REFACS

Original Article
Rev. Fam., Ciclos Vida Saúde Contexto Soc.
http://seer.uftm.edu.br/revistaeletronica/index.php/refacs/index
ISSN: 2318-8413 DOI: 10.18554/refacs.v12i4.7841

Development and validation of a checklist for measuring capillary blood glucose in newborns

Construção e validação de checklist de aferição de glicemia capilar no recém-nascido

Development and validation of a checklist for measuring capillary blood glucose in newborns

Janaína Aparecida Maia Silva[1], Ketlin Meira Pereira[1], Maria Paula Custódio Silva[2]
Karoline Faria de Oliveira[3], Divanice Contim[3], Jesislei Bonolo Amaral Rocha[3]

Received: 06/08/2024 **Accepted:** 29/11/2024 **Published:** 28/12/2024

Abstract:
Objective: to develop and validate a checklist to assess the technical skills of nursing students in measuring capillary blood glucose in newborns. **Methods:** a methodological study, carried out between July 2023 and February 2024, developed virtually in two stages: development and validation of a checklist. The data were analyzed using the Content Validity Index. **Results:** nine specialist nurses participated in the study. The final version of the instrument was had 31 items and obtained an average Content Validation Index greater than 0.80. **Conclusion:** the checklist was validated and may contribute to the development of educational activities in undergraduate courses and support future studies to improve the quality of care in measuring capillary blood glucose in newborns.
Keywords: Infant, Newborn; Glycemic control; Nursing.

Resumo:
Objetivo: construir e validar um *checklist* para avaliar as habilidades técnicas de estudantes de enfermagem na aferição de glicemia capilar no recém-nascido. **Método:** estudo metodológico, realizado entre julho de 2023 e fevereiro de 2024, em ambiente virtual, desenvolvido em duas etapas: elaboração e validação de um *checklist*. Os dados foram analisados por meio do Índice de Validade de Conteúdo. **Resultados:** participaram do estudo nove enfermeiras especialistas. A versão final do instrumento ficou estruturada em 31 itens e obteve Índice de Validação de Conteúdo médio maior que 0,80. **Conclusão:** o *checklist* foi validado e poderá contribuir no desenvolvimento de atividades educativas na graduação e subsidiar estudos futuros, para ampliar a qualidade do cuidado na aferição de glicemia capilar no recém-nascido.
Palavras-chave: Recém-nascido; Controle glicêmico; Enfermagem.

Resumen:
Objetivo: construir y validar un checklist para evaluar las competencias técnicas de los estudiantes de enfermería en la medición de la glicemia capilar en recién nacidos. **Método:** estudio metodológico, realizado entre julio de 2023 y febrero de 2024, en ambiente virtual, desarrollado en dos etapas: elaboración y validación de un checklist. Los datos se analizaron mediante el Índice de Validez de Contenido. **Resultados:** nueve enfermeras especializadas participaron en el estudio. La versión final del instrumento se estructuró en 31 ítems y obtuvo un Índice de Validación de Contenido medio superior a 0,80. **Conclusión:** el checklist fue validado y podrá contribuir para el desarrollo de actividades educativas en cursos de pregrado y subsidiar futuros estudios para mejorar la calidad de la atención en la medición de la glicemia capilar en recién nacidos.
Palabras-clave: Recién nacido; Control glucémico; Enfermeria.

Corresponding Author: Jesislei Bonolo Amaral Rocha – jesisleiamaralrocha@gmail.com

1. Nurse. Uberaba/MG, Brazil
2. Hospital das Clínicas of the Universidade Federal do Triângulo Mineiro. Uberaba/MG, Brazil
3. Scientific Didactic Department of Nursing in Hospital Care of the Undergraduate Nursing Course at the Universidade Federal do Triângulo Mineiro. Uberaba/MG, Brazil

INTRODUCTION

Hospitalization of newborns (NBs) often requires invasive procedures, which can be painful, such as heel puncture to measure capillary blood glucose[1,2]. This is a procedure for collecting capillary blood, which is applied to reagent strips for bedside analysis using a glucometer, a device that allows rapid measurement of blood glucose[3]. However, when this test is inappropriately performed, it can cause iatrogenic complications[4]. So, it is important for the team responsible for performing the procedure to masters its technique, understand its indications and select the appropriate materials[5].

