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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии
საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებში.

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman (Кириллица)**, для текста на грузинском языке следует использовать **AcadNusx**. Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи.** Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - <http://www.spinesurgery.ru/files/publish.pdf> и http://www.nlm.nih.gov/bsd/uniform_requirements.html. В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректур авторам не высылаются, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or computer-printed on a single side of standard typing paper, with the left margin of 3 centimeters width, and 1.5 spacing between the lines, typeface - **Times New Roman (Cyrillic)**, print size - 12 (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf

In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

**Articles that Fail to Meet the Aforementioned
Requirements are not Assigned to be Reviewed.**

ავტორთა საყურადღებო!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე, დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx**. შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემავსებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრაფიის ფოტოსურათები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შედეგების ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფხიხლებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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SKIN-TO-SKIN CONTACT IN NEONATAL CARE: CLINICAL SIGNIFICANCE, IMPLEMENTATION CHALLENGES, AND LONG-TERM OUTCOMES IN GEORGIA

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Abstract.

Skin-to-skin contact (SSC) is a crucial component of neonatal care, playing a vital role in early physiological stabilization, neurodevelopment, and the formation of maternal–infant bonding. A growing body of evidence indicates that deprivation of SSC, particularly during the immediate postnatal period, is associated with long-term adverse outcomes, including emotional dysregulation, behavioral difficulties, and impaired cognitive development. Importantly, the absence of early SSC has also been shown to negatively affect the initiation and continuation of breastfeeding, thereby limiting its well-documented benefits for both infants and mothers. Our research focuses on the clinical condition of children in Georgia who were deprived of early skin-to-skin contact. The study was conducted by member physicians of a professional association – the Georgian Children's Health Care Association. (The study was conducted by the authors, whose professional backgrounds include pediatrics, allergy, and clinical immunology, and doctoral-level training in public health.) using a survey-based approach and obtaining informed parental consent. Over two years, 168 parents were interviewed during routine pediatric visits. The questionnaire included key variables such as: (1) mode of delivery (vaginal vs. cesarean section, elective or medically indicated), (2) whether SSC was initiated within the first hour after birth, and (3) type of feeding (breastfeeding vs. formula feeding). In cases of artificial feeding, additional data were collected regarding the use of specialized therapeutic formulas, particularly cow's milk protein allergy formulas, given their notably high usage in Georgia.

For the clinical component of the study, a total of 168 children were initially assessed. From this cohort, 16 children aged 4–6 years were identified and selected for detailed evaluation, based on parental reports of limited SSC during the neonatal period, with maternal–infant separation lasting from one week to two months.

These children presented with a range of developmental and behavioral challenges. From this group, 11 children aged 4–6 years were selected as a subgroup for detailed evaluation. These children presented with a range of behavioral disturbances, anxiety, difficulties in social interaction, attention deficits, and sleep disturbances, 5 children were selected as another subgroup who had developed behavioral challenges, including delayed speech development, emotional dysregulation, and were referred for psychological intervention.

Additionally, from the same cohort of 168 children, 15 children aged 4–6 years were selected who did not have early skin-to-skin contact deficits but had similar behavioral difficulties. and were referred for psychological intervention. Following 6–7 months of therapy, significant improvement was observed across multiple domains.

Although this issue requires further in-depth investigation and large-scale analysis, our findings, even within a limited sample, highlight the critical importance of SSC and underscore its benefits and role in the child's neurodevelopment.

In the context of increasing global trends, including rising rates of surrogacy, assisted reproductive technologies, and single motherhood, observed both in Georgia and worldwide, ensuring early physical contact between newborns and caregivers is becoming increasingly relevant. We therefore emphasize the need for greater discussion, awareness, and integration of SSC into standard clinical practice.

Key words. Skin-to-skin contact (SSC), neonatal care, breastfeeding, neurodevelopment, emotional regulation, Neonatal intensive care (NICU), Georgia.

Introduction.

The transition from intrauterine to extrauterine life represents one of the most critical periods in human development. During this time, newborns must rapidly adapt to a range of physiological changes, including independent respiration, thermoregulation, and metabolic regulation. Skin-to-skin contact (SSC), defined as placing a naked newborn prone on the bare chest of the mother or caregiver, has emerged as a key intervention facilitating this transition. Initially introduced as a component of kangaroo mother care for preterm infants, SSC is now widely recommended for all newborns regardless of gestational age or delivery mode [1-9].

The importance of SSC extends beyond immediate physiological stabilization. It encompasses a broad spectrum of outcomes, including neurodevelopment, emotional bonding, breastfeeding success, and maternal health [2-4]. Global health organizations emphasize that SSC should be initiated immediately after birth and maintained uninterrupted for at least the first hour, often referred to as the “Golden Hour.” However, real-world implementation varies significantly due to medical, institutional, and sociocultural factors.

This paper aims to synthesize current evidence on SSC, address its application in complex clinical situations, and

evaluate its long-term implications, while also considering regional challenges and opportunities for improvement.

Physiological and Neurobiological Foundations of Skin-to-Skin Contact.

Skin-to-skin contact exerts its effects through multiple interconnected physiological and neurobiological pathways. One of its most immediate benefits is thermoregulation. The mother's chest acts as a natural incubator, adjusting its temperature in response to the infant's needs through a process known as thermal synchrony. This mechanism is particularly important for preterm infants, who are highly susceptible to hypothermia.

