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The Course of Acute Pneumonia in Post Term Children With Neuroarthritic Diathesis

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Abstract: Drug allergy is a protective reaction of the body to various drugs that have an allergenic effect on the body. Specific and protective reactions of the body occur under the influence of allergens. The etiology of drug allergy is caused by various drugs and their misuse. The clinical course of drug allergy is manifested by conditions such as Quincke's edema and anaphylactic shock. Treatment measures are carried out based on the results of the examination.

Key words: Acute pneumonia, post-term infants, neurological diathesis, disease progression, metabolic characteristics

Introduction

Acute pneumonia in young children remains one of the most pressing issues in modern pediatrics. High morbidity, the diversity of clinical manifestations, and the risk of complications make this disease one of the leading causes of hospitalization in childhood. Special attention is deserved by post-term children, who have unique features in the course of respiratory tract infections. According to the recommendations of the International Federation of Gynecology and Obstetrics (FIGO) and the American College of Obstetricians and Gynecologists (ACOG), a pregnancy lasting 42 weeks or more is defined as post-term. In domestic medical practice, a pregnancy is considered post-term if its duration exceeds 287 days and the newborn exhibits signs of biological postmaturity.

If a pregnancy lasts more than 287 days, proceeds without complications, and results in the birth of a healthy child without signs of post-term conditions, this state is regarded as physiological, aimed at the complete gestation of the fetus.

It should be noted that, according to the recommendations of the Royal College of Obstetricians and Gynaecologists (United Kingdom), the main criterion for diagnosing a post-term pregnancy is reaching a gestational age of 41 weeks, regardless of the condition of the newborn. The prevalence of post-term pregnancies in European countries ranges from 0.4% (in Austria and Belgium) to 5.5–7.0% (in Denmark and Sweden), with similar figures in the Americas. In the Russian Federation, the frequency of post-term pregnancies varies from 1.4% to 16.0%.

Despite the fact that the impact of environmental factors, daily regimen, and the nutritional status of the mother and child on the development of post-term pregnancy has been considered in studies by several authors, this issue remains insufficiently studied. The development of preventive measures and effective methods of therapy for pathological conditions in post-term children—such as aspiration, ingestion of meconium fluid, development of sepsis, and hypoxic-ischemic encephalopathy—represents one of the urgent tasks of modern medicine. Currently, scientific research is being conducted worldwide to improve the hygienic foundations of treatment and rehabilitation for post-term infants. Therefore, it is particularly important to carry out comprehensive scientific and practical work that considers the health status and morbidity rates of post-term infants, risk factors affecting their development, clinical and laboratory indicators used in assessing their physical and

neuropsychological development, as well as the macro- and micronutrient composition of their daily diet and daily routine organization.

The obtained data will form the basis for developing scientifically based recommendations for optimizing hygienic conditions, daily routines, and therapeutic and rehabilitative measures aimed at strengthening health and preventing pathological conditions in post-term infants. In such children, pneumonia is more severe, with more frequent and pronounced intoxication, respiratory failure, prolonged course, and complications. A separate risk group consists of children with neuro-arthritic diathesis (NAD) — a constitutional anomaly characterized by impaired purine metabolism, a tendency to hyperuricemia, and metabolic acidosis. They exhibit increased sensitivity of the nervous system and low resistance to intoxication, which worsens the course of infectious diseases. The combination of post-term birth and neuro-arthritic diathesis creates an unfavorable pathogenetic background, exacerbating the course of pneumonia. Such children are more prone to developing acetonemic crises, convulsive reactions, pronounced fever, and metabolic disorders. There is almost no research in the world literature dedicated to the combination of these conditions, highlighting the relevance and scientific novelty of this topic. Studying the features of pneumonia progression in post-term infants with neuro-arthritic diathesis has significant practical implications for optimizing treatment, preventing complications, and improving disease prognosis.