Accurate measurement of blood glucose levels is essential for the diagnosis and treatment of neonatal hypoglycemia. Clinical guidelines extensively discuss the ideal methods of assessment, which generally include chemical strips or portable meters at the patient's bedside[6].

Although glucose meters are widely used, as they provide rapid results and require small blood samples, their accuracy is limited, especially for low blood glucose levels, with deviations that can reach 10-20 mg/dL. Therefore, laboratory confirmation of the results is recommended before establishing a definitive diagnosis, especially in asymptomatic newborns[7,8].

The frequency of capillary blood glucose measurement in newborns is determined by clinical condition and medical and nursing prescriptions. In this context, nurses and nursing technicians play an essential role in performing the procedure and in the early identification of glycemic changes, using reagent strips and glucose monitors[9-11].

Despite the relevance of the topic, studies on the technique of measuring capillary blood glucose in newborns are scarce. When performed incorrectly, this procedure can compromise patient safety and generate iatrogenesis, which highlights the need for research that explores interventions and strategies to improve procedure performance[7,8,12].

In this sense, construction and validation of a checklist for the practice of measuring capillary blood glucose in newborns are promising strategies. The use of this instrument can improve communication between patients and staff, contributing to the development of relational skills and promoting safety and quality of care[13,14]. Thus, this study aims to construct and validate a checklist to assess the technical skills of nursing students in measuring capillary blood glucose in newborns.

METHODS

This is a methodological study with a quantitative approach, focusing on the development and validation of an instrument[15] to assess skills and attitudes in measuring capillary blood glucose in newborns. The study took place between October 2023 and March

2024, in two stages: the first consisted of developing a checklist based on technical recommendations, and the second consisted of content validation by specialists in the area of neonatal and pediatric nursing.

The research was conducted in accordance with the guidelines of the Revised Standards for Quality Improvement Reporting Excellence tool[16].

In the initial stage, a checklist-type instrument was developed based on the guidelines of the Newborn Health Care Manual: A Guide of Health Professionals[5]. In this process, based on the definition of the object of study, items that covered the fundamental skills and attitudes for performing the hemoglucose test on newborns by nursing students were created. The preliminary version of the instrument had 31 items, distributed in three stages: pre-procedure, procedure and post-procedure.

In the second stage, the Delphi technique was used to validate the checklist. This method consists of the evaluation of the content by a panel of experts, with the aim of reaching consensus on specific aspects of the instrument. Although the technique allows multiple rounds of analysis, only one round was necessary in this study, since the minimum consensus was reached within the first evaluation[17,18].

The content validation of the checklist was conducted according to the recommendations of Haynes *et al*.[19], which suggests the participation of approximately six to twenty experts in this type of process.

To select potential experts, consultations were carried out on the Lattes Platform of the National Council for Scientific and Technological Development (*Conselho Nacional de Desenvolvimento Científico e Tecnológico* - CNPq) and criteria adapted from Fehring[20] were applied. The score awarded considered: master's degree in nursing (4 points), master's degree with dissertation in the area of interest of the study (1 point), doctorate in the area of study (2 points), clinical practice of at least one year in the area of interest (1 point), certificate of specialization in the area of interest (2 points), relevant publication in the area of interest (2 points) and article on the subject in a reference journal (2 points). To be selected, nurses had to obtain at least 5 points and have a master's degree[20]. The sampling was constituted by convenience.

Specialists who agreed to participate in the research but did not respond or did not submit the questionnaire after 15 days of receiving it were excluded from the study.

To validate the checklist, each selected expert received a formal invitation by email containing the researcher's initial presentation; clarifications on the research topic; a copy of

approval of the Research Ethics Committee and the Informed Consent Form. After formal acceptance, the link to the electronic form was made available on Google Forms™.

The form, structured on the Google Drive platform in HyperText Markup Language (HTML) standard, was composed of three parts. Part I covered personal and professional identification of the experts, including information such as age, gender, institution they work at, academic background, title and sector of activity. Part II presented the 31 items of the checklist to assess skills and attitudes necessary for measuring capillary blood glucose in newborns (NB). The items were evaluated on a five-point Likert scale (strongly disagree, partially disagree, agree, partially agree and strongly agree), with the option of additional comments and suggestions in the open field. Part III consisted of a general analysis of the instrument, with ten criteria[21]: usefulness/relevance, consistency, clarity, objectivity, simplicity, feasibility, updating, precision, instructional sequence of topics and presentation format. An overall score was also requested at the end.