In addition to thermal regulation, SSC stabilizes cardiovascular and respiratory function. Infants in SSC demonstrate more regular heart rates, improved oxygen saturation, and reduced episodes of apnea compared to those placed in incubators or separated from their mothers. These effects are mediated by the calming influence of physical contact and the regulation of the autonomic nervous system [10,11].

From a neurobiological perspective, SSC stimulates the release of oxytocin in both the mother and the infant. Oxytocin plays a central role in social bonding, stress reduction, and emotional regulation. It also promotes maternal behaviors and enhances the mother's sensitivity to the infant's cues. Concurrently, SSC reduces cortisol levels, mitigating the stress response in both parties [4,12-15].

Another critical aspect is sensory stimulation. SSC provides continuous tactile, olfactory, and auditory input, all of which are essential for early brain development. The infant is exposed to the mother's heartbeat, voice, and scent, creating a familiar and secure environment that supports neural organization and development [14].

Barriers to the Implementation of Skin-to-Skin Contact.

Despite its well-established benefits, the implementation of SSC remains inconsistent due to multiple clinical and systemic barriers.

One of the primary factors is the high rate of cesarean section, which often results in delayed maternal-infant contact due to surgical recovery, anesthesia, and institutional routines. Complicated labor and maternal medical conditions may further limit the ability to initiate immediate SSC [6].

Neonatal factors also play a significant role. Infants requiring medical intervention, including resuscitation or admission to neonatal intensive care units (NICUs), are frequently separated from their mothers, reducing opportunities for early contact.

The COVID-19 pandemic introduced additional challenges. During its early stages, precautionary infection control measures led to the routine separation of mothers and newborns in many healthcare settings. Although later evidence confirmed that SSC can be safely practiced with appropriate precautions, these early practices significantly disrupted standard care and contributed to reduced SSC implementation [8].

Institutional barriers, including a lack of standardized protocols, insufficient training of healthcare personnel, and variability in clinical practice, further contribute to the problem.

International Practices and Recommendations.

International guidelines consistently emphasize that SSC should be implemented as early as possible and maintained even in challenging clinical situations [1,3].

Global health organizations recommend that SSC be initiated immediately after birth and continued uninterrupted for at least the first hour of life. Even in cases involving cesarean delivery, efforts should be made to facilitate early contact whenever the clinical condition of the mother and infant allows.

In neonatal intensive care settings, modified SSC - often referred to as kangaroo care - is strongly encouraged, particularly for preterm and low-birth-weight infants. This approach has been shown to improve survival rates, promote weight gain, and enhance neurodevelopmental outcomes.

Importantly, international practice increasingly supports a family-centered model of care, recognizing that maintaining physical contact between the newborn and caregiver is essential under nearly all circumstances [6].

Management in the Absence of Maternal SSC.

When the mother is unable to provide SSC for medical or other reasons, international recommendations emphasize the importance of alternative strategies to maintain continued physical contact.

In such cases, the father or another caregiver is encouraged to provide skin-to-skin contact. This approach has been shown to offer similar physiological and psychological benefits, including improved neonatal stability and bonding [15].

If no family member is available, trained healthcare providers may temporarily provide SSC to support the infant's physiological regulation and reduce stress. Although not equivalent to parental contact, this practice is considered preferable to complete separation.

Despite these established international recommendations, there are currently no clearly defined national guidelines in Georgia addressing situations in which maternal SSC is not feasible. This represents an important gap in neonatal care policy and practice [1,3].

Current Situation in Georgia.

The Georgian healthcare context presents several challenges that contribute to inconsistent SSC implementation.

One of the most significant factors is the high rate of cesarean delivery, which directly affects the timing and feasibility of early maternal-infant contact. At the same time, breastfeeding rates-particularly exclusive breastfeeding-remain suboptimal and require further attention [2-4].

The use of artificial feeding, including specialized therapeutic formulas such as those for cow's milk protein allergy, is relatively high, suggesting potential gaps in early feeding practices and support systems.

Although important legislative steps have been taken to improve neonatal care and promote breastfeeding, practical implementation remains inconsistent. In particular, the training and preparedness of healthcare personnel continue to be a critical issue.

Strengthening professional education, standardizing clinical protocols, and increasing awareness among both healthcare

providers and parents are essential steps toward improving SSC implementation in Georgia [2-4].

Application in Special Clinical Situations.

Maternal Complications:

When maternal health complications prevent immediate SSC, alternative strategies must be employed. These may include SSC provided by the father or another caregiver, ensuring that the infant continues to receive the benefits of physical contact. This approach reflects the principles of family-centered care and acknowledges the role of caregivers beyond the mother [16-20].

Absence of a Father or Caregiver:

In situations where no family member is available, healthcare providers may temporarily assume responsibility for providing SSC. While not equivalent to parental contact, this practice helps maintain thermal stability and reduces stress in the newborn [21].

Neonatal Resuscitation:

In cases requiring immediate resuscitation, life-saving interventions take precedence over SSC. However, efforts should be made to minimize separation and initiate SSC as soon as the infant is stabilized. Emerging practices aim to integrate resuscitation and SSC by performing interventions in proximity to the mother whenever feasible [15].

Long-Term Consequences of Skin-to-Skin Contact Deficiency.

Attachment theory provides a framework for understanding these effects. Early physical closeness facilitates the development of secure attachment, which is associated with positive social, emotional, and cognitive outcomes. Conversely, early separation may disrupt this process, leading to insecure attachment patterns and associated challenges.

Physiologically, the lack of SSC may result in less stable early adaptation, including irregular heart rate and temperature fluctuations. These early instabilities can have cascading effects on overall health and development.

Study Design and Setting.