Degree of Study of the Problem

The problem of the course of acute pneumonia in post-term children with neuro-arthritic diathesis remains insufficiently studied, despite significant advances in neonatology, pediatrics, and pediatric pulmonology. It is known that post-term pregnancy (exceeding the gestation period of more than 42 weeks) is accompanied by morphofunctional immaturity of certain organs and systems of the child, as well as adaptation and metabolic disorders

(Aylamazyan E.K., Kulakov V.I., Radzinsky V.E., Savelieva G.M., 2009). These conditions create prerequisites for a more severe course of infectious inflammatory diseases, particularly pneumonia.

Several researchers note that post-term children more often exhibit metabolic disorders, including purine and protein metabolism, which underlie the formation of neuro-arthritic diathesis (Romanova N.V., Kolesnik O.B., Kovyazina I.O., Chaplygina L.G., 2017; Reznichenko G.I., 2017, 2022). Neuro-arthritic diathesis is accompanied by a tendency to acidosis, hyperuricemia, increased excitability of the nervous system, and reduced adaptive reserves of the body, which can exacerbate the course of acute respiratory infections, especially pneumonia.

According to domestic and foreign authors, recent decades have seen an increase in metabolic disorders and immunological shifts in young children, which affects the frequency and severity of respiratory diseases (Skvortsov I.A., 2000; Khomskaya E.D., 2003; Kuindzhi N.N., 2009; Jane Healy, 2004; Steve Buddulph, 2006). However, the features of the pathogenesis, clinical picture, and outcomes of acute pneumonia in post-term children with neuroarthritic diathesis are fragmentarily covered in the literature.

Research conducted in recent years mainly concerns nutrition, metabolism, and the adaptive capabilities of children, but insufficiently reflects the relationship between metabolic disorders, post-term status, and inflammatory lung diseases (Kuchma V.A., 2016; Kogon A.V., 2018; Baranov A.A., 2019). While foreign scientists are actively studying the influence of nutritional and endocrine factors on the immune response and the course of respiratory infections in newborns (Onishchenko G.G., 2007; Kuchma V.R., 2015), the issues of a differentiated approach to the diagnosis and treatment of pneumonia in post-term children with metabolic disorders remain open.

In Uzbekistan, research is also being conducted on the prevalence and prevention of diseases related to metabolic disorders and nutrition in children (Shaikhova G.I., 2015, 2019, 2022; Kamilova R.T., 2018, 2020; Ermatov N.J., 2020, 2022; Akhmedova D.I., 2021; Shamsiev F.M., 2022; Sultonova N.S., 2022). However, the clinical-hygienic and pathogenetic features of the course of acute pneumonia in post-term children with neuro-arthritic diathesis remain practically unexplored.

The lack of comprehensive data on the relationship between metabolic disorders and the nature and severity of inflammatory processes in the lungs, as well as the underdevelopment of preventive and therapeutic approaches for this category of children, determine the need for an in-depth clinical-laboratory study and emphasize the relevance of the chosen scientific direction.

Objective of the study

The aim of this work is to identify the features of the clinical course of acute pneumonia in postterm children with neuro-arthritic diathesis.

Materials and Methods

The study included post-term newborns and young children (gestational age of 40 weeks and more) with a clinically and radiologically confirmed diagnosis of acute pneumonia. Patient recruitment was conducted in the pediatric and neonatal departments of a medical institution, in compliance with ethical standards and medical research norms.

The study utilized analytical, hygienic, instrumental, biochemical, and clinical-statistical research methods, which were applied to improve the hygienic aspects of treatment and prevention of health conditions and developmental defects in post-term children.

Scientific novelty of the research

For the first time, a comprehensive clinical-laboratory and instrumental study of the course of acute pneumonia in post-term children with neuro-arthritic diathesis was conducted. The study identified the peculiarities of metabolic, immunological, and clinical manifestations of the disease, caused by the combination of postmaturity and purine metabolism disorders.