The data collected via Google Forms™ were tabulated, stored and analyzed in an Excel™ spreadsheet. Agreement between experts was assessed using the Content Validity Index (CVI). The following formula was applied for calculation: CVI = number of agreements/total responses, considering items with an agreement index greater than 0.8015 as valid.

The research followed the ethical principles set out in Resolution No. 466 of December 12, 2012, of the Brazilian National Health Council, approved by the Research Ethics Committee under No. 6,419,349 with Certificate of Presentation for Ethical Assessment (*Certificado de Apresentação para Apreciação Ética* - CAAE) No.: 74239123.7.0000.5154.

RESULTS

Nine specialists participated in the study, all female, aged between 33 and 68 years old and with nine to 30 years of professional experience. The group had a heterogeneous profile in regards to the areas of activity, covering care, teaching and research.

The validation included steps for measuring blood glucose, including pre-procedure, procedure and post-procedure. The validation included specific steps related to measuring capillary blood glucose, covering pre-procedure, procedure and post-procedure.

All items evaluated obtained a Content Validity Index (CVI) higher than 0.80, and adjustments were incorporated to improve clarity and applicability of care in measuring capillary blood glucose in newborns. The suggestions made are described in Chart 1. In turn, the final version of the checklist after incorporating the suggestions and the CVI of each item is presented in Table 1.

Chart 1. Suggestions and changes of expertise in the evaluation of the Instrument for Measuring Capillary Glycemia in Newborns. Uberaba/MG, Brazil, 2024.

Variable	Suggestion	Final Version
Pre-Procedure		
3. Prepare materials and environment	Maintain good lighting in the room; Check if the reading device is calibrated and ready before starting the procedure	3. Prepare materials and environment, maintain good lighting, check if reading device is calibrated
5. Check identification of the newborn	I think that there was a lack of conversation with the mother or guardian to explain the procedure; guidance for the mother/guardian of the newborn; something was missing regarding communication about the procedure with parents/family or guardian, related to quality, safety and Family-Centered care, this is very important	5. Check identification of newborn, if a guardian is present, guide him/her on the procedure to be performed
7. Perform non-pharmacological intervention for pain management, such as use of 25% sucrose, restraint, swaddling, and non-nutritive sucking	In non-pharmacological intervention, I suggest addition of skin-to-skin contact	7. Perform non-pharmacological intervention for pain management, such as non-nutritive sucking, restraint, use of 25% sucrose, skin-to-skin contact
Procedure - Hemoglycotest		
15. Choose lateral or medial side of the heel	Some materials recommend avoiding the central part of the heel due to its proximity to the calcaneus bone and the increased risk of complications. I suggest keeping only the lateral sides. Regarding the location of lancing site, it is important to consider the necessary rotation of areas, especially for babies who are undergoing regular monitoring and who have previous bruising.	15. Choose the lateral side of the heel, observing previous punctures and rotate the sites to be punctured
16. Apply lancing device close to the skin	Wait for the glucometer signal, asking you to place the drop of capillary blood in the specific area.	16. Wait for the glucometer signal to insert the drop of capillary blood and apply the lancing device close to the skin
17. Trigger lancet	Trigger lancet at a perpendicular angle to the skin, with a single, quick and firm movement.	17. Trigger lancet at a perpendicular angle to the skin, with a single, quick and firm movement
18. Position foot so that a sufficient drop of blood is formed	Avoid excessive handling to obtain dripping	18. Position the foot so as to form a sufficient drop of blood, avoiding excessive handling to obtain the drip
22. After collection, compress the puncture site with sterile gauze until complete hemostasis is achieved	Regarding compression, I suggest using cotton instead of gauze	22. After collection, compress the puncture site with cotton until complete hemostasis is achieved
Post-Procedure		
24. Make sure that there is no prolongation of bleeding	I suggest that we take some precautions after the procedure to calm the newborn after the procedure; Place the child in a comfortable, appropriate and safe position, preferably, if possible, on the mother's or guardian's lap	24. Make sure that there is no prolongation of bleeding and place the child in a comfortable, appropriate and safe position.
28. Clean the glucometer with cotton soaked in a product standardized by the CCI and store it	It would be important to clean the material after removing the gloves, as they may be contaminated	28. Remove the gloves and discard them in the common trash.
29. Remove gloves and discard them in the common trash	It would be important to clean the material after removing the gloves, as they may be contaminated	29. Wash hands
30. Wash hands	It would be important to clean the material after removing the gloves, as they may be contaminated	30. Clean the glucometer with cotton soaked in a product standardized by the CCI and store it.
31. Record on a specific form	I also believe that there was a lack of communication of the result to the family, parents or guardian, as well as the adoption of prescribed or even	31. Record on a specific form stating: measured value, description of the puncture site, adverse events and measures taken, inform the family about the results and actions taken.