This study was conducted using a mixed-methods design, combining a cross-sectional survey with a retrospective observational analysis. The research was carried out over two years by member physicians of a professional medical association (to be specified in co-authorship, with specialties listed accordingly). Data collection took place during routine pediatric visits, when parents presented their children for scheduled medical evaluations.

All participants were included based on informed parental consent.

Survey Component.

The survey was conducted in Tbilisi, Georgia, over three years. Participants were selected through consecutive sampling and included parents who attended routine pediatric consultations at Jo Ann Medical Center (Tbilisi, Georgia) and the Givi Zhvania Pediatric University Clinic (Tbilisi, Georgia), and who agreed to participate in the interview. Specifically, a total of 168 parents were interviewed during routine pediatric visits. Inclusion

was based on voluntary consent to participate, and all eligible parents presenting during the study period were invited to complete the survey. The study was carried out in two pediatric healthcare institutions providing outpatient pediatric services in Tbilisi. Participants included parents residing both in Tbilisi and in various regions of Georgia. A structured questionnaire was administered to collect data on key perinatal and early neonatal factors. The questionnaire included, among other variables, the following core items:

1. Mode of delivery – vaginal delivery or cesarean section, with further differentiation between elective procedures and those performed based on medical indications.
2. Timing of skin-to-skin contact (SSC) – whether SSC was initiated within the first hour after birth.
3. Infant feeding method – breastfeeding or formula feeding.

In cases where formula feeding was reported, additional data were collected regarding the type of formula used, including specialized therapeutic formulas such as those designed for cow's milk protein allergy [2-4].

Selection of Clinical Subgroup.

For the observational component of the study, a subgroup of children was identified based on parental reports of restricted skin-to-skin contact (SSC) during the neonatal period.

A total of 16 cases out of 168 were initially selected for detailed evaluation, in which SSC was either absent or significantly limited, with maternal–infant separation lasting from one week to two months after birth. Among these 16 cases, 4 were due to COVID-19, 7 were due to the newborns' medical conditions (such as Low birth weight, incubator placement, asphyxia/hypoxia, neonatal intensive care unit placement), and 5 were due to maternal health complications (including cesarean section, postpartum complications such as hemorrhage, hypertension).

The 16 cases who were aged 4-6 years were divided into 2 subgroups. The first subgroup consisted of 5 children who showed early skin-to-skin contact deficits, as well as developmental and behavioral disorders, such as delayed speech development, emotional dysregulation, behavioral disturbances, anxiety, difficulties in social interaction, attention deficits, and sleep disturbances. In addition, the second subgroup consisted of 11 children who also had a deficit in early skin-to-skin contact and behavioral disorders such as attachment, emotional dysregulation, behavioral disturbances, anxiety, difficulties in social interaction, attention deficits, and sleep disturbances, but no developmental disorders.

Additionally, 15 children out of the same cohort, aged 4-6 years, were selected who did not have early skin-to-skin contact deficits, but had similar behavioral disorders to those seen in the 11 children in the second subgroup.

The groups of children (16 and 15 participants, respectively) were selected because they belonged to the same age category (4–6 years) and presented with nearly identical psychological and behavioral disturbances, allowing for a more comparable clinical evaluation.

Children from the above-mentioned groups were sent to a psychologist.

Early skin-to-skin contact (SSC) should be regarded as a powerful early biological and relational regulatory mechanism

that supports stress regulation, emotional stability, parent–infant bonding, and adaptive development. By reducing stress reactivity and promoting physiological and emotional regulation, SSC may provide an important foundation for healthy early development; however, it should not be considered an independent determinant of a child’s long-term psychological outcomes.

The authors acknowledge that several children in the SSC-deprived subgroup had neonatal conditions requiring admission to the neonatal intensive care unit (NICU) and incubator care, which may have independently contributed to later developmental and behavioral difficulties. Therefore, the observed outcomes cannot be attributed solely to the absence of early SSC, and the findings should not be interpreted as evidence of a direct causal relationship. Rather, SSC deprivation may represent one of several interacting factors that contribute to developmental vulnerability [22,23].

Importantly, although the effects associated with early SSC deprivation may be modifiable through appropriate intervention and caregiving support, we believe that preserving SSC remains essential as a fundamental component of optimal neonatal care and as the beginning of a healthy caregiving continuum that should extend throughout childhood. The findings of our study are clinically meaningful, particularly given the significant positive developmental changes observed following psychological intervention, including improvements in attachment-related behaviors and emotional stabilization. These observations suggest that early developmental vulnerabilities associated with SSC deprivation may be responsive to timely therapeutic support and sensitive caregiving.

The age of the evaluated children (4–6 years) is also of particular interest, especially in relation to the transition into the 7–9-year developmental period and school environment. This stage is widely recognized as an important period for the manifestation of emotional and psychological difficulties, not necessarily because such problems originate at that age, but because increasing developmental demands, social expectations, and school-related adaptation often contribute to their clearer expression.

We believe that future research should extend beyond the assessment of neonatal SSC alone and examine the continuity of relational caregiving factors throughout childhood, including frequent physical closeness (such as hugging), sensitive and consistent caregiving, emotional responsiveness, and the presence or absence of secure parent–child attachment. It will be particularly important to determine whether children who experienced SSC deprivation also had reduced access to these protective relational experiences over time, and to compare them with children who did not experience neonatal SSC deprivation but may have encountered deficits in emotional closeness, attachment security, or responsive caregiving during later childhood.