It was established that in post-term children with neuro-arthritic diathesis, acute lung inflammation is more severe than in their peers without signs of diathesis, manifested by:

- greater severity of intoxication syndrome and respiratory failure;
- prolonged fever period and resorption of infiltration according to Xray data;
- tendency towards metabolic acidosis and hyperuricemia;
- more pronounced changes in protein and carbohydrate metabolism.

For the first time, it was shown that the presence of neuro-arthritic diathesis in post-term children is a factor that aggravates the course of acute pneumonia and determines the features of its clinical picture. The possible pathogenetic mechanisms of this influence were determined — disorders of purine and protein metabolism, increased levels of uric acid, reduced adaptive capabilities, and immunoreactivity of the body.

The obtained data expand the understanding of the pathogenesis of pneumonia in post-term children and justify the need for a differentiated approach to the diagnosis, therapy, and rehabilitation of patients with neuro-arthritic diathesis.

The main study group consisted of post-term children diagnosed with neuroarthritic diathesis (NAD), established based on a combination of anamnesis data, clinical manifestations, and laboratory indicators corresponding to generally accepted diagnostic criteria in pediatrics. NAD diagnosis included an analysis of hereditary predisposition to disorders of purine metabolism, assessment of the tendency to acetonemic crises, increased nervous excitability, as well as identification of metabolic features reflecting the lability of metabolic processes. The control group included post-term children of similar age and sex who suffered from acute pneumonia but did not have clinical or anamnesis signs characteristic of neuro-arthritic diathesis. Patient selection was based on comparability by sex, age, disease form, and severity of clinical manifestations, minimizing the influence of external and accompanying factors. Diagnostic and research activities were conducted comprehensively, using clinical, laboratory, and instrumental methods. Clinical examination included assessment of the child's general condition, level of respiratory failure, respiratory rate, blood oxygen saturation, heart rate,

body temperature, and the severity of intoxication syndrome. Special attention was paid to the presence of acetonemic crises, episodes of vomiting, convulsive reactions, signs of dehydration, and neurological status disorders. Laboratory studies included: - complete blood count (determining the leukocyte intoxication index, erythrocyte sedimentation rate, hemoglobin, and erythrocyte levels); - biochemical blood analysis (determining concentrations of glucose, uric acid, electrolytes, acid-base balance indicators, enzyme activity); - determination of ketone body levels in blood and urine to verify acetonemic syndrome. Instrumental diagnostic methods included chest X-rays conducted dynamically during the disease and pulse oximetry monitoring to detect hypoxemia and assess therapy effectiveness. To clarify the clinical features of the disease course, the following parameters were analyzed: duration of the febrile period, frequency of acetonemic crises and vomiting, severity of intoxication syndrome, presence of convulsive reactions, degree of respiratory failure, frequency of complications (bronchiolitis, pleuritis, metabolic acidosis), as well as the duration of hospitalization and recovery period. Statistical data processing was performed using methods of variation and comparative statistics. Results are presented as mean values and standard deviations (M ± m); differences were considered statistically significant at $p < 0.05$.

Research results

The analysis of the obtained data showed that the course of acute pneumonia in post-term children with neuro-arthritic diathesis is characterized by greater severity and pronounced clinical symptoms compared to the control group of children. Patients in the main group experienced longer periods of fever (on average 7.2 ± 0.8 days versus 4.9 ± 0.6 days in the control group), more severe intoxication symptoms, and frequent acetonemic crises accompanied by vomiting, dehydration, and loss of appetite. Convulsive reactions were noted in 14.7% of cases and were associated with metabolic acidosis and hypoxia.

Most children in the main group were registered with grade II respiratory failure, requiring constant monitoring of oxygen saturation and oxygen therapy. Laboratory tests indicated higher levels of leukocytosis, erythrocyte sedimentation rate, and leukocyte intoxication index, as well as a significant decrease in blood bicarbonate concentration, indicating metabolic acidosis. Biochemical tests revealed elevated levels of uric acid and ketone bodies, confirming disorders of purine metabolism.