Table 1. Content validity index (CVI) of the checklist to assess technical skills in measuring capillary blood glucose in newborns. Uberaba/MG, Brazil, 2024.

Steps for measuring capillary blood glucose	CVI
Pre-procedure	
1. Check the medical prescription and ask about the procedure's schedule	0.98
2. Wash hands	1.0
3. Prepare the material and environment, maintain good lighting, check if the reading device is calibrated	1.0
4. Position the material close to the newborn	1.0
5. Check the newborn's identification, if there is a guardian, guide him/her on the procedure to be performed	1.0
6. Put on gloves	1.0
7. Perform non-pharmacological intervention for pain management, such as non-nutritive suction, restraint, use of 25% sucrose, skin-to-skin contact	0.8
8. Turn on device	1.0
9. Check if the reading device is calibrated and ready for the procedure	1.0
Procedure - hemoglucotest	
10. Insert the test strip into the device, without touching the reagent part	
11. Expose and warm up chosen foot	1.0
12. Wrap the heel with the palm of your hand and index finger	1.0
13. Perform antisepsis of the heel with antiseptic according to the gestational age and skin conditions	1.0
14. Let it dry	1.0
15. Choose the lateral side of the heel, observing previous punctures and rotate the sites to be punctured	0.9
16. Wait for the glucometer signal requesting a drop of capillary blood and apply lancing device close to the skin	1.0
17. Trigger lancet at a perpendicular angle to the skin, with a single, quick and firm movement	1.0
18. Position the foot so as to form a sufficient drop of blood, avoiding excessive handling to obtain the drip	1.0
19. Bring the reagent strip close to the drop of blood formed	1.0
20. Wait for the strip to fill automatically by capillarity	1.0
21. Wait the time necessary for the device to perform the reading	1.0
22. After collection, compress the puncture site with cotton until complete hemostasis is achieved	1.0
23. Perform the glycemic index reading	1.0
Post-procedure	1.0
24. Make sure that there is no prolongation of bleeding and place the child in a comfortable, appropriate and safe position	
25. Collect material	1.0
26. Remove the reagent strip from the capillary blood glucose device and discard it in the biological waste bin	1.0
27. Discard the needle or lancet in the sharps box and cotton in the infectious waste bin	1.0
28. Remove gloves and discard them in the common waste bin	1.0
29. Wash hands	1.0
30. Clean the glucometer with cotton soaked in a product standardized by the CCI and store it	1.0
31. Record on a specific form stating: measured value, description of the puncture site, adverse events and measures taken, inform the family about the results and actions taken	1.0

The average overall checklist score was 9.5. The other items evaluated are presented in Table 2.

Table 2. General evaluation of the checklist for measuring capillary blood glucose: content validity index (CVI) by items evaluated. Uberaba/MG, Brazil, 2024.

Evaluated items	Average
1. Usefulness/Relevance	10.0
2. Consistency	9.5
3. Clarity	9.7
4. Objectivity	10.0
5. Simplicity	9.8
6. Feasibility	9.8
7. Updating	9.6
8. Precision	10.0
9. Instructional sequence of topics	9.6
10. Presentation of protocol	9.8
11. Overall score of instrument	9.5

DISCUSSION

The development and validation of instruments, such as checklists, have become essential practices in nursing, especially to ensure quality and safety of the care provided. These instruments not only standardize techniques, but also serve as fundamental tools for assessment and improvement of specific skills and abilities, such as those required for measuring capillary blood glucose levels in newborns. The implementation of structured checklists can reduce inconsistencies in procedures, minimize errors, and optimize efficiency in health care[22-24].

Content validation, performed with the participation of experts, allows for a careful and rigorous analysis of the items that make up the instrument, ensuring its relevance and clarity[25,26]. In this study, the checklist was developed in a structured manner, covering three fundamental stages for measuring capillary blood glucose levels in newborns: pre-procedure, procedure, and post-procedure. This organization aims to standardize the process, ensuring greater safety and effectiveness in neonatal care.

