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Access to Neonatal Screening Test in Monitoring the Care of Newborn

Maria Cândida Furtado, PhD¹

Beatriz Molina Carvalho, SN¹

Waldomiro Roberto Tavares, RN²

Jéssica Batistela Vicente, MSN, RN¹

Gabriel Zanin Sanguino, RN³

Debora Falleiros Mello, PhD, RN⁴

(1)Maternal-Infant and Public Health Nursing Department, University of São Paulo at Ribeirão Preto College of Nursing, Ribeirão Preto, Brazil

(2)Municipal Health Department, Municipal Health Department, Ribeirão Preto, Brazil

(3)University of São Paulo at Ribeirão Preto College of Nursing, Ribeirão Preto, Brazil

(4)Maternal-Infant and Public Health Nursing Department, School of Nursing Ribeirao Preto University of Sao Paulo, Ribeirao Preto, Brazil

Access to neonatal screening test as monitoring the care of newborn

Introduction: The Brazilian government, through public policies, seeks to organize assistance and identify priority actions for child health, intervening in the perinatal causes which are the main reasons for the deaths of children under one year old (Growth and Development: Child Health, 2012; National Policy of Comprehensive Care to Children's Health, 2015). The Commitment Agenda for Integral Health of the Child and Reduction of Infant Mortality proposes comprehensive care through actions of health promotion, prevention of diseases, treatment and rehabilitation. The third line of care of the Agenda, called "Neonatal Screening: Heel prick Test", turns the look and attention to an important exam after birth, which prioritizes the early detection of possible pathologies, as well as the appropriate treatment and follow-up to these children (The Commitment Agenda, 2004; Neonatal screening technical manual, 2016). In 2001, the Brazilian Ministry of Health established the National Neonatal Screening Program (NNSP). This program articulates the Ministry of Health and the Health Departments of the states, the Federal District and municipalities in order to develop neonatal screening actions to diagnose congenital diseases. Neonatal screening should be performed up to the seventh day of the child's life and this exam makes the diagnosis of phenylketonuria, congenital hypothyroidism; sickle cell disease and other hemoglobinopathies, cystic fibrosis, biotinidase deficiency and congenital adrenal hyperplasia (Protocol of fourth phase, 2013). This exam is extremely important as a child's right to care, as well as access to early diagnosis and referral to a specialized service at opportune time (Costa *et al.*, 2012 and Hayeems *et al.*, 2013). Thus, this study investigated the performance of the neonatal screening test, based on the management of the neonatal screening program, considering as "the access" those tests performed until the seventh day of life.

Methods: This quantitative study verified the access of newborns to the neonatal screening test in Ribeirão Preto, São Paulo, Brazil, in 2016. All infants who underwent the test between January 1 and December 31, 2016, in health units, hospitals or laboratories of the municipality were included in the study. The data were obtained in April 2017, and they were extracted from the worksheets of the Municipal Neonatal Screening Program (MNSP). The information was based on the place of the exam (health units/hospital/laboratories); date of exam collection, date and hospital of childbirth; type of health user (public health system or private health system). The program Statistical Package for the Social Science (SPSS) version 22.0 did the data processing. The newborns were characterized for the variables of interest, seeking to identify access to the neonatal screening test in the first week of life. In the analytical phase, we verified the possible associations between "age of the child in the collection" (dependent variable) and "collection site" and "type of health user" (independent variables). The Research Ethics Committee of University of São Paulo at Ribeirão Preto College of Nursing approved the research.

Results: In 2016, 7,955 children were born in Ribeirão Preto, São Paulo, Brazil and 7,640 (96.0%) of them were screened for neonatal screening; 5,089 (66.6%) occurred in health units and 2,551 (33.4%) in hospitals and private laboratories. The health units collected tests both in users of the Unified Health System (SUS) that is the Brazilian public health system and in non-SUS users. Of the collections, 3,720 (73%) were SUS users; and 1,369 (27%) non-SUS users. There was a greater demand for collection for the SUS user and the average collection of health units was higher in the period of three to five days of the child's life (52.6 collections for SUS users and 22.4 collections for non-SUS users). There was a decrease in the average number of exams performed, considering the period outside the one recommended by the Ministry of Health (over one week of life). For SUS users, the months from January to August presented over 300 collections per month, with a decrease from September, reaching an average of 255 collections per month, which coincided with the reduction in the number of live births in the municipality at the end of 2016. Regarding to non-SUS users, the average collection was about 120 exams per month, with a decrease from October. Hospitals and private laboratories performed 2,551 exams in 2016, the majority (2,236; 83,7%) precocious, from three to five days of life. There was also a decrease in the frequency of collections, when considering the ages above one week of life. The infants who remained in hospital collected the exams at these institutions. The chi-square test, processed in the R i386 version 3.4.0 (2017) program, showed an association between the age of the child and the local of collection and type of health user ($p < 0.001$).