Such a longitudinal investigation may help clarify the relative contribution of early SSC and ongoing caregiving relationships to long-term developmental outcomes. While SSC deficiency may be, at least in part, correctable through appropriate intervention and nurturing support, our findings reinforce the importance of protecting early skin-to-skin contact as an essential first step in

establishing healthy developmental trajectories and fostering resilient parent–child relationships [24,25].

Clinical Assessment and Intervention.

The selected children underwent clinical evaluation based on reported developmental and behavioral concerns, including impairments in emotional regulation, behavior, communication, and social interaction.

All children were subsequently referred for psychological assessment and intervention. A structured therapeutic program was implemented over a period of 6–7 months, allowing for follow-up evaluation of developmental progress.

Comparative Considerations.

Outcomes in the study group were qualitatively compared with those of children presenting with similar diagnoses who were undergoing comparable rehabilitation programs but did not have a history of early skin-to-skin contact deprivation, and with those who didn’t have a history of SSC but had behavioral and developmental challenges. This comparison was used to assess the potential impact of early neonatal factors on developmental trajectories.

Results.

A total of 168 parents were included in the survey component of the study. The analysis revealed important patterns in perinatal care practices and early neonatal experiences. A relatively high rate of cesarean section was observed, including both elective and medically indicated procedures, which appeared to contribute to inconsistent implementation of early skin-to-skin contact (SSC). Initiation of SSC within the first hour after birth was not routinely achieved, indicating gaps in adherence to recommended neonatal care practices.

Infant feeding patterns further reflected these challenges. A considerable proportion of infants were formula-fed, and among these cases, there was a notably high use of specialized therapeutic formulas, including those designed for cow’s milk protein allergy. Among the 16 infants who did not experience early skin-to-skin contact, only 3 (18.8%) were reported to have received breast milk, while 13 (81.2%) did not receive breastfeeding and were primarily fed with formula. These findings support an association between the absence of early SSC and reduced rates of breastfeeding initiation and continuation.

Among the selected subgroups, children who had experienced a deficit of early skin-to-skin contact and subsequently developed behavioral disturbances without developmental disorders ($n = 11$), and children who had not experienced early skin-to-skin contact deficits but presented with behavioral disturbances without developmental disorders ($n = 15$), demonstrated improvement in symptoms at nearly identical proportional rates following intervention. Improvement was observed in 9 of the 11 children in the first subgroup and in 11 of the 15 children in the second subgroup.

In contrast, the third subgroup, consisting of 5 children who presented with developmental difficulties, showed only minimal positive changes following the intervention, with improvements being considerably less pronounced than those observed in the other two subgroups.

Following clinical assessment, all children were referred for psychological intervention and participated in a structured therapeutic program over a period of 6–7 months.

Comparative observations further indicated that children with a history of SSC deprivation tended to present with more pronounced initial deficits, required more sustained therapeutic support, and showed relatively slower or less complete recovery. These findings suggest that early maternal–infant contact may play an important role in shaping long-term developmental trajectories and responsiveness to intervention, but still many other underlying factors, such as children’s medical conditions, social problems that may arise in the path of a child’s

psychological development, may also be the reason of a higher prevalence long-term emotional, behavioral, and developmental difficulties. Furthermore, children deprived of SSC appear to demonstrate less favorable therapeutic outcomes, highlighting the potential long-term impact of early neonatal separation.

The consistency of these findings across the group and subgroups may suggest a potential association between early SSC deprivation and later developmental vulnerabilities, but there is a need of further studies, because of the many other underlying medical conditions that were present either at/ after birth or after, as well as additional conditions such as developmental difficulties (Figures 1-5).