In the pre-procedure stage, priority is given to actions such as checking the prescription regarding the frequency of the procedure, verifying the newborn's identification, and communicating with the guardian about the importance and need of the test. These actions are aligned with patient safety measures that highlight strategies developed by nurses to prevent errors and promote safety in neonatal intensive care units. Such strategies include adoption of preventive barriers and effective communication practices, which are essential to ensure the quality and safety of the care provided[27].

In the checklist developed, hand hygiene is highlighted as a mandatory step before and after the capillary blood glucose measurement procedure, reinforcing preventive barriers and promoting adherence to safety protocols. This practice is essential to prevent Healthcare-

Associated Infections (HAIs), a significant problem that can be mitigated by simple and effective strategies, such as proper hand hygiene, widely recognized as a fundamental control measure[28].

Capillary blood glucose measurement, although a routine procedure, is painful and, when performed repeatedly, can negatively impact the newborn's development, causing physiological and behavioral changes. To minimize these effects, it is recommended to adopt non-pharmacological pain management measures, such as facilitated restraint, non-nutritive sucking, skin-to-skin contact, and administration of sweetened solutions, which are recommended due to their effectiveness, low cost, and easy application[1,29].

These practices were incorporated into the checklist developed, with a specific item on non-pharmacological intervention for pain management, which includes non-nutritive sucking, restraint, use of 25% sucrose, and skin-to-skin contact. This item achieved a content validity index (CVI) higher than 0.80, reflecting high agreement among experts regarding its importance for promoting the newborn's comfort and well-being.

During the validation of the checklist, the experts suggested standardizing the antiseptic solution used to clean the newborn's skin. However, it was decided to maintain the recommendation that each institution adopt the standardized solution according to its internal practices, in line with the recommendations of the Brazilian Ministry of Health. These guidelines include the use of 70% alcohol for cleaning the umbilical cord stump and skin antisepsis, in addition to options such as chlorhexidine gluconate degerming agent (2-4%), 0.5% alcohol or 0.2% aqueous solution[5].

Despite this, a gap was identified in publications on the subject, highlighting the need for further studies to support decisions on the standardization of antiseptics.

During the validation of the checklist, the suggestion was included to specify the puncture site on the heel, recommending the lateral surfaces. This recommendation is associated with the need to observe previous punctures and rotate the sites to be punctured, in order to avoid complications such as necrosis, osteomyelitis and other problems[3]. This measure reinforces the importance of safe and evidence-based practices to minimize risks and promote the integrity of the newborn's tissues.

During the validation process, the instrument achieved an overall score of 9.5, indicating a high level of agreement among evaluators regarding content and appearance. All criteria presented rates above 80%, evidencing the relevance of the checklist as an evaluation tool in services. These results reflect the participants' consensus on the validity of the protocol, confirming its ability to effectively address the issues necessary to promote safe care.

The validation of content and appearance involved the participation of a group of experts who considered the tools valid and recommended their use after the necessary adjustments. The use of these instruments, specific to the neonatal context, was an important means of verifying the conditions that compromise safe care for newborns, related to active and latent problems, with the aim of seeking continuous improvement[30].

The results indicate that the provision of safe care depends on the entire multidisciplinary team, although nursing plays a central role due to its continuous and close work with the patient. This proximity allows the identification of failures in the processes and the implementation of measures to minimize risks, consolidating nursing as one of the main agents in the prevention of incidents and in the guarantee of quality care[31].

CONCLUSION

When developing the checklist, a gap was identified in the systematization of the capillary blood glucose measurement technique, whose organization can facilitate teaching, learning and evaluation of this practice. The instrument developed is also relevant for clinical practice and health education actions, especially in a routine procedure in hospitalized newborns, which requires precision to avoid harm to health and the care provided.

A limitation of the study is the difficulty in contacting specialists due to outdated information in Lattes or ORCID CVs, which resulted in delays and lack of responses to participate in the research. These issues, combined with the small sample, may have influenced the analysis. In addition, there was a minimal number of recent articles on the validation of similar instruments applied to the measurement of capillary blood glucose in newborns, limiting direct comparison with other studies.

The systematization of the steps proposed in the checklist can provide valuable support for both teaching and learning as well as for clinical practice, favoring greater safety and efficiency in neonatal care. It is therefore recommended that future research be carried out to broaden the scope of the topic, addressing other neonatal care scenarios and incorporating multidisciplinary perspectives.

