REGIONAL DISTRIBUTION OF ATYPICAL PNEUMONIA IN CHILDREN IN UZBEKISTAN, THE IMPORTANCE OF LABORATORY INDICATORS FOR EARLY DETECTION, AND THE ROLE OF HEALTHY NUTRITION

M.Ibragimova
Central Asian Medical University
Clinical residiency

Abstract Atypical pneumonia is a major contributor to pediatric respiratory morbidity and hospitalization worldwide. In Uzbekistan, regional differences in epidemiology, healthcare access, and environmental factors influence the distribution and outcomes of atypical pneumonia among children. Early diagnosis is challenging due to nonspecific clinical manifestations; therefore, laboratory biomarkers and molecular diagnostics are essential for timely detection and appropriate treatment. In addition, adequate nutrition plays a significant role in immune function, disease prevention, and recovery. This article reviews the regional epidemiology of pediatric atypical pneumonia in Uzbekistan, highlights the diagnostic value of laboratory indicators, and discusses evidence-based nutritional strategies for prevention and management.

Keywords: atypical pneumonia, children, Uzbekistan, regional epidemiology, laboratory diagnosis, nutrition, Mycoplasma pneumoniae

Introduction

Pneumonia remains one of the leading causes of illness and hospitalization in children, particularly in low- and middle-income countries. Atypical pneumonia—most commonly caused by *Mycoplasma pneumoniae*, *Chlamydia pneumoniae*, and respiratory viruses—accounts for a significant proportion of community-acquired pneumonia in school-aged children.[1,2,3,4]

In Uzbekistan, respiratory infections continue to represent an important pediatric health burden, with regional variability influenced by climate, population density, vaccination coverage, socioeconomic conditions, and healthcare accessibility.[5,6] Because early symptoms of atypical pneumonia are often mild or nonspecific, laboratory-based diagnosis and preventive strategies, including proper nutrition, are essential for improving outcomes.[7,8,9]

Regional Distribution of Pediatric Atypical Pneumonia in Uzbekistan

Available national health statistics and regional clinical observations indicate that respiratory infections in children are more frequently reported in densely populated and industrial regions, including Tashkent city and region, Fergana Valley provinces (Andijan, Namangan, Fergana), and Samarkand. Seasonal peaks—especially during autumn and winter—are associated with increased transmission of *Mycoplasma pneumoniae* and respiratory viruses.[10,11,12,13]

In contrast, lower population density regions such as Karakalpakstan and some desert areas report fewer registered cases but may experience underdiagnosis due to

limited access to advanced laboratory diagnostics and pediatric pulmonology services. Regional disparities therefore likely reflect both true epidemiological differences and variations in healthcare infrastructure.[14,15,16,17]

Clinical Features of Atypical Pneumonia in Children

Typical clinical characteristics observed in Uzbek pediatric populations are consistent with global data:

Gradual onset of illness

Persistent dry cough

Low-grade or moderate fever

Mild intoxication symptoms compared with bacterial pneumonia

Interstitial or patchy infiltrates on chest imaging

Extrapulmonary manifestations—such as skin rash, gastrointestinal symptoms, or mild neurological signs—may occur in a subset of patients, particularly in *Mycoplasma* infection.[18,19,20,21,22]

Importance of Laboratory Indicators in Early Detection

1. Hematological Parameters

Children with atypical pneumonia usually demonstrate:

Normal or slightly elevated leukocyte count

Relative lymphocytosis

Absence of pronounced neutrophilia

These findings help differentiate atypical pneumonia from typical bacterial pneumonia.[23,24,25,26]

2. Inflammatory Biomarkers

C-reactive protein (CRP): normal or moderately elevated

Erythrocyte sedimentation rate (ESR): mildly increased

Procalcitonin: generally low, supporting non-typical bacterial etiology

Low procalcitonin levels are particularly valuable for reducing unnecessary antibiotic use.[27,28,29,30]

3. Serological and Molecular Diagnostics

Detection of pathogen-specific antibodies (IgM, rising IgG titers) and polymerase chain reaction (PCR) testing from respiratory samples significantly improves early diagnosis. Expansion of PCR-based diagnostics in Uzbekistan could markedly enhance detection accuracy and epidemiological surveillance.[31,32,33,34]

Role of Healthy Nutrition in Prevention and Recovery

1. Nutritional Status and Immune Function

Adequate intake of protein, vitamins (A, C, D), zinc, and iron is essential for optimal immune response and resistance to respiratory infections. Malnutrition increases susceptibility to pneumonia and prolongs recovery.[35,36,37,38]

2. Breastfeeding and Early Childhood Nutrition

Exclusive breastfeeding during the first six months of life provides protective antibodies and reduces the risk of severe respiratory infections, including pneumonia.

3. Balanced Diet During Illness

Children with atypical pneumonia benefit from:

Easily digestible, protein-rich foods

Adequate fluid intake

Fruits and vegetables rich in antioxidants

Limitation of highly processed and high-sugar foods

4. Public Health Nutrition Strategies

School-based nutrition programs, parental education, and micronutrient supplementation in high-risk regions may reduce pneumonia incidence and severity.