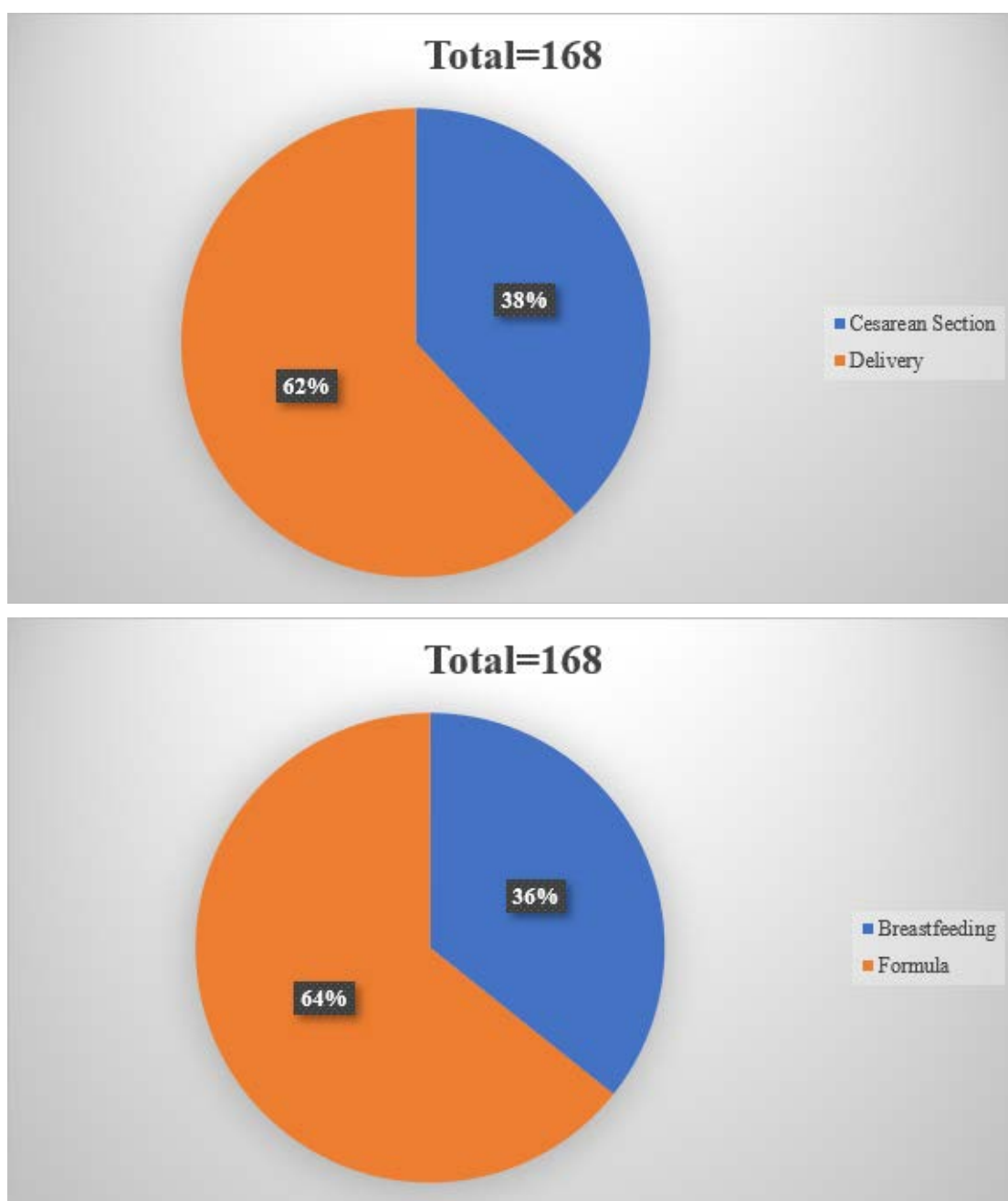


Figure 1. Of these, 14.3% (24 children) received hypoallergenic formula.

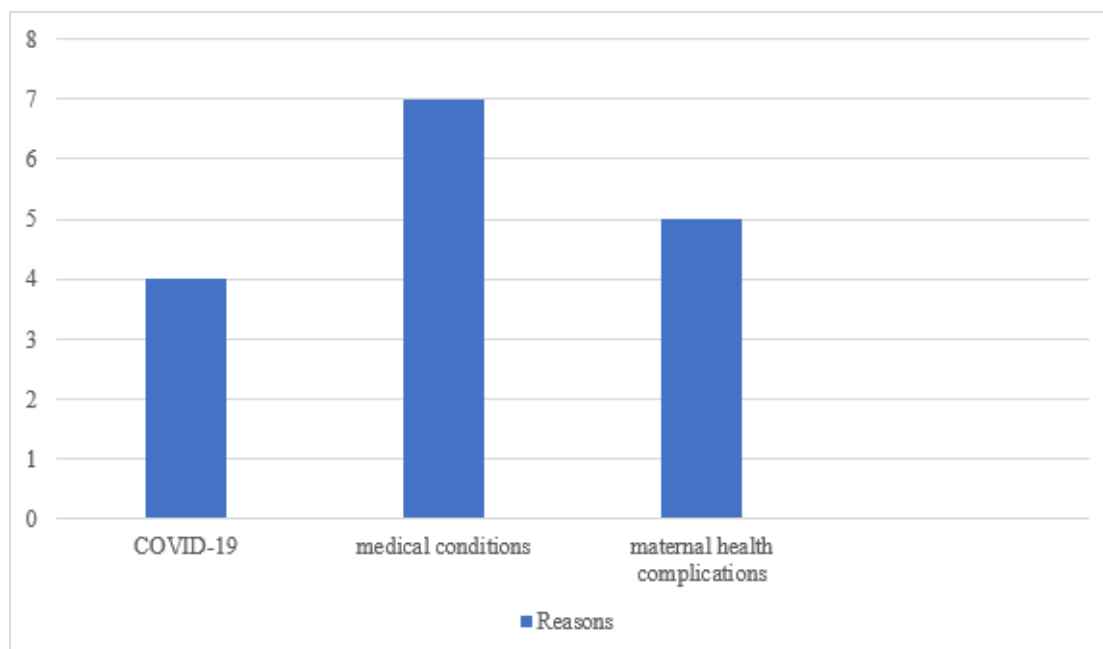


Figure 2. Out of 168 newborns, skin-to-skin contact was restricted in 16 cases. Among these 16 cases, 4 were due to COVID-19, 7 were due to the newborns' medical conditions, and 5 were due to maternal health complications.

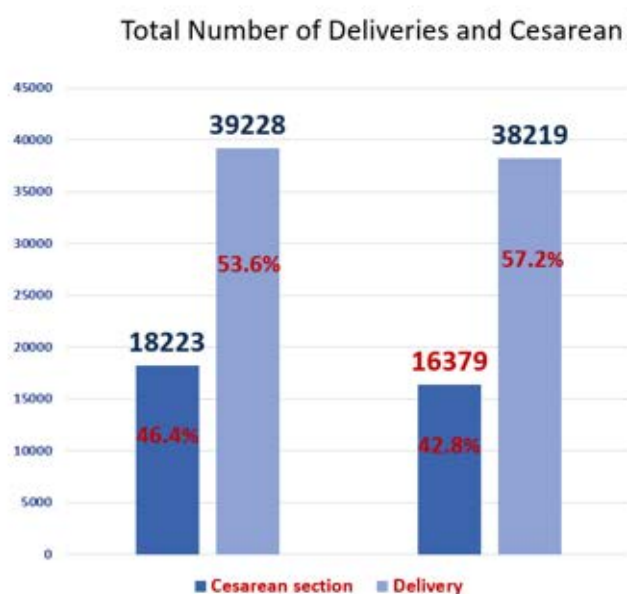


Figure 3. Total Deliveries and Cesarean Sections (2023–2024). Slight decline in total births in 2024, accompanied by an increase in the cesarean section rate.