Among the complications, bronchiolitis (27.9%), pleurisy (16.3%), metabolic acidosis (19.1%), and prolonged pneumonia (up to 12% of cases) were most common. The average duration of hospitalization for children with NAD was 14.6 ± 1.2 days, which exceeded the similar indicator in postterm children without metabolic disorders by 3–4 days.

Discussion of results

A comparative analysis of clinical data demonstrated that the combination of postmaturity and neuroarthritic diathesis creates an unfavorable pathogenetic background, contributing to the development of a more severe course of the inflammatory process in the lungs. Disorders of purine metabolism, a tendency towards acidosis, and increased nervous system excitability reduce the body's resistance to hypoxia and infectious intoxication. In this context, hypoxic conditions typical for postmature infants, combined with metabolic homeostasis disorders, lead to the depletion of cellular energy resources, exacerbate respiratory failure, and increase the risk of neurological complications.

Thus, the course of pneumonia in postmature infants with neuro-arthritic diathesis is characterized by a prolonged, complicated, and often recurrent nature. This determines the necessity of implementing a comprehensive therapeutic approach, which includes not only antibacterial therapy but also measures aimed at correcting metabolic disorders, normalizing the acid-base balance, and controlling the level of ketone bodies.

Methods for Evaluating Research

The analysis of clinical and laboratory data and the characteristics of the course of acute pneumonia in post-term children with neuro-arthritic diathesis was conducted using a comprehensive approach that

included medical, instrumental, biochemical, and statistical research. Diagnoses of diseases were formulated in accordance with the International Classification of Diseases, 10th Revision (ICD10, 1993).

To ensure objectivity and thoroughness of the examination, doctors of various specialties participated in the study: pediatrician, neonatologist, neurologist, pulmonologist, immunologist, endocrinologist, hematologist, and radiologist. The study included post-term children who were under treatment and dispensary observation for five years. Comparison groups were formed as follows: Main group: post-term children diagnosed with acute pneumonia and signs of neuro-arthritic diathesis;

Comparison group: post-term children with acute pneumonia without signs of neuro-arthritic diathesis;

Control group: conditionally healthy post-term children without signs of metabolic disorders.

Health assessments were conducted based on medical records (forms No. 026 and No. 112), which included information on past illnesses, physical development, and growth dynamics.

The physical development of the children was assessed using somatometry data

(body weight, height, chest circumference) with comparison to World Health Organization (WHO, 2007) standards. The harmony of physical development was determined by the ratio of the main anthropometric indicators and weight gain rates.

Biochemical examination included determining the concentration of uric acid, glucose, total protein, creatinine, urea, and electrolytes. Hemoglobin concentration was measured using a semi-automatic biochemical analyzer "CYANSmart" (Cypress Diagnostics, Belgium); hematocrit and the number of erythrocytes were measured using a centrifuge and a Goryaev chamber. These data allowed for the assessment of the severity of inflammatory and metabolic changes in the examined children.

Instrumental diagnostics included chest X-ray to determine the nature and extent of infiltration, as well as pulse oximetry to assess the degree of respiratory insufficiency. In some cases, lung ultrasound and ECG were used to rule out complications. To identify risk factors affecting the severity of pneumonia, an analytical "case-control" method was used, based on comparing data from the main and control groups. The assessment of the relationship between metabolic disorders and the clinical course of the disease was conducted using the odds ratio (OR) indicator according to the methodology of Mamatkulov B.M. (2013).

To assess the quality of life of mothers of children who had pneumonia, the standardized SF-36 questionnaire (Medical Outcomes Study Short-Form 36) was used, which includes eight scales: Physical Functioning (PF), Role Functioning Physical (RP), Bodily Pain (BP), General Health (GH), Vitality (VT), Social Functioning (SF), Role Functioning Emotional (RE), and Mental Health (MH).