REFERENCES

1. Uema RTB, Queiroz RO, Stolarz MF, Rissi GP, Shibukawa BMC, Higarashi IH. Análise de procedimentos em unidade de terapia intensiva neonatal: subsídios para melhoria da assistência. Brazilian Journal of Health [Internet]. 2021 [cited in 10 Feb 2024]; 4(5):18669-83. DOI: https://doi.org/10.34119/bjhrv4n5-019

2. Perry M, Tan Z, Chen J, Weidig T, Xu W, Cong XS. Neonatal pain: perceptions and current practice. Crit Care Nurs Clin North Am. [Internet]. 2019 [cited in 10 Feb 2024]; 30(4):549-61. DOI: https://doi.org/10.1016/j.cnc.2018.07.013

3. Fleury MK. Programa nacional de controle de qualidade. Manual de coleta em laboratório clínico 2019. 3. ed. Rio de Janeiro: Sociedade Brasileira de Análises Clínicas; 2019 [cited in 10 Feb 2024]. Available from: https://pncq.org.br/uploads/2019/PNCQ-Manual_de_Coleta_2019-Web-24_04_19.pdf

4. Bortolato-Major C, Arthur JP, Mattei ÂT, Mantovani MF, Felix JVC, Boostel R. Contribuições da simulação para estudantes de graduação em enfermagem. Rev Enferm UFPE on line [Internet]. 2018 [cited in 10 Feb 2024]; 12(6):1751-62. DOI: https://doi.org/10.5205/1981-8963-v12i6a230633p1751-1762-2018

5. Ministério da Saúde (Brasil). Atenção à saúde do recém-nascido: guia para os profissionais de saúde [Internet]. 3. ed. Brasília. DF: Ministério da Saúde; 2014 [cited in 20 July 2022]. Available from: https://www.gov.br/saude/pt-br/assuntos/saude-de-a-a-z/s/saude-da-crianca/publicacoes/atencao-a-saude-do-recem-nascido-guia-para-os-profissionais-de-saude-vol-iii/@@download/file

6. Narvey MR, Marks SD. The screening and management of newborns at risk for low blood glucose. Paediatr Child Health [Internet]. 2019 [cited in 10 Feb 2024]; 24(8):536-44. DOI: https://doi.org/10.1093/pch/pxz134

7. Harding JE, Harris DL, Hegarty JE, Alsweiler JM, MC Kinlay CJD. An emerging evidence base for the management of neonatal hypoglycaemia. Early Hum Dev. [Internet]. 2017 [cited in 10 Feb 2024]; 104:51-56. DOI: https://doi.org/10.1016/j.earlhumdev.2016.12.009

8. Glasgow MJ, Harding JE, Edlin R. Cost analysis of cotside screening methods for neonatal hypoglycaemia. Neonatol. [Internet]. 2018 [cited in 10 Feb 2024]; 114(2):155-62. DOI: https://doi.org/10.1159/000489080

9. Presidência da República (Brasil). Lei nº 7.498, de 25 de junho de 1986. Dispõe sobre a regulamentação do exercício da enfermagem, e dá outras providências [Internet]. Brasília, DF, 26 jun 1989 [cited in 20 July 2024]. Available from: https://www.planalto.gov.br/ccivil_03/leis/l7498.htm

10. Conselho Federal de Enfermagem. Decreto nº 94.460, de 8 de junho de 1987. Regulamenta a Lei nº 7.498, de 25 de junho de 1986, que dispõe sobre o exercício da enfermagem, e dá outras

providências [Internet]. D.O.U., Brasília, DF, 9 jun 1987 [cited in 20 July 2024]. Seção 1, 8853-8855. Available from: https://www.cofen.gov.br/decreto-n-9440687/

11. Conselho Regional de Enfermagem de São Paulo. Parecer COREN-SP 030/2013 – CT. Ementa: Realização de glicemia capilar e aferição de pressão arterial. São Paulo: COREN-SP; 2013 [cited in 20 July 2024]. Available from: https://portal.coren-sp.gov.br/wp-content/uploads/2013/07/parecer_coren_sp_2013_30.pdf