Comparison of Vaginal Deliveries and Cesarean Sections (2021–2024) (%)

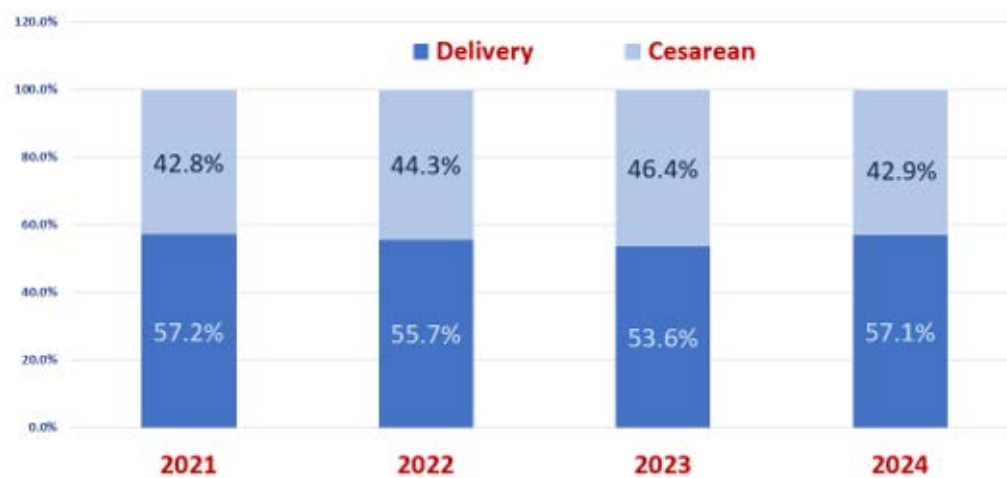


Figure 4. Vaginal vs. Cesarean Deliveries (2021–2024).

Fluctuating trends show a gradual rise in cesarean deliveries, peaking in 2023 before stabilizing in 2024.

Cesarean Sections (2024)



Figure 5. Cesarean Sections Breakdown (2024).

Most cesarean sections in 2024 were emergency procedures (64%), with elective cases accounting for 36%.

Discussion.

The findings of this study are consistent with a growing body of international evidence demonstrating that early skin-to-skin contact plays a fundamental role in neonatal adaptation and long-term neurodevelopment. SSC facilitates physiological stabilization, including thermoregulation, heart rate control, and glucose homeostasis, while simultaneously promoting early breastfeeding initiation through hormonal mechanisms such as oxytocin release.

From a neurodevelopmental perspective, early tactile and emotional stimulation provided through SSC is critical for the maturation of neural pathways associated with emotional regulation, stress resilience, and social bonding. The absence of such stimulation during the critical postnatal period may lead to dysregulation of the hypothalamic–pituitary–adrenal (HPA) axis, contributing to increased anxiety, behavioral disturbances, and impaired cognitive development later in life.

The Georgian context presents unique challenges that may contribute to the underutilization of SSC. Despite national

policies supporting breastfeeding and improvements in neonatal care, implementation remains inconsistent. High rates of cesarean delivery, limited SSC protocols in neonatal intensive care units, insufficient healthcare provider training, and systemic barriers within maternity care settings all contribute to delayed or absent mother–infant contact. Additionally, during periods such as the COVID-19 pandemic, infection control measures further restricted opportunities for early SSC, exacerbating existing gaps in care.

Conclusion.

In conclusion, no clear link could be established between lack of early skin-to-skin contact in infancy and behavioral and developmental challenges.

Despite the study's conclusion, skin-to-skin contact during the newborn period is crucial.

It is desirable to minimize the deficit of skin-to-skin contact, as it provides the most important benefits to the newborn and may establish the groundwork for his or her proper neurodevelopment.

A particular focus of our interest was whether the positive involvement of parents later in the child's life could compensate for the absence or deficiency of early skin-to-skin contact. In other words, we sought to explore whether sustained parental engagement, emotional support, and responsive caregiving during childhood might mitigate the potential adverse effects associated with early mother–infant separation and reduced skin-to-skin contact in the neonatal period.

Skin-to-skin contact should be recognized not merely as a supportive or optional practice, but as a fundamental clinical intervention with both immediate and lasting benefits. Its role in promoting successful breastfeeding, enhancing maternal–infant bonding, stabilizing neonatal physiology, and supporting optimal brain development is well supported by both our study findings and existing international evidence.

Importantly, this issue has become increasingly relevant in Georgia amid evolving reproductive and social trends. The rising utilization of surrogacy, cesarean section, and assisted reproductive technologies, both globally and within Georgia, alongside the growing prevalence of single-parent families, further emphasizes the need for systematic attention to the organization and timely initiation of skin-to-skin contact. These changes introduce new practical challenges for neonatal care systems, particularly regarding the immediate availability of caregivers and the standardization of SSC practices across diverse birth scenarios.