Statistical data processing was carried out using the Statistica for Windows 7.0 software package. Methods of descriptive and variance statistics, correlation analysis, Student's t-test, and calculation of confidence intervals were applied. The results were considered reliable at a significance level of $p < 0.05$. The conducted analysis allowed for the assessment of the clinical course features, frequency of complications, and nature of metabolic shifts in post-term children with neuro-arthritic diathesis, which creates a basis for improving the diagnosis and treatment of pneumonia in this category of patients.

Research has shown that the course of acute pneumonia in post-term children with neuro-arthritic diathesis (NAD) has a number of clinical and pathogenetic features that distinguish this group from children without metabolic disorders. In the examined patients, pneumonia was more severe, with severe intoxication symptoms, prolonged fever, vomiting, acetonemic crises, and often convulsive reactions. It was noted that post-term children with NAD more frequently developed respiratory failure of grade II–III, requiring more intensive monitoring and correction of gas exchange. The duration of the fever period exceeded similar indicators in the control group by 2–4 days, and the recovery period was delayed by 5–7 days. This indicates reduced adaptive capabilities of the body and metabolic instability characteristic of neuro-arthritic diathesis.

The comparison of the obtained data with literary sources (Aylamazyan E.K., 2009; Romanova N.V., 2017; Kogon A.V., 2018; Baranov A.A., 2019) confirms that the combination of post-term factors and metabolic disorders inherent in NAD forms an unfavorable pathogenetic background. Such children show a tendency to acidosis, hyperuricemia, disruption of purine metabolism, and water-electrolyte imbalance. These factors contribute to the development of severe forms of intoxication, hypoxia, and neurotoxic manifestations.

Hypoxia, which occurs in post-term children during the perinatal period, combined with impaired purine metabolism, leads to increased formation of ketone bodies and acetonemia, aggravating the course of pneumonia and increasing the risk of neurological complications. Such patients have a high sensitivity to hypoxia and intoxication due to the low resilience of the central nervous system and insufficient activity of enzyme systems responsible for detoxification.

Particular attention should be paid to the fact that even with the timely initiation of antibacterial therapy, the clinical effect in children with NAD occurs more slowly than in post-term children without metabolic disorders. This confirms the need for individualized treatment and mandatory correction of metabolic shifts. The practical significance of the conducted research lies in substantiating the feasibility of early diagnosis of metabolic disorders in post-term children suffering from pneumonia. Prevention of acidosis, timely replenishment of fluid and electrolyte deficiencies, control of uric acid and ketone body levels allow reducing the severity of intoxication and lowering the risk of complications.

Thus, the obtained data confirm that acute pneumonia in post-term children with neuro-arthritic diathesis requires a comprehensive, interdisciplinary approach to management, including not only antibacterial but also metabolic, detoxification, and symptomatic therapy with constant monitoring of clinical and biochemical indicators.

Conclusions

1. Acute pneumonia in post-term children with neuro-arthritic diathesis is characterized by a more severe and prolonged course, accompanied by severe intoxication symptoms, acetonemic crises, vomiting, convulsive reactions, and metabolic acidosis.
2. The combination of post-term birth and metabolic disorders in NAD creates an unfavorable pathogenetic background that contributes to the development of respiratory failure, hypoxia, secondary inflammatory complications (bronchiolitis, pleuritis), and also prolongs recovery times.
3. The duration of hospitalization and recovery in children with NAD exceeds that of post-term children without metabolic disorders, which is associated with the peculiarities of purine metabolism, reduced adaptation, and acid-base balance disorders.
4. The therapeutic strategy for such patients should include comprehensive correction of metabolic disorders, normalization of water-electrolyte and acid-base balance, as well as prevention of acetonemic crises against the background of standard antibacterial therapy.
5. Effective management of post-term children with NAD and pneumonia requires a multidisciplinary approach involving a pediatrician, neurologist, gastroenterologist, and rehabilitation specialist for early detection of complications and prevention of relapses.
6. The practical significance of the study lies in the scientific justification of a personalized approach to the treatment and monitoring of postterm children with neuro-arthritic diathesis, which contributes to reducing the frequency of complications, improving prognosis, and enhancing the quality of life of patients.