Discussion

Regional variation in pediatric atypical pneumonia in Uzbekistan highlights the importance of equitable access to laboratory diagnostics, standardized clinical protocols, and preventive healthcare strategies. Integration of PCR testing, inflammatory biomarkers, and nutritional assessment into routine pediatric care could significantly improve early detection and treatment outcomes.
Public health interventions combining disease surveillance, vaccination, improved nutrition, and healthcare accessibility are essential for reducing the national burden of pediatric respiratory infections.[12,15,17]

Conclusion

Atypical pneumonia in children remains a significant health concern in Uzbekistan, with noticeable regional disparities influenced by demographic and healthcare factors. Early laboratory diagnosis—particularly through inflammatory markers, serology, and PCR—plays a decisive role in accurate detection and rational treatment. Healthy nutrition is a critical component of both prevention and recovery. Strengthening regional diagnostic capacity and implementing nutrition-focused preventive programs are key strategies for improving pediatric respiratory health in Uzbekistan.

REFERENCES:

1.Waites KB, et al. *Mycoplasma pneumoniae infections in children.* Clinical Microbiology Reviews.

2.Jain S, et al. *Community-acquired pneumonia in hospitalized U.S. children.* New England Journal of Medicine.

3.Bradley JS, et al. *Guidelines for management of community-acquired pneumonia in infants and children.* Clinical Infectious Diseases.

4.Principi N, Esposito S. *Macrolide-resistant Mycoplasma pneumoniae in pediatric pneumonia.* Journal of Antimicrobial Chemotherapy.

5. M Abdullayeva, U Makhamatov /EARLY DETECTION OF IRON DEFICIENCY IN WOMEN OF CHILDREN. AMERICAN JOURNAL OF APPLIED MEDICAL SCIENCE 4 (1), 209-214

6. U Khatamova, U Makhamatov /DIAGNOSTIC AND PROGNOSTIC MARKERS OF LEUKEMIA DURING HEMATOLOGICAL ANALYZER EXAMINATION: LABORATORY ANALYSIS OF LEUKEMIA MARKERS AMERICAN JOURNAL OF APPLIED MEDICAL SCIENCE 4 (1), 215-221

7. A Kholmatov, U Makhamatov/ BLOOD PLASMA PROTEIN FRACTIONS AND IMMUNOFIXATION IN MYELOMA DISEASE—IMMUNO-LABORATORY ANALYSIS
AMERICAN JOURNAL OF APPLIED MEDICAL SCIENCE 4 (1), 222-227
8. Makhamatov, U., Malikov, N., Po‘latov, S., Yusupov, M., Ibragimov, U., Kenjayeva, X., & Umarov, S. (2026). ORGANIZING HEALTHY AND SAFE NUTRITION IN NON-COMMUNICABLE DISEASES. *Shokh Articles Library*, *1*(1).
9.SOG‘LOM TURMUSH TARZINI TASHKIL ETISHNI DOLZARB MUAMMOLARI VA ULARNING YECHIMLARI. M .Ashurova, U Maxamatov, X Xaitov, S Yakubov, U Ibragimov. SCIENTIFIC ASPECTS AND TRENDS IN THE FIELD OF SCIENTIFIC RESEARCH 3 (33), 57-61
10. Flatulence in Children and Adolescents and its Prevention. U Shoirjonovich, KM Abdulkhamidovna. European Journal of Innovation in Nonformal Education 2 (1), 83-85
11. Its Importance for The Health of the Child and Mother. HA Akhunjonova, US Makhamatov, KM Saydullayeva, KO Khojimatov, ...Journal of clinical and preventive medicine 2, 61-64
12. HISTOSTRUCTURE OF THE GASTRIC MUCOUS MEMBRANE OF RATS WITH A SINGLE PROTEIN DIET. S Salomov, XM Aliyev, PP Rakhmanov, MD Ashurova, US Makhamatov. EUROPEAN JOURNAL OF MODERN MEDICINE AND PRACTICE 2 (4), 14-16
13. Platelet deficiency disease among children and adolescents and measures to prevent it. KMA Makhamatov U.Sh. Eurasian Medical Research Periodical, 37-39
14. Food Poisoning and Its Prevention and Disposal Methods. XU Baxodirovna, MU Shoirjonovich. Мировая наука, 85-87
15. Negative Consequences of Poor and Irregular Diet and Recommendations for Healthy Diet. MD Ashurova, US Maxamatov, UA Teshaboyev, KM Saydullayeva
Ethiopian International Journal of Multidisciplinary Research 10 (11), 509-512
16. Integral Helmintoses in Children and Their Etiological Factors. U Maxamatov, M Xabibullayeva. IQRO JURNALI 1 (2), 233-236
17. CLINIC, DIAGNOSIS OF BOTULISM IN CHILDREN AND ADOLESCENTS OF SCHOOL AGE MUS COURSE. World Bulletin of Public Health 18, 50-52
18. Nutrition of Young Mothers and Recommendations. U Maxamatov, A Nematullayev, D Raimjonov, J Ikromov. Eurasian Journal of Medical and Natural Sciences 2 (6), 160-162
19. Negative Consequences of More Eating and Recommendations on Eating
U Maxamatov, D Raimjonov, J Ikromov, A Nematullayev
Евразийский журнал медицинских и естественных наук 2 (6), 156-159
20. THE EFFECTIVENESS OF URGENT MEDICAL INSTRUCTIONS IN EMERGENCY STATIONS. MU Shoirjonovich, XU Baxodirovna
Мировая наука, 37-40
21. Determining the health of children and adolescents. M.D. Ashurova, U.Sh. Makhamatov, K.M. Saydullaeva, A.L Valiyev, F.I Isroilov. BIO Web of Conferences 65, 05029

