Therefore, new studies about this theme will improve assistance provided by the State and broaden care strategies targeted to the newborn and their parents, especially in the first week of life of a newborn that could have consequences in subsequent life stages.

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