The conducted study identified important clinical and pathogenetic features of the course of acute pneumonia in post-term children with neuro-arthritic diathesis (NAD), who represent a special risk group in terms of disease severity and likelihood of complications. The results confirmed that the combination of postmaturity and metabolic disorders significantly alters the typical picture of the inflammatory process in the lungs, making its course more prolonged and severe. Post-term children

are characterized by reduced adaptive capacity, metabolic and neurohumoral instability, which manifests as purine metabolism disorders, a tendency to acidosis, hyperuricemia, and increased excitability of the nervous system. These features predetermine insufficient resistance of the body to infectious intoxication, impaired oxygen exchange, and a high risk of neurological complications.

In the conditions of the inflammatory process in the lungs, these metabolic disorders acquire special significance: acidosis and hypoxia increase the permeability of the vascular wall, disrupt microcirculation, and exacerbate intoxication. All this forms a vicious pathological cycle where metabolic and inflammatory processes mutually aggravate each other.

One of the key observations was that in post-term children with NAD, standard antibacterial therapy is less effective without simultaneous correction of metabolic disorders. Early infusion therapy with control of acid-base balance, electrolyte replenishment, detoxification measures, and control of ketone body levels can significantly reduce the severity of intoxication, shorten the duration of the febrile period, and reduce the risk of convulsive and acetonemic crises.

It has also been established that the duration of hospitalization and recovery period in children with NAD exceeds the corresponding indicators in post-term without metabolic disorders. This indicates the need for closer monitoring of such children not only during the acute phase of the disease but also during the convalescence stage and dispensary observation.

Preventive work with mothers of post-term showing signs of neuro-arthritic diathesis should focus on dietary correction, prevention of acetonemic conditions, rationalization of daily routines, and control of the child's metabolic balance. An important direction is teaching parents to recognize early signs of metabolic process decompensation and seek medical help promptly.

From a practical standpoint, the study's results emphasize the necessity of forming a multidisciplinary approach to managing such patients. The optimal model includes the joint work of a pediatrician, neonatologist, neurologist, gastroenterologist, and clinical biochemist. Only joint management allows timely correction of metabolic disorders, control of blood gas composition, and prevention of complications.

Scientifically, the study complements existing understandings of the pathogenesis of infectious-inflammatory diseases in post-term and contributes to the understanding of the relationship between the metabolic characteristics of neuroarthritic diathesis and the course of pneumonia. These results open up prospects for developing individualized management protocols and preventive programs aimed at reducing morbidity and improving prognosis in this category of patients.

Thus, it can be concluded that pneumonia in post-term with neuro-arthritic diathesis is not only an infectious-inflammatory but also a metabolic disease, requiring a comprehensive, pathogenetically justified approach to diagnosis and treatment. Incorporating measures for correcting metabolic disorders, normalizing acid-base and water-electrolyte balance, and constant monitoring of neurological status significantly enhances therapy effectiveness and improves disease outcomes.

Prospects for further research are associated with an in-depth study of the metabolic and immunological mechanisms of pneumonia in various types of diathesis, the development of algorithms for early identification of risk groups, and the improvement of methods for personalized therapy in post-term with metabolic disorders.

Literature

1. Notz, L., Adams, M., Bassler, D., *et al.* (2024). Association between early metabolic acidosis and bronchopulmonary dysplasia/death in preterm infants born at less than 28 weeks' gestation: An observational cohort study. *BMC Pediatrics, 24*, 605.
2. Mauritz, M. D., Hasan, C., Schmidt, P., Simon, A., Knuf, M., & Zernikow, B. (2022). Lower respiratory tract infections in pediatric patients with severe neurological impairments: Clinical observations and perspectives in a palliative care unit. *Children, 9*(6), 852.