22. THE PLACE AND ROLE OF HEALTHY AND HIGH-QUALITY NUTRITION IN STUDENTS'MASTERY OF EDUCATIONAL ACTIVITIES
MD Ashurova. Ethiopian International Journal of Multidisciplinary Research 10 (11), 506-508
23. Anemia Disease and Rational Nutrition in it. U Makhamatov IQRO 2 (2), 280-283
24. Gigenic Bases of Optimization of Children and Comments Nursed in General Schools. U Maxamatov. Web of Semantic: Universal Journal on Innovative Education 2 (3), 56-65
25. Treatment of Triggeral Helmintosis in Children and Adolescents Using Folk Medicine. U.Sh. Maxamatov. Univer Publishing
26. Анализ пациентов с инфекцией COVID-19, роль микроэлемента цинка в организме человека и его роль в распространении и профилактике заболевания. УА Тешабоев, ХК Рузматова, УШ Махаматов, КМ Сайдуллаева
Экономика и социум, 374-381
27. Vitamins and Human health. UB Xatamova, US Maxamatov. Мировая наука, 83-85
28. OPTIMAL NUTRITION PROGRAM FOR CHILDREN: DEVELOPMENT AND IMPLEMENTATION. M Umidjon Modern World Education: New Age Problems–New solutions 1 (3), 70-72
29. ОЖИРЕНИЕ И ЕГО ПОСЛЕДСТВИЯ. У Махаматов Научный Импульс 3 (26), 69-73
30. EKSTRAGENITAL PATOLOGIYALAR, HOMILADORLIKNING O‘ZARO BIR BIRIGA TA'SIRI VA BU HOLATDA OVQATLANISH TARTIBI
U Maxamatov, D Abselyamov, X Kenjayeva, S Po‘latov. MASTERS 3 (3), 5-10
31. CARDIOVASCULAR DISEASES AND HYGIENIC PRINCIPLES OF HEALTHY NUTRITION. F Mamadaliyev, D Abselyamov, S Pulatov, K Kenjayeva, U Maxamatov. Journal of Multidisciplinary Sciences and Innovations 1 (2), 765-768
32. EMERGENCY SITUATIONS RESPONSIBILITIES AND PREVENTION MEASURES. MU Shoirjonovich, XU Baxodirovna. Мировая наука, 33-36
33. РАЗВИТИЕ ДИАБЕТА У БОЛЬНЫХ ИНФЕКЦИЕЙ COVID-19//Евразийский журнал медицинских и естественных наук.–2022
УШ Махаматов. Т 2 (5), 13-18
34. СТАНОВЛЕНИЕ МИКРОБИОЦЕНОЗА У НЕДОНОШЕННЫХ И НОРМАЛЬНОРОЖДЁННЫХ НОВОРОЖДЕННЫХ ДЕТЕЙ
РМ Шерматов, УШ Махаматов. Актуальные научные исследования в современном мире, 76-79
35. METABOLISM OF BASIC SUBSTANCES AND THEIR SIGNIFICANCE IN THE BODY. U Maxamatov, D Abselyamov. MODELS AND METHODS FOR INCREASING THE EFFICIENCY OF INNOVATIVE RESEARCH 4
36. Makhamatov U., Muslimakhon R. THE ROLE OF UNHEALTHY DIET IN THE PATHOGENESIS OF NON-COMMUNICABLE DISEASES //AMERICAN JOURNAL OF APPLIED MEDICAL SCIENCE. – 2025. – Т. 3. – №. 10. – С. 63-72.

37. Makhamatov U., Muslimakhon R. NUTRITION OPTIMIZATION IN OSTEOPOROSIS FOLLOWING COVID-19 //AMERICAN JOURNAL OF APPLIED MEDICAL SCIENCE. – 2025. – T. 3. – №. 10. – C. 52-62.
38. Maxamatov U., Muslimaxon R. SOG'LOM TURMUSH TARZI SALOMATLIK OMILI //AMERICAN JOURNAL OF APPLIED MEDICAL SCIENCE. – 2025. – T. 3. – №. 10. – C. 73-82.