Importantly, this issue is becoming increasingly relevant in Georgia in light of evolving reproductive and social trends. The growing number of births resulting from surrogacy and assisted reproductive technologies, as well as the increasing prevalence of single-parent families, introduces new challenges in ensuring the timely implementation of SSC. In surrogacy cases, intended parents may not always be present at delivery or may decline immediate contact with the newborn, while in situations involving single mothers or maternal health complications, the capacity to initiate SSC may be limited. These scenarios raise critical clinical and ethical questions regarding responsibility for initiating early contact and ensuring that the newborn does not experience unnecessary separation.

International experience suggests that SSC can be successfully implemented through alternative caregivers, such as fathers or other designated individuals, when the biological or intended mother is unavailable. However, such practices are not yet systematically integrated into the Georgian healthcare system and remain inconsistently applied.

For the Georgian healthcare system, these findings highlight the need to strengthen and standardize clinical protocols, enhance healthcare provider training, and ensure the consistent implementation of SSC across all maternity and neonatal care settings. Furthermore, adapting international guidelines to local realities—particularly in the context of surrogacy and single parenthood—should be considered a priority. Addressing these gaps and recognizing SSC as a standard of care rather than an optional practice has the potential to significantly improve early childhood developmental outcomes at the population level and contribute to healthier long-term societal well-being.

In addition, an important and still-debated issue in international practice concerns who should provide skin-to-skin contact

when the mother is unavailable. In several European healthcare settings, it is not uncommon for alternative caregivers to assume this role, including extended family members or, in some cases, trained healthcare staff. While such approaches are intended to prevent neonatal deprivation of physical contact, they raise ethical, cultural, and clinical concerns. The involvement of non-parental individuals in early intimate contact with the newborn remains controversial, particularly in relation to parental consent, bonding processes, and cultural acceptability.

These differing practices highlight the lack of universally accepted standards and underline the need for clear guidelines that balance the physiological benefits of skin-to-skin contact with ethical considerations and family-centered care principles.

Future Perspectives.

Future research should focus on large-scale, longitudinal studies to more precisely quantify the long-term cognitive, behavioral, and psychosocial outcomes associated with early SSC practices in Georgia. Such studies would provide valuable evidence to inform national healthcare policies and clinical guidelines.

In addition, there is a need to develop and implement targeted interventions aimed at overcoming existing barriers to SSC. These may include training programs for healthcare professionals, integration of SSC protocols into neonatal intensive care settings, and public health campaigns designed to increase awareness among parents.

Expanding access to maternal education, particularly in rural areas, and strengthening support systems for breastfeeding mothers are also essential components of a comprehensive strategy. The involvement of multidisciplinary teams, including pediatricians, neonatologists, and nutritionists, will be crucial in ensuring the successful implementation of these initiatives.

Ultimately, prioritizing skin-to-skin contact as a standard of care represents a cost-effective and evidence-based approach to improving neonatal health and long-term developmental outcomes, with significant implications for public health in Georgia.

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აბსტრაქტი.

კანით: კანთან კონტაქტი ახალშობილთა მოვლის მნიშვნელოვანი კომპონენტია, რომელიც ფუნდამენტურ როლს ასრულებს მის ადრეულ ფიზიოლოგიურ სტაბილიზაციაში, ნეიროგანვითარებასა და დედა-შვილს შორის კავშირის დამყარებაში. სულ უფრო მეტი მტკიცებულება მიუთითებს, რომ კანით-კანთან კონტაქტის დეფიციტი, განსაკუთრებით მშობიარობის შემდგომ პერიოდში, დაკავშირებულია გრძელვადიან არასასურველ შედეგებთან, მათ შორის ემოციურ, ქცევით სირთულეებთან და კოგნიტური განვითარების დარღვევასთან. მნიშვნელოვანია, რომ ადრეულ ეტაპზე სკკ-ის არარსებობა ასევე უარყოფითად მოქმედებს ძუძუთი კვების დაწყებასა და გაგრძელებაზე, რითაც ზღუდავს მის არაერთხელ დადასტურებულ სარგებელს როგორც ჩვილებისთვის, ასევე დედებისთვის.

კვლევის კლინიკური კომპონენტისთვის გამოვლინდა და დეტალური შეფასებისთვის შეირჩა 4-6 წლის

ასაკის 16 ბავშვი, რომელთა მშობლების ინფორმაციით, ნეონატალურ პერიოდში აღენიშნებოდათ კანთან-კანის ადრეული კონტაქტის (SSC) შეზღუდვა, ხოლო დედისა და ახალშობილის განცალკევების ხანგრძლივობა მერყეობდა ერთი კვირიდან ორ თვემდე.

აღნიშნულ ბავშვებს აღენიშნებოდათ ქცევითი და განვითარების სირთულეების სხვადასხვა გამოვლინება. ამ ჯგუფიდან 4-6 წლის ასაკის 11 ბავშვი შეირჩა ცალკე ქვეჯგუფად დეტალური შეფასებისთვის. მათ შორის გამოვლინდა ქცევითი დარღვევები, შფოთვა, სოციალური ურთიერთობების სირთულეები, ყურადღების დეფიციტი და ძილის დარღვევები, მაგრამ არ ჰქონდათ განვითარების შეფერხება.

მეორე ქვეჯგუფში გაერთიანდა 5 ბავშვი, რომლებსაც აღენიშნებოდათ ქცევითი პრობლემები, მეტყველების განვითარების შეფერხება და ემოციური რეგულაციის სირთულეები და განვითარების შეფერხება. რის გამოც ისინი მიმართული იყვნენ ფსიქოლოგიური ინტერვენციისთვის.