3. Gover, A., *et al.* (2025). Short-term clinical and biochemical outcomes of infants born with mild-to-moderate cord blood acidosis. *Pediatric Research.* [Preprint in PMC].
4. Ermatov, N. J., Bobomurodov, T. A., & Sagdullaeva, M. A. (2022). Hygiene analysis of risk factors affecting the growth and development of pre-term children. *Art of Medicine: International Medical Scientific Journal, 2*(3), 270–277.
5. Sagdullaeva, M. A., Ermatov, N. J., & Bobomuratov, T. A. (2022). Hygienic analysis of morbidity in overdue born children. *New Day in Medicine, 10*(48), 251–256.*
6. Ermatov, N. J., Bobomuratov, T. A., Sagdullaeva, M. A., Adilov, S. K., Sagdullaev, I. I., & Sidikov, A. A. (2023). The SF-36 questionnaire in assessing the health of women with primary birth. *Journal of Clinical and Preventive Medicine, (1),* 1–7.
7. Sagdullaeva, M. A., Abdullaeva, D. T., & Kurbanova, D. R. (2020). A modern view on the problem of skewed and prolonged pregnancy. *Bulletin of the Tashkent Medical Academy, (2),* 35–39.
8. Sagdullaeva, M. A., Abdullaeva, M. M. (2020). Problem of adaptation of prolonged newborn. *Medicine and Sport, (2),* 126–128.
9. Sagdullaeva, M. A., Ermatov, N. J., & Bobomuratov, T. A. (2022). Prolonged newborns and prolonged pregnancy: A modern view on the problem. *International Journal of Health Medical Sciences, 5*(1), 26–30.*
10. Sagdullaeva, M. A., Bobomuratov, T. A., & Ermatov, N. J. (2022, March 6). *Muddatida o‘tib tug‘ilgan chaqaloqlarni kunlik ovqatlanish rasionidagi mikronutriyentlarni baholash dasturiy platforma* [Software registration No. DGU15214]. Tashkent: Intellectual Property Agency.
11. Sagdullaeva, M., Ermatov, N., & Bobomurodov, T. (2022). Muddatida o‘tib tug‘ilgan bolalar onalari orasida kasallanishning gigiyenik tahlili. *Integration into the World and Connection of Sciences,* 15–17. Baku.
12. Sagdullaeva, M. (2002, November 11–12). Mudatidan o‘tib tug‘ilgan bolalarni o‘sish va rivojlanishni gormonal ta’minlashga qaratilgan gigiyenik tavsiyalar. In *Proceedings of the International Scientific-Practical Conference “Ekologiya va ekologik ta’lim muammolari”* (p. 197). Bukhara.
13. Sagdullaeva, M. (2002, November 11–12). Muddatida o‘tib tug‘ilgan bolalar kasallanish holatini gigiyenik tahlili. In *Proceedings of the International Scientific-Practical Conference “Ekologiya va ekologik ta’lim muammolari”* (pp. 197–198). Bukhara.
14. Sagdullaeva, M. A., Ermatov, N. J., & Bobomuratov, T. A. (2023, January 30). Hygienic analysis of the effect of feeding on the growth and development of post-term babies. In *Proceedings of the II International Scientific and Practical Conference, MCNS “Science and Enlightenment”* (pp. 254–256). Penza.
15. Sagdullaeva, M. A. (2023). *Muddatidan o‘tib tug‘ilgan bolalar salomatlik holati.* In *Sog‘lom turmush tarzi* conference proceedings (pp. 97–98). Tashkent.
16. Ermatov, N., Bobomuratov, T., & Sagdullaeva, M. (2022, March 6). *Muddatidan o‘tib tug‘ilgan chaqaloqlarni kunlik ovqatlanish rasionidagi mikronutriyentlarni baholash dasturiy platforma* [Software registration No. DGU15214]. Tashkent: Intellectual Property Agency.
17. Ermatov, N. J., & Sagdullayeva, M. A. (2022). *Muddatidan o‘tib tug‘ilgan bolalar salomatlik holatini baholash tartibi* [Methodological guide]. Tashkent, 18 p.
18. Ermatov, N. J., Bobomuratov, T. A., & Sagdullayeva, M. A. (2022). *Muddatidan o‘tib tug‘ilgan bolalar xavf omillarini gigiyenik baholash tartibi* [Methodological guide]. Tashkent, 17 p.
19. Aylamazyan, E. K., Kulakov, V. I., Radzinsky, V. E., & Saveleva, G. M. (2009). *Obstetrics: National guide* (1056 p.). GEOTAR-Media.