Conclusions: The study contributes to the management of the MNSP by reaffirming the occurrence of early access to the neonatal screening test, as a guarantee of timely identification of diseases screened by this examination. For the exams that were collected after the recommended period, the results indicate the need for a detailed evaluation of the reasons for the collection after the recommended one. From this, it will be possible to point out specific intervention for each identified case, in order to provide constant improvement in access to this type of care action for the newborn's health. Therefore, it will meet the recommendations of the national health care policies to Brazilian population.

Descriptors: Neonatal Screening, Health Service Evaluation, Health Services Coverage.

Title:

Access to Neonatal Screening Test in Monitoring the Care of Newborn

Keywords:

Health Service Evaluation, Health Services Coverage and Neonatal Screening

References:

Protocol of fourth phase of National Neonatal Screening Program. (2013). Available from: <http://www.apaesp.org.br/Noticias/Documents/FASE%20IV%20-%20PROTOCOLO%20DA%20TRIAGEM%20NEONATAL%2004112013.pdf>

Commitment Agenda for Integral Health of the Child and Reduction of Infant Mortality. (2004). Brasília. Available from: http://bvsmms.saude.gov.br/bvs/publicacoes/agenda_compro_crianca.pdf

Child Health: growth and development. (2012). Brasília. Available from: http://bvsmms.saude.gov.br/bvs/publicacoes/saude_crianca_crescimento_desenvolvimento.pdf

Neonatal Screening: technical manual. 2016. Brasília. Available from: http://bvsmms.saude.gov.br/bvs/publicacoes/triagem_neonatal_biologica_manual_tecnico.pdf

National Policy to Comprehensive Care to Children's Health. 2015. Brasília. Available from: http://bvsmms.saude.gov.br/bvs/saudelegis/gm/2015/prt1130_05_08_2015.html

Costa, S. N., Boa-Sorte, N., Couto, R. D., Oliveira, E. G., & Couto, F. D. (2012). Neonatal Screening for Phenylketonuria, Congenital Hypothyroidism and Hemoglobinopathies: Evaluation of coverage in Cruz das Almas e Valença, Bahia, Brasil. *Rev. Baiana Saúde Públ.*, 36(1), 31-43. Available from: <http://files.bvs.br/upload/S/0100-0233/2012/v36n3/a3471.pdf>

Hayeems, R. Z., Miller, F. A., Carroll, J. C., Little, J., Allanson, J., Bytautas, J. P., Chakraborty, P., & Wilson, B. J. (2013). Primary care role in expanded newborn screening after the heel prick test. *Can Fam Physician*, 59, 861-868. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3743702/>

Abstract Summary:

Neonatal screening test is extremely important as a child's right to care, as well as access to early diagnosis and referral to a specialized service at opportune time.

Content Outline:

Introduction: The Brazilian government, through public policies, seeks to organize assistance and identify priority actions for child health, intervening in the perinatal causes which are the main reasons for the deaths of children under one year old (Growth and Development: Child Health, 2012; National Policy of Comprehensive Care to Children's Health, 2015). The Commitment Agenda for Integral Health of the Child and Reduction of Infant Mortality proposes comprehensive care through actions of health promotion, prevention of diseases, treatment and rehabilitation. The third line of care of the Agenda, called "Neonatal Screening: Heel prick Test", turns the look and attention to an important exam after birth, which prioritizes the early detection of possible pathologies, as well as the appropriate treatment and follow-up to these children (The Commitment Agenda, 2004; Neonatal screening technical manual, 2016). In 2001, the Brazilian Ministry of Health established the National Neonatal Screening Program (NNSP). This program articulates the Ministry of Health and the Health Departments of the states, the Federal District and municipalities in order to develop neonatal screening actions to diagnose congenital diseases. Neonatal screening should be performed up to the seventh day of the child's life and this exam makes the diagnosis of phenylketonuria, congenital hypothyroidism; sickle cell disease and other hemoglobinopathies, cystic fibrosis, biotinidase deficiency and congenital adrenal hyperplasia (Protocol of fourth phase, 2013). This exam is extremely important as a child's right to care, as well as access to early diagnosis and referral to a specialized service at opportune time (Costa *et al.*, 2012 and Hayeems *et al.*, 2013). Thus, this study investigated the performance of the neonatal screening test, based on the management of the neonatal screening program, considering as "the access" those tests performed until the seventh day of life.