ასევე შეირჩა 4-6 წლის ასაკის 15 ბავშვი, რომელთაც არ ჰქონდათ ადრეული კანთან-კანის კონტაქტის დეფიციტის ისტორია, თუმცა აღენიშნებოდათ მსგავსი ქცევითი და განვითარების სირთულეები როგორც პირველ ჯგუფში 11 ბავშვს და ისინი ასევე გადიოდნენ ფსიქოლოგიურ ინტერვენციას.

6-7-თვიანი თერაპიის დასრულების შემდეგ, მრავალ ფუნქციურ სფეროში დაფიქსირდა მნიშვნელოვანი გაუმჯობესება იმ ჯგუფების ბავშვებში, რომელთაც არ ჰქონდათ განვითარების შეფერხება მიუხედავად იმისა ჰქონდათ თუ არა კანით-კანთან კონტაქტის დეფიციტი დაბადებისას.

მიუხედავად იმისა, რომ აღნიშნული საკითხი საჭიროებს შემდგომ სიღრმისეულ შესწავლასა და ფართომასშტაბიან ანალიზს, ჩვენი კვლევის შედეგები, თუნდაც შეზღუდული რაოდენობის მონაწილეთა პირობებში, ხაზს უსვამს კანთან-კანის ადრეული კონტაქტის მნიშვნელობას, მის მრავალმხრივ სარგებელსა და შესაძლო როლს ბავშვის ნეიროგანვითარებაში.

მსოფლიოში მიმდინარე ტენდენციების ფონზე - მათ შორის სუროგაციის, დამხმარე რეპროდუქციული ტექნოლოგიების გამოყენებისა და მარტოხელა მშობლობის შემთხვევების ზრდის პირობებში, რაც შეინიშნება როგორც საქართველოში, ისე გლობალურად - ახალშობილსა და მის ძირითად მომვლელს შორის ადრეული ფიზიკური კონტაქტის უზრუნველყოფა სულ უფრო აქტუალურ მნიშვნელობას იძენს. შესაბამისად, საჭიროა SSC-ის მნიშვნელობის შესახებ ფართო დისკუსიის წახალისება, ცნობიერების ამაღლება და მისი ინტეგრირება სტანდარტულ კლინიკურ პრაქტიკაში.

Аннотация.

Контакт «кожа к коже» является одним из важнейших компонентов ухода за новорожденными, играющим фундаментальную роль в ранней физиологической стабилизации, нейроразвитии и формировании эмоциональной связи между матерью и ребёнком. Современные исследования показывают, что дефицит

контакта «кожа к коже», особенно в послеродовом периоде, связан с долгосрочными неблагоприятными последствиями, включая эмоциональные и поведенческие трудности, а также нарушения когнитивного развития. Важно отметить, что отсутствие контакта «кожа к коже» на раннем этапе негативно влияет на начало и продолжительность грудного вскармливания, тем самым ограничивая его многократно доказанную пользу как для матерей. Наше исследование было сосредоточено на клиническом состоянии детей в Грузии, у которых в раннем периоде отсутствовал контакт «кожа к коже». Исследование проводилось с использованием анкетного метода на основе информированного согласия родителей. В рамках клинического этапа исследования были выявлены и отобраны для углублённой оценки 16 детей в возрасте 4–6 лет, у которых, согласно данным, полученным от родителей, в неонатальном периоде имело место ограничение раннего контакта «кожа к коже» (Skin-to-Skin Contact, SSC). Продолжительность разлучения матери и новорождённого варьировала от одной недели до двух месяцев. У обследованных детей наблюдались различные проявления поведенческих и developmental нарушений. На основании клинических характеристик данная выборка была разделена на две подгруппы. В первую подгруппу вошли 11 детей в возрасте 4–6 лет с поведенческими нарушениями, тревожностью, трудностями социального взаимодействия, дефицитом внимания и нарушениями сна, при отсутствии признаков задержки психического развития. Вторую подгруппу составили 5 детей, у которых наряду с поведенческими проблемами отмечались задержка речевого развития, нарушения эмоциональной регуляции и общая задержка развития. Все дети данной подгруппы были направлены на психологическую коррекцию и сопровождение. В

качестве группы сравнения были отобраны 15 детей в возрасте 4–6 лет, не имевших в анамнезе дефицита раннего контакта «кожа к коже», однако демонстрировавших сходные поведенческие и эмоциональные трудности, сопоставимые с нарушениями, выявленными у детей первой подгруппы. Данные дети также проходили психологическую интервенцию. По завершении 6–7-месячного курса психологической терапии было отмечено статистически и клинически значимое улучшение показателей в различных функциональных сферах у детей без признаков задержки развития, независимо от наличия или отсутствия дефицита раннего контакта «кожа к коже» в неонатальном периоде. Несмотря на ограниченный объём выборки и необходимость дальнейших исследований с привлечением большего числа участников, полученные результаты свидетельствуют о потенциальной значимости раннего контакта «кожа к коже», его многогранном положительном влиянии на развитие ребёнка и возможной роли в процессах нейроразвития. В условиях современных демографических и социальных изменений, включая увеличение числа случаев суррогатного материнства, расширение применения вспомогательных репродуктивных технологий и рост числа неполных семей, наблюдаемых как в Грузии, так и во многих странах мира, обеспечение раннего физического контакта между новорождённым и его основным ухаживающим лицом приобретает особую актуальность. В связи с этим представляется важным дальнейшее изучение механизмов влияния SSC на развитие ребёнка, повышение осведомлённости специалистов и общества о значении данной практики, а также её более широкая интеграция в стандарты клинической помощи и неонатального сопровождения