12. Giouleka S, Gkiouleka M, Tsakiridis I, Daniilidou A, Mamopoulos A, Athanasiadis A, et al. Diagnosis and management of neonatal hypoglycemia: a comprehensive review of guidelines. Children [Internet]. 2023 [cited in 10 Feb 2024]. 10(7):1220. DOI: https://doi.org/10.3390/children10071220

13.Oliveira CF, Ribeiro AAV, Luquine Junior CD, Bortoli MC, Toma TS, Chapman EMG, et al. Barriers to implementing guideline recommendations to improve childbirth care: a rapid review of evidence. Rev Panam Salud Pública [Internet].2020 [cited in 10 Feb 2024]; 45:e07. DOI: https://doi.org/10.26633/RPSP.2021.7

14. Lugão NCS, Brandão MAG, Silva RC. Elaboração e validação de tecnologia para segurança do cuidado intraoperatório obstétrico. Rev Bras Enferm. [Internet]. 2020 [cited in 10 Feb 2024]; 73(Supl 6):e20190605. DOI: https://doi.org/10.1590/0034-7167-2019-0605

15. Polit DF, Beck CT. Fundamentos de pesquisa em enfermagem: avaliação de evidências para a prática de enfermagem. 9. ed. Porto Alegre: Artmed; 2019. 456 p.

16. Squire. Revised Standards for Quality Improvement Reporting Excellence SQUIRE 2.0 [Internet]. Squire; 2020 [cited in 10 Oct 2024]. Available from: http://squire-statement.org/index.cfm?fuseaction=Page.ViewPage&PageID=471

17. Cassiani SHB, Rodrigues LP. A técnica de Delphi e a Técnica de grupo nominal como estratégias de coleta de dados das pesquisas em enfermagem. Acta Paul Enferm. [Internet]. 1996 [cited in 27 Jan 2024]; 9(3):76-83. Available from: https://acta-ape.org/wp-content/uploads/articles_xml/1982-0194-ape-S0103-210019960009000174/1982-0194-ape-S0103-210019960009000174.pdf

18. Marques JBV, Freitas D. Método DELPHI: caracterização e potencialidades na pesquisa em Educação. Pro-Posições [Internet]. 2018 [cited in 27 Jan 2023]; 29(2):389-415. DOI: https://doi.org/10.1590/1980-6248-2015-0140

19. Haynes SN, Richard DCS, Kubany ES. Content validity in psychological assessment: a functional approach to concepts and methods. Psychol Assess. [Internet]. 1995 [cited in 27 Jan 2023]; 7(3):238-47. DOI: https://psycnet.apa.org/doi/10.1037/1040-3590.7.3.238

20. Fehring RJ. Methods to validate nursing diagnoses. Heart Lung [Internet]. 1987 [cited in 27 Jan 2023]; 16(6):625:29. Available from: https://core.ac.uk/download/pdf/213076462.pdf

21. Pasquali L. Instrumentação psicológica: fundamentos e práticas. Porto Alegre: Artmed; 2010. 560 p.

22. Braga LM, Siman AG, Souza CC, Dutra HS, Gomes AP, Batista RS. Construção e validação do checklist para paramentação e desparamentação dos equipamentos de proteção individual. Rev Enferm Cent-Oeste Min. [Internet]. 2020 [cited in 10 Feb 2024]; 10(1):e4079. DOI: https://doi.org/10.19175/recom.v10i0.4079

23. Costa CC, Dibai DB, Silva EFM, Firmo WCA, Rêgo AS, Rabêlo PPC, et al. Construção e validação de checklist para sala operatória como dispositivo de segurança do paciente. Cogitare Enferm. [Internet] 2021 [cited in 10 Feb 2024]; 26:e71752. DOI: https://doi.org/10.5380/ce.v26i0.71752

24. Saraiva COPO, Andrade FB, Chiavone FBT, Barbosa ML, Medeiros, SG, Souza NL, et al. Avaliação da segurança do paciente neonatal: construção e validação de protocolo e checklist. Acta Paul Enferm. [Internet]. 2022 [cited in 10 Feb 2024]; 35:eAPE0085345. DOI: https://doi.org/10.37689/acta-ape/2022AO0085345

25. Silva MCA, Cabral LA, Martins AMEBL, Galiza DDF, Melo NFR, Pinto MF, et al. Construção e validação de vídeos educativos para adolescentes com síndrome de Down fundamentados no letramento em saúde – Programa LISA Down. Rev Bras Saúde Mater Infant. [Internet]. 2023 [cited in 10 Feb 2024]; 23:e20220231. DOI: https://doi.org/10.1590/1806-9304202300000231