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First Primary Presenting Author

Primary Presenting Author

Maria Cândida Furtado, PhD
University of São Paulo at Ribeirão Preto College of Nursing
Maternal-Infant and Public Health Nursing Department
Associate Professor
Ribeirão Preto
Brazil

Professional Experience: 2007--Ph.D. in Public Health Nursing. 2008- present --Professor, Maternal-

Infant and Public Health Nursing Department, University of São Paulo at Ribeirão Preto College of Nursing (EERP/USP). Ribeirão Preto, São Paulo, Brazil.

Author Summary: Associate Professor at Maternal-Infant and Public Health Nursing Department, University of São Paulo at Ribeirão Preto College of Nursing. Experience in the area of Pediatric and Neonatal Nursing, working mainly on the following topics: neonatal nursing, pediatric nursing, humanization and health assessment.

Second Author

Beatriz Molina Carvalho, SN
University of São Paulo at Ribeirão Preto College of Nursing
Maternal-Infant and Public Health Nursing Department
assistant research
Ribeirão Preto
Brazil

Professional Experience: Bachelor's and Bachelor's degree student in nursing in University of São Paulo at Ribeirão Preto College of Nursing. Conducts research in the area of child health, specifically in child health programs

Author Summary: Bachelor's and Bachelor's degree student in nursing in University of São Paulo at Ribeirão Preto College of Nursing. Conducts research in the area of child health, specifically in child health programs

Third Author

Waldomiro Roberto Tavares, RN
Municipal Health Department
assistant research
Ribeirão Preto
Brazil

Professional Experience: Register Nurse, technical head of the comprehensive health program for children and adolescents, technical head of the Municipal Neonatal Screening Program at Municipal Health Department of Ribeirão Preto.

Author Summary: Register Nurse, technical head of the comprehensive health program for children and adolescents, technical head of the Municipal Neonatal Screening Program at Municipal Health Department of Ribeirão Preto.

Fourth Author

Jéssica Batistela Vicente, MSN, RN
University of São Paulo at Ribeirão Preto College of Nursing
Maternal-Infant and Public Health Nursing Department
PhD candidate
Ribeirão Preto
Brazil

Professional Experience: Member of the Nursing Research Group on Child and Adolescent Care (GPECCA) and the Rho Upsilon Chapter of the Sigma Theta Tau International Nursing Society. She develops research in the area of Nursing, with emphasis on Child Health, Pediatric Nursing and Family Nursing.

Author Summary: PhD student at the Graduate Program in Nursing in Public Health, University of São

Paulo at Ribeirão Preto College of Nursing, member of the Research Group on Nursing in Child and Adolescent Care, working in the area of Nursing, with emphasis on Child Health, Pediatric Nursing and Family Nursing.

Fifth Author

Gabriel Zanin Sanguino, RN

University of São Paulo at Ribeirão Preto College of Nursing
assistant research
Ribeirão Preto
Brazil

Professional Experience: Register Nurse, graduate student of the postgraduate nursing program in public health in University of São Paulo at Ribeirão Preto College of Nursing. Experience with research in the area of child health.

Author Summary: Register Nurse, graduate student of the postgraduate nursing program in public health in University of São Paulo at Ribeirão Preto College of Nursing. Experience with research in the area of child health.

Sixth Author

Debora Falleiros Mello, PhD, RN

School of Nursing Ribeirão Preto University of São Paulo
Maternal-Infant and Public Health Nursing Department
Associate Professor
Ribeirão Preto
Brazil

Professional Experience: 2008-present--Leader of the Nursing Research Group on Child and Adolescent Care at Ribeirão Preto College of Nursing. 2012- present--Associate Professor 3 of the Department of Maternal and Child Nursing and Public Health of EERP-USP. 2014-present-- Effective Member of the Scientific Committee of the Nucleus Science for Childhood (NCPI).

Author Summary: Associate Professor at Maternal-Infant and Public Health Nursing Department, University of São Paulo at Ribeirão Preto College of Nursing. Leader of the Nursing Research Group on Child and Adolescent Care at Ribeirão Preto College of Nursing. Experience in the area of Nursing in Child Health, working with nursing and primary health care in children, child care in the context of the family, health follow-up of term children, preterm and low weight at born.