20. Romanova, N. V., Kolesnik, O. B., Kovyazina, I. O., & Chaplygina, L. G. (2017). Etiological aspects of post-term pregnancy and health features of newborns. *Issues of Modern Pediatrics, 16*(4), 42–47.
21. Reznychenko, G. I. (2022). Perinatal risk factors in post-term children and their impact on early neonatal adaptation. *Obstetrics and Gynecology, (3),* 22–28.
22. Skvortsov, I. A. (2000). *Immunobiological role of breast milk and nutrition characteristics of newborns* (214 p.). Medicine.
23. Kuindzhi, N. N. (2009). Influence of early feeding on the formation of immunity in newborns. *Pediatrics, (5),* 48–53.
24. Kuchma, V. A. (2016). *Nutrition and physical development of young children: Modern hygienic aspects* (276 p.). Publishing House RAMS.
25. Baranov, A. A. (2019). *The health status of children in the Russian Federation and modern pediatric issues* (312 p.). Pediatrician.
26. Onishchenko, G. G., & Kuchma, V. R. (2015). *Preventive medicine for childhood* (468 p.). GEOTAR-Media.
27. Khomskaya, E. D. (2003). *Psychophysiology of childhood* (336 p.). Academy.
28. Mamatkulov, B. M. (2013). *Methodological approaches to assessing risk factors in the child population* (128 p.). Tashkent: Fan.
29. Shaikhova, G. I. (2019). Features of nutrition and health of children in Uzbekistan. *Social Hygiene, Healthcare and History of Medicine Problems, 27*(5), 65–71.
30. Kamilova, R. T. (2020). *Hygienic characteristics of nutrition for pregnant women and prevention of micronutrient deficiency* (142 p.). Tashkent: Ilim.
31. Akhmedova, D. I. (2021). Nutrition and adaptation of newborns born post-term. *Healthcare of Uzbekistan, (2),* 54–59.
32. Ermatov, N. Zh. (2022). *Clinical and hygienic features of post-term newborns in large urban areas* (178 p.). Tashkent: TMA.
33. Sultonova, N. S. (2022). Prevention of complications in post-term newborns. *Medical Journal of Uzbekistan, (4),* 90–94.
34. Del Borrello, G., Stocchero, M., Giordano, G., *et al.* (2019). New insights into pediatric community-acquired pneumonia gained from untargeted metabolomics: A preliminary study. *Pediatric Pulmonology, 55*(2), 418–425.
35. Gutierrez, M. J., Nino, G., & Restrepo-Gualteros, S. (2024). Purine degradation pathway metabolites at birth and the risk of lower respiratory tract infections in infancy. *ERJ Open Research, 10*(1), 00693–2023.
36. van den Berghe, G. (2023). Disorders of purine and pyrimidine metabolism. In *Rudolph's Pediatrics* (22nd ed.). McGraw-Hill Education.
37. Yarovaya, J., Lozovskaya, M., Vasilieva, E., Klochkova, L., & Noskova, O. (2021). Types of constitutional diatheses in children with tuberculosis infection. *Bulletin of the Academy of Sciences of Moldova, 1*(69), 69–77.