26. Nazário AP, Lima VF, Fonseca LMM, Leite AM, Scochi CGS. Desenvolvimento e avaliação de vídeo educativo para família sobre alívio da dor aguda do bebê. Rev Gaúcha Enferm. [Internet]. 2021 [cited in 10 Feb 2024]; 42:e20190386. DOI: https://doi.org/10.1590/1983-1447.2021.20190386

27. Noleto RC, Campos CF. Estratégias desenvolvidas por enfermeiros para garantir a segurança do paciente na unidade de terapia intensiva neonatal. JNT - Facit Business and Technology Journal [Internet]. 2020 [cited in 10 Feb 2024]; 16(2):92-103. Available from: https://jnt1.websiteseguro.com/index.php/JNT/article/download/605/455

28. Maras GB, Kocaçal E, Bahar A. Higiene das mãos dos profissionais de saúde: perspectivas do estudante de enfermagem no papel de paciente/familiar. Acta Paul Enferm. [Internet]. 2024 [cited in 10 Feb 2024] 37:eAPE003511. DOI: http://dx.doi.org/10.37689/acta-ape/2024AO00000351

29. Junqueira-Marinho MF, Cunha PVS, Vieira ACG, Bueno AC, Valeri BO, Manzo BF, et al. Diretriz para prevenção e manejo da dor aguda por procedimentos dolorosos no período neonatal [Internet]. Rio de Janeiro: Fiocruz; 2023 [cited in 10 Feb 2024]; 70 p. Available from: https://www.arca.fiocruz.br/handle/icict/57750#collapseExample

30. Reis CEP. Protocolo de segurança do paciente na Unidade de Terapia Intensiva: a importância da equipe de enfermagem. Revista Científica Multidisciplinar Núcleo do Conhecimento [Internet]. 2019 [cited in 10 Feb 2024] ;9(3):104-13. Available from: https://www.nucleodoconhecimento.com.br/saude/protocolo-de-seguranca

31. Saraiva COP, Andrade FB, Chiavone FBT, Barbosa ML, Medeiros SG, Souza NL, et al. Avaliação da segurança do paciente neonatal: construção e validação de protocolo e checklist. Acta Paul Enferm. [Internet]. 2022 [cited in 10 Mar 2024]; 35:eAPE0085345. DOI: https://doi.org/10.37689/acta-ape/2022AO0085345

Associated Publisher: Rafael Gomes Ditterich

Conflict of Interests: the authors declared there are no conflict of interests

Financing: none

CONTRIBUTIONS
Concept – Rocha JBA
Investigation – Pereira KM, Silva JAM
Writing – first draft – Contim D, Oliveira KF, Rocha JBA, Silva JAM, Silva MPC
Writing – revision and editing - Contim D, Oliveira KF, Rocha JBA, Silva JAM, Silva MPC

How to cite this article (Vancouver)
Silva JAM, Pereira KM, Silva MPC, Oliveira KF, Contim D, Rocha JBA. Development and validation of a checklist for measuring capillary blood glucose in newborns. Rev Fam, Ciclos Vida Saúde Contexto Soc. [Internet]. 2024 [cited in *insert day, month and year of access*]; 12(4):e7841. DOI: https://doi.org/10.18554/refacs.v12i4.7841

How to cite this article (ABNT)
SILVA, J. A. M.; PEREIRA, K. M.; SILVA, M. P. C.; OLIVEIRA, K. F. de; CONTIM, D.; ROCHA, J. B. A. Development and validation of a checklist for measuring capillary blood glucose in newborns. **Revista Família, Ciclos de Vida e Saúde no Contexto Social**, Uberaba, MG, v. 12, n. 4, e7841, 2024. DOI: https://doi.org/10.18554/refacs.v12i4.7841. Access in: *insert day, month and year of access*.

How to cite this article (APA)
Silva, J. A. M., Pereira, K. M., Silva, M. P. C., Oliveira, K. F., Contim, D., & Rocha, J. B. A. (2024). Development and validation of a checklist for measuring capillary blood glucose in newborns. Rev. Fam., Ciclos Vida Saúde Contexto Soc., 12(4), e7841. Retrieved in *insert day, month and year of access* from https://doi.org/10.18554/refacs.v12